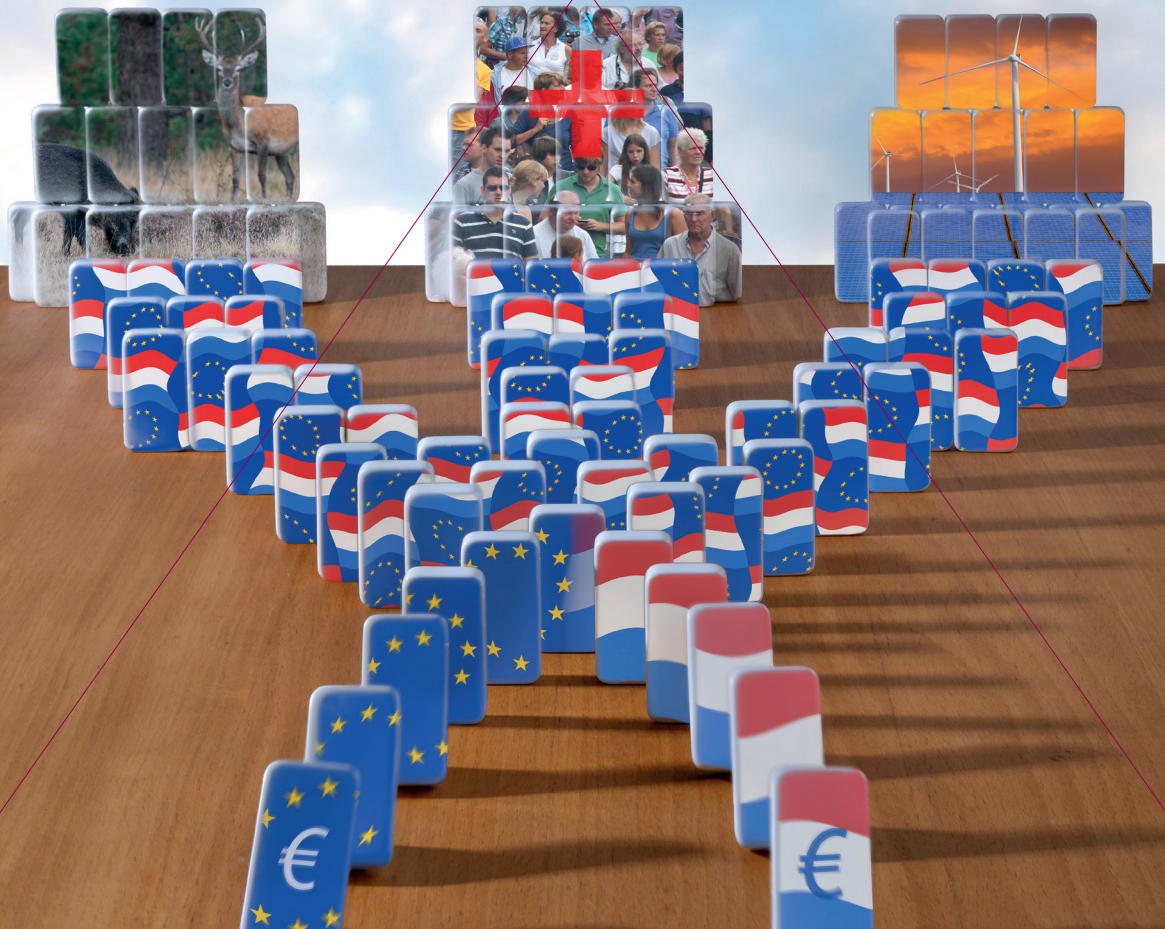


STRATEGIC INTERPLAY

COMBINE THE STRENGTHS OF THE NETHERLANDS AND
THE EU FOR GREATER RESEARCH AND INNOVATION IMPACT



The Dutch Advisory Council for Science, Technology and Innovation (AWTI) publishes solicited and unsolicited advisory reports to the Dutch government. Its independent reports are strategic in nature and focus on the contours of government science, technology and innovation policy. Council members are drawn from knowledge institutes and the business world. AWTI's work is founded on the principle that knowledge, science and innovation are vital for the economy and society, and will become more important in the future.

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Strategic interplay

Combine the strengths of the Netherlands and the EU for greater research and innovation impact

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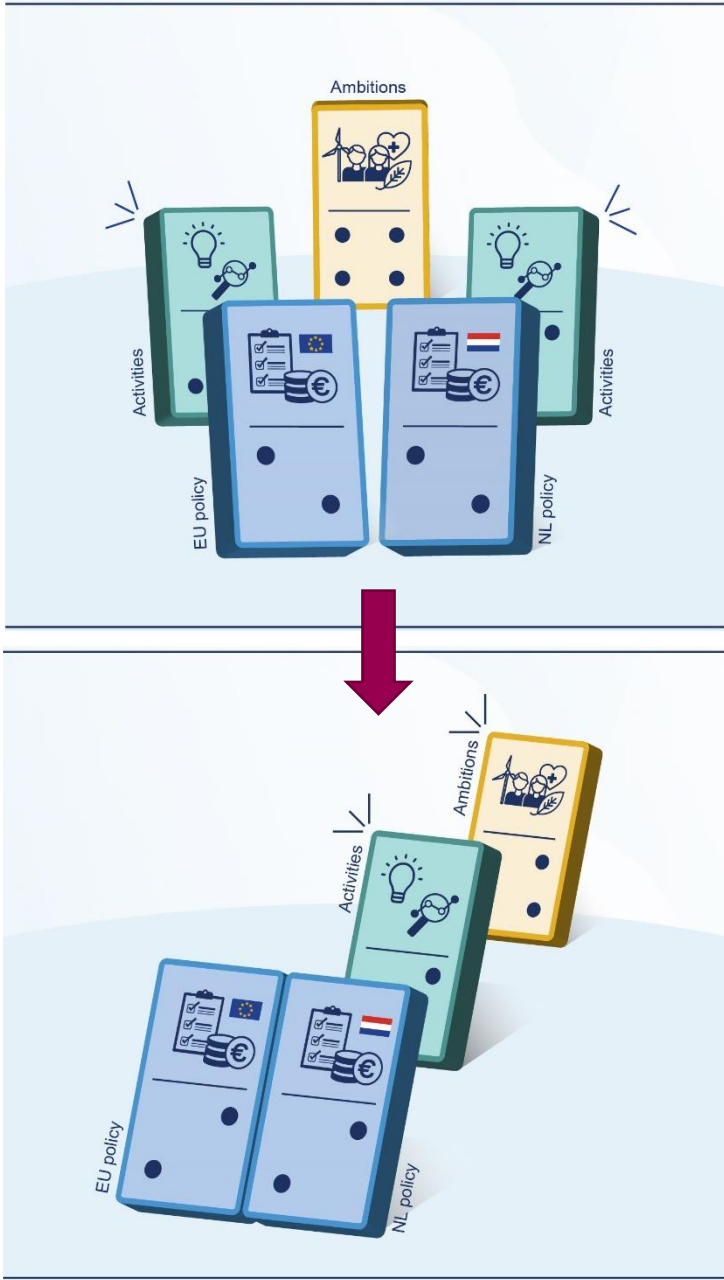
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Problem: Lack of joined-up policy undermines STI contribution to achievement of the ambitions



Advice: Ensure a coherent mix of EU and Dutch policy aimed at achieving ambitions

Summary

Science, technology and innovation (STI) are crucial for the future of the EU and the Netherlands: for the development of the EU and the Netherlands as knowledge economies and in the light of the many societal challenges we face. The EU accordingly formulates policy to promote STI, as the Netherlands does. How can we ensure that European and Dutch STI policy are better aligned and mutually reinforcing?

EU policy on STI offers many opportunities for all types of research and innovation. The EU's focus on excellence has helped steadily raise the bar for the standard of research in Europe. EU STI policy also promotes international cooperation. Compared with their counterparts in other countries, Dutch knowledge institutes, companies and other organisations make extensive use of the opportunities offered by the EU, but even so there are practical barriers which make access more difficult for certain actors, such as universities of applied sciences and SMEs.

One problem is that EU and Dutch policy on STI are relatively 'separate' from each other, each following its own direction and not in perfect alignment with each other. This means opportunities are missed to create 'leverage' in which one policy instrument can reinforce another. The Netherlands could also operate more effectively in Brussels to ensure better alignment between the Dutch and EU policy agendas. And while there is a strong focus on the resources needed to support research and innovation, the policy devotes much less attention to the impact: how much do the supported research and innovation activities actually contribute to the achievement of the policy ambitions?

Advice: Ensure a coherent mix of European and Dutch STI policy aimed at achieving the ambitions

The Dutch Advisory Council for Science, Technology and Innovation (AWTI) advises that European and Dutch policy on STI be treated as a single whole in which the different components are aligned in a way that creates a coherent policy mix. At the same time, it is key to ensure that the promoted STI activities actually contribute to achieving the ambitions. AWTI makes the following six recommendations for achieving this.

Recommendation 1: Ensure good alignment between Dutch and EU policy on STI so that they reinforce or complement each other

Treat Dutch and European policy on STI as a single whole. Maintain a clear view of the ambitions and create a coherent policy mix which serves those ambitions. Ensure that Dutch and EU policy instruments (including fiscal policy) reinforce or complement each other. Carry out a preliminary 'EU check' when designing Dutch STI policy, then make a considered judgement on how and where Dutch policy will align with this, and carry out a subsequent evaluation of the whole policy mix of national and EU instruments.

Recommendation 2: Take a proactive and strategic stance in Brussels with a focused agenda

The Netherlands could be more effective in Brussels if it focused on making a more strategic, selective and targeted contribution to EU policy processes. This requires a good national assessment framework and a clear agenda of what the Netherlands wishes to achieve through the EU. Operate proactively and take into account the specific Brussels playing field. Also reinforce the Dutch input in the phase of fleshing out EU STI instruments so that they are better aligned with the Dutch policy and agenda.

Recommendation 3: Continue to support basic research in the EU and link it more effectively to innovation

The Netherlands should continue to provide generous support for basic research within the EU STI policy and should advocate strengthening the links between basic research and (the instruments for) the practical application of knowledge where relevant.

Recommendation 4: Create regional links with EU STI policy

To enable the regions to make better use of the opportunities offered by EU policy and to ensure that regional and EU policy reinforce or complement each other, it is important to:

- a) take account of relevant EU policy in the regional innovation agenda;
- b) spend the regional EU funds in such a way that they reinforce other STI policy;
- c) help regional actors to make use of EU instruments;
- d) link regional ecosystems to promote inter-European collaboration.

Recommendation 5: Provide support in making use of EU instruments

Ensure that Dutch actors such as knowledge institutes and companies are able to make maximum use of the possibilities offered by EU instruments for STI, by ensuring well-organised support. Focus government support on those actors which (still) have more difficulty accessing EU instruments (such as universities of applied sciences and SMEs). Apart from support with applications, this also means support in growing these actors' relevant networks.

Recommendation 6: Safeguard opportunities for collaboration with attractive non-EU partners

The Netherlands must make efforts to keep open opportunities for collaboration with partners from Israel, the United Kingdom and Switzerland within the EU STI programmes. If this fails at any point, the Netherlands must work on bilateral options for collaboration where this offers clear added value.

Background and request for advice

1.1 Research and innovation of strategic importance for the EU

Marked changes are taking place on the world stage as regards the position of science, technology and innovation (STI). Several countries are making great efforts to gather new knowledge and make technological advances in order to strengthen their own position. The United States and China are good examples. These geopolitical trends are putting pressure on the openness which has long characterised EU policy on STI. Where for many years the EU credo was ‘*open innovation, open science, open to the world*’,¹ attention in European policy is now turning more towards ‘*open strategic autonomy*’ as a policy objective.² One of the underlying aims of the current EU Horizon Europe Framework Programme is to promote the strategic autonomy of the EU by stimulating innovation and research in emerging and key technologies such as Artificial Intelligence and micro/nanotechnology.³ Another example is the proposal for a European Chips Act aimed at making the European semiconductor industry a world leader.⁴ The recent New European Innovation Agenda also embodies the ambition of garnering a solid and leading position for the EU in the field of ‘deep tech’.⁵

At the same time, EU policy on STI has expanded steadily, and this has also led to a number of shifts over time.⁶ Where European support for research originally (i.e. in the 1980s) focused on pre-competitive research in international collaboration to foster

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1. European Commission, Directorate-General for Research and Innovation (2016), *Open innovation, open science, open to the world: a vision for Europe*, Publications Office of the EU.
 2. European Commission (2021a), *Communication of the European Commission on the Global Approach to Research and Innovation - Europe's strategy for international cooperation in a changing world*, Brussels, 18.05.2021, COM(2021) 252 final.
 3. European Commission, Directorate-General for Research and Innovation (2020), *Strategic Plan 2020-2024*; and: European Commission (2022c), *Key enabling technologies policy*, website: https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies_en.
 4. European Commission (2022a), *Chips Act for Europe*, Brussels, 08.02.2022, COM(2022) 45 final. See also Council conclusions of 1 December 2022 at <https://www.consilium.europa.eu/nl/meetings/compet/2022/12/01/>
 5. European Commission (2022b), *A New European Innovation Agenda*, 05.07.2022 COM(2022) 332 final. See also the Council conclusions of 2 December 2022 at <https://www.consilium.europa.eu/en/press/press-releases/2022/12/02/new-innovation-agenda-council-adopts-conclusions/>.
 6. For a comprehensive overview of the development of the European Framework Programmes in support of research and innovation, see: Reillon, V. (2017), *EU framework programmes for research and innovation. Evolution and key data from FP1 to Horizon 2020 in view of FP9*, Brussels: European Parliamentary Research Service (EPRS).

industrial development, in later years more and more other research and innovation activities also gradually became eligible for support. The goals were also broadened, with more attention for meeting societal needs and challenges.⁷ Support also became available for individual beneficiaries, such as researchers (initially through the ‘Marie Skłodowska-Curie Actions’ from 1996, and the European Research Council from 2007) and companies (through instruments targeting the SME sector). In the most recent (completed) Framework Programme, Horizon 2020, roughly a third of the budget was earmarked for individual beneficiaries (the rest for collaboration).

Most EU policy on STI has traditionally focused on specific themes or sectors⁸ but, particularly in recent decades, attention has been growing for *generic* support for research and innovation.⁹ The two top priorities of the European Commission in the current EU policy on STI, namely the Green Deal and digitalisation,¹⁰ set a clear direction for initiatives such as the New Industrial Strategy for Europe¹¹ or the Strategic Plan for Horizon Europe 2021-2024.¹² The focus is shifting away from ‘smart, sustainable and inclusive *growth*’ towards a growing emphasis on the sustainable and digital *transition*, and this is finding its way into EU policy on research and innovation. At the same time, there is a steadily growing emphasis on strengthening the competitiveness of European industry and avoiding new dependencies after the transition.¹³ Some policy instruments are linked to the substantive ambitions of the EU policy for the different sectors or themes: this is ‘specific’ policy. There are also a (smaller) number of generic instruments.

The balance between specific and generic policy is a continual source of debate, as is the question of which kinds of activities should receive support from the EU STI policy. It is important that the EU maintains a strong knowledge base, but at the same time it is noted

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7. From the Fifth Framework Programme (1999) onwards, societal needs/challenges have been an explicit goal of each Programme; see e.g.: Reillon (2017).
 8. In the first Framework Programme, around 85% of the budget was ‘thematic’; this proportion subsequently reduced in stages until it reached 60% in the (eighth) Framework Programme, Horizon 2020; see e.g.: Reillon (2017).
 9. The biggest generic instrument is the European Research Council, which accounted for 17% of the Framework Programme budget in Horizon 2020; see e.g.: Reillon (2017).
 10. U. von der Leyen (2020), *Political guidelines for the next European Commission 2019-2024; Opening statement in the European Parliament plenary session 15 July 2019; Speech in the European Parliament plenary session 27 November 2019*. Luxembourg: Publications Office of the European Union.
 11. European Commission (2020a), *A New Industrial Strategy for Europe, Brussels, 10.3.2020, COM(2020) 102 final*; European Commission (2020b). *Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe’s recovery*, Brussels, 5.5.2021, COM(2021) 350 final.
 12. European Commission, Directorate-General for Research and Innovation (2021a), *Horizon Europe Strategic Plan (2021-2024)*.
 13. U. von der Leyen (2023), ‘Special Address by President von der Leyen at the World Economic Forum’, 17 January 2023, https://ec.europa.eu/commission/presscorner/detail/en/speech_23_232

that Europe is lagging behind in the successful commercialisation of that knowledge. To what extent should the EU (seek to) play a role in upscaling innovation or in the growth of start-ups?

The EU has become a highly relevant source of funding for STI in the Netherlands: the funding received from the European Framework Programme Horizon 2020 accounted for more than 10% of total Dutch public research funding.¹⁴ The EU support programmes for research and innovation have also contributed to collaboration within Europe, the setting of an EU-wide standard for excellent research and the application of knowledge in addressing societal needs and challenges.

The Netherlands receives structurally more from the EU framework programmes in support of STI than it contributes to them. However, there are no guarantees that this will continue to be the case in the future. Brexit has meant that the successful United Kingdom has disappeared from the EU and its funding arrangements, and as a result it is now more noticeable that the Netherlands is also a significant net beneficiary. Other countries, for example from Central and Eastern Europe or large Member States such as France and Germany (which receive relatively little EU funding on a per capita basis)¹⁵ are focusing increasingly on these European funds, and that too is putting the relatively large share of funding received by the Netherlands under pressure.

Apart from the financial contribution from EU programmes to research and innovation in the Netherlands, there is also the crucial question of to what extent EU STI policy contributes to the realisation of the ambitions of the EU and the Netherlands, respectively. Does EU policy on STI, in tandem with Dutch national policy, contribute to those underlying ambitions in practice? On the one hand the EU, like the Netherlands, aims for excellence in science in view of the importance of a strong European knowledge base. On the other hand, STI itself is also expected to make a useful contribution – via various applications of the knowledge gained – to meeting societal challenges. And what is the relationship between EU policy, most of which is targeted and strategic in nature, and Dutch STI policy, which has by contrast long been predominantly generic and open?

These questions are very topical. The Dutch Advisory Council on International Affairs (AIV) recently drew attention to this dichotomy in the context of industrial policy.¹⁶ Additionally, in 'Brussels', the first steps are currently being taken towards the next EU framework programme for STI.

14. Rathenau Instituut (2022a), *Nederland en Horizon 2020*, reference date 4 April 2022.

15. IDEA Consult (2023), *Nederland in Horizon 2020. Een kwantitatieve analyse voor de AWTI*, Den Haag: AWTI. See also: Rathenau Instituut (2022), *Wetenschap in Cijfers. Europese financiering*. Accessed at: <https://www.rathenau.nl/nl/wetenschap-cijfers/geld/europese-financiering>.

16. AIV (2022), *Designing smart industrial policy: new departures for the Netherlands within the EU*.

1.2 Request for advice

Against the backdrop of the aforementioned geopolitical shifts and changes within the EU, both of which have an impact on European STI policy and its alignment with Dutch policy on science, technology and innovation, the Dutch government asked AWTI to address the following question:¹⁷

How can the Netherlands make optimum use of European STI policy in order to strengthen the impact of science, technology and innovation within and from the Netherlands?

In answering this question, the Council took the Dutch ambitions for the development of science, technology and innovation as a starting point, and looked at European policy and developments from this perspective: to what extent does EU policy on STI contribute to the realisation of the ambitions? And how might the Netherlands influence EU policy in order to bring it more into line with Dutch ambitions? What recommendations can the Council make for policy and practice in the Netherlands, at both national and regional level, to ensure that European and Dutch policy are mutually reinforcing and together contribute to the realisation of the ambitions for STI? A related question is how the Netherlands can contribute to the common European ambitions for STI; here we look at the entire spectrum of research, development and innovation, with the goal being that European and national policy complement or reinforce each other as much as possible.

The government also lists a number of specific focus areas¹⁸ in its request for advice:

1. The relationship between support for fundamental research on the one hand and its application and upscaling within EU STI policy on the other.
2. The growing influence of European sectoral and thematic policy priorities on (the detailed content of) European STI policy.¹⁹
3. The role that (regional) research and development ecosystems could play in strengthening the research and innovation capacity in countries/regions which currently lag behind in this regard.

17. See Appendix 1 for the Request for Advice received by AWTI from the Minister of Education, Culture and Science, partly on behalf of the Minister of Economic Affairs and Climate Policy.

18. See Appendix 1.

19. This development applies especially for the transition from Horizon 2020 to Horizon Europe. The share of 'thematic and sectoral' content has been falling across the entire history of the framework programmes; see Reillon (2017).

1.3 Approach taken in this advisory report

In compiling this advisory report, we first mapped the most relevant EU programmes that impinge on science, technology and innovation. A key programme here is the European Framework Programme for Research and Innovation. For the most recently ended Framework Programme, Horizon 2020, we commissioned a more detailed study of how Dutch actors (such as knowledge institutes, companies, public authorities and other organisations) made use of that programme. The results are set out in a background study for this report (*Nederland in Horizon 2020* ('The Netherlands in Horizon 2020')),²⁰ and the principal findings are incorporated in Chapter 2 of this report. We also held many discussions and carried out a literature review to gain an impression of how well aligned Dutch and European science, technology and innovation policy are. A list of interviewees can be found in Appendix 3. We also looked at a number of instructive examples from other countries.

Chapter 2 first describes EU STI policy (section 2.1). We then zoom in on the extent to which Dutch actors are able to make use of the possibilities offered by EU policy, and highlight the main findings from our background study (section 2.2). In section 2.3 we explore how much EU STI policy and the activities it promotes contribute to the underlying policy ambitions at both EU and Dutch national level, as well as how well aligned EU and national STI policy are. The chapter ends with conclusions in section 2.4.

Chapter 3 sets out our advice and derived recommendations.

Project group and reviewers

This report was prepared by a project group consisting of Council members Koenraad Debackere (chair), Jos Benschop and Chokri Mousaoui and staff members Hamilcar Knops (secretary), Bart Gulden, Justien Dingelstad, Jeffrey de Hoogen, Otilie Nieuwenhuis and Paul van der Sande.

In the final phase of compiling this advisory report, the draft report was submitted to two external reviewers (see Appendix 2), who were asked to reflect on the consistency of the draft and identify any gaps. Their comments were subsequently incorporated into the final version under the responsibility of the Council.

20. IDEA Consult (2023), *Nederland in Horizon 2020. Een kwantitatieve analyse voor de AWTI*, Den Haag: AWTI.

Analysis

2.1 Growing importance of EU policy for STI

2.1.1 European STI policy is growing in volume and scope

EU policy on science, technology and innovation matters. It has evolved from joint programmes to support industrial development in specific sectors (such as ICT) through pre-competitive research carried out in international collaboration. After the creation of the European Union (Treaty of Maastricht) and the expansion of its remit (e.g. in the Treaty of Amsterdam), an independent and ever broader EU research and innovation policy developed, which has been growing steadily ever since. The framework programmes continue to provide the most important context for this development. An important element of these programmes has developed over the last 15 years focusing on the generic underpinning of support of excellent research.

The European programmes focusing on STI have made a clear contribution to raising standards in the EU, regularly lifting them above national standards. The Netherlands has made good use of the opportunities offered by Europe, and continues to do so. At the same time, EU STI policy has also fostered international STI collaboration within and beyond the EU, enabling the fruits of international synergy to be plucked.

Growing budget

European STI policy is growing - in terms of the number of policy instruments, scope, budget and the number of participating countries. Traditionally, the principal instruments for STI have been the EU framework programmes.²¹ The budget for these programmes has grown steadily.²² The budget for Horizon 2020 (which ran from 2014 to 2020) was 77 billion euros; the budget for the current Horizon Europe Framework Programme (2021-2027) is 95.5 billion euros. EU programmes have accordingly become a very relevant source of funding for STI in the Netherlands, accounting for more than 10% of public research funding.²³ As well as the framework programmes for STI, other EU policy

21. Article 182 of the Treaty on the Functioning of the European Union (TFEU).

22. The first six Framework Programmes (FPs) each ran for around four years and were assigned budgets of EUR 3.8 billion (FP1), EUR 5.4 billion (FP2), EUR 6.6 billion (FP3), EUR 11.8 billion (FP4), EUR 13.7 billion (FP5) and EUR 17.9 billion (FP6). For subsequent programmes, the term was increased to seven years and the budgets also rose, to EUR 50 billion (FP7), EUR 77 billion (FP8 (Horizon 2020)), and EUR 95.5 billion (FP9 ('Horizon Europe')). (The figures for FP1 – FP8 were taken from Reillon (2017)).

23. Rathenau Instituut (2022b), *De financiering uit EU-kaderprogramma's*, reference date 8 April 2022.

instruments have emerged over time which are relevant for research and innovation. That too represents a steady increase EU in funding to support STI.

Attention for applications and innovation as well as basic research

As well as this financial growth, the scope of the policy (and thus of the parties involved) is also increasing. European support for research and innovation initially focused on pre-competitive research, but over time this has broadened out to encompass all phases of the research, development and innovation 'chain', and now covers not only basic research, but also areas such as applied research, innovative start-ups and scale-ups. This reflects the growing focus by the EU on the entire 'chain', based on the realisation that EU countries, whilst strong in terms of developing knowledge, are relatively less successful in commercialising that knowledge at sufficient scale.²⁴ For example, Horizon 2020 included a separate 'SME instrument' which targeted the development and expansion of (innovative) SMEs,²⁵ an initiative which has transitioned in Horizon Europe into the EIC Accelerator.²⁶ This is an instrument in the third pillar of Horizon Europe, alongside ambitions such as upscaling. In contrast with this movement, the European Research Council (ERC) has since the seventh Framework Programme built a very solid instrument which provides generic support for excellent (basic) research.

EU enlargement means more and more countries involved

The enlargement of the EU in recent years means that the number of countries targeted by EU STI policy has also increased. To ensure that these new Member States align with the research and innovation 'standard' within the EU, the 'Widening participation and spreading excellence' programme was created with the aim of contributing to building research and development capacity in countries which lag behind in this area.²⁷ There are also a number of structural funds and other programmes aimed at reducing the welfare differentials between the regions and Member States, for example the European Regional Development Fund (ERDF)²⁸ and Interreg. These funds are intended among other things to improve economic competitiveness by stimulating innovation. This focus

24. See also: European Commission (2022b), *A New European Innovation Agenda*, 5 July 2022 COM(2022) 332 final.

25. European Commission (2022e), *Horizon 2020 Online Manual*. Accessed at: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/sme_en.htm

26. European Innovation Council (2022), *EIC Funding Opportunities*.

27. The countries concerned are Bulgaria, Cyprus, Estonia, Greece, Hungary, Croatia, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovenia, Slovakia and the Czech Republic. See also: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-11-widening-participation-and-strengthening-the-european-research-area_horizon-2021-2022_en.pdf.

28. Article 176 of the Treaty on the Functioning of the European Union (TFEU).

on providing a stimulus for lagging Member States and regions lends European STI policy not only a more thematic, but also a geographical and broader dimension.

2.1.2 European STI policy: both generic and specific

The first European programmes for (supporting) research had a sectoral or thematic focus. This tied in with the principle set out in a general Treaty article which allowed EEC Member States to decide unanimously to take actions on behalf of the common market.²⁹ The first Framework Programme (1984-1987) thus contained six thematic priorities and one 'horizontal' objective.³⁰ The scope of the EC's competence subsequently expanded to cover all research activities which supported an EC/EU objective.³¹ Later still, the scope widened further to include societal challenges as an objective. The framework programmes were also firmly embedded in the Treaty.³²

The Seventh Framework Programme (FP7), which launched in 2007, provided a major new instrument, the European Research Council (ERC), whose mission is to promote and provide generic support for excellent research. It stood alongside an existing powerful generic instrument, the Marie Skłodowska-Curie Actions, which aimed to promote career development for researchers. The EU saw these instruments as a means of strengthening the position of the EU in basic research, in part relative to countries such as the United States. Besides this generic support for STI, most EU framework programmes still focus(ed) on specific goals (thematic or sectoral). A key feature is the EU's desire to promote research throughout the entire 'chain', from basic research to application and roll-out.

Framework programme still more linked to 'substantive' ambitions

The deployment of STI is increasingly linked to the sectoral policy of the EU.³³ The current European Framework Programme for Research and Innovation, Horizon Europe, for example, incorporates a range of ambitions. The stated aims of the Strategic Plan contained in the Framework Programme include promoting 'open strategic autonomy', restoring European ecosystems and biodiversity, making Europe the first digitally

29. Article 235 of the Treaty Establishing the European Economic Community (Treaty of Rome), see: <https://eur-lex.europa.eu/eli/treaty/teec/sign>.

30. Reillon (2017).

31. Article 130f, paragraph 1 of the EC Treaty stated the following in 1993: "The [European] Community shall have the objective of strengthening the scientific and technological bases of Community industry and encouraging it to become more competitive at international level, while promoting all the research activities deemed necessary by virtue of other Chapters of this Treaty."

32. Currently in Article 182 TFEU.

33. Cf. European Commission (2022b), *A New European Innovation Agenda*. COM(2022) 332 final.

supported climate-neutral, sustainable economy, and creating a more resilient, more inclusive Europe, as driving factors behind European innovation policy.³⁴

EU policy on STI incorporates a mix of instruments, from generic to specific

These ambitions are reflected in various ways in the design of the different pillars within Horizon Europe, the current EU framework programme.³⁵ In addition to a first pillar aimed at excellent science in a broad sense, the second pillar focuses on societal challenges such as health, climate and the digital transition. The EU opts for a mission-driven approach here, formulating five mission areas with ambitious goals: 1) Adaptation to climate change; 2) Cancer: saving more than three million lives; 3) Healthy Oceans, Seas, Coastal and Inland Waters; 4) Climate-Neutral and Smart Cities; and 5) Soil Health and Food. The second pillar also supports industrial competitiveness, including through partnerships.³⁶ This second pillar is thematic and combines the second and third pillars from Horizon 2020. Innovation plays a key role in the third pillar of Horizon Europe, partly through the formation of a European Innovation Council, and among other things supports scaling up and radical innovation against the backdrop of the supporting ecosystems.

Link to industrial policy and regional policy

There is also alignment with the EU's industrial policy, with a key role assigned to a number of specific 'key technologies', where linkage is sought with Horizon Europe.³⁷ There are also other policy instruments outside the framework programme which benefit STI; for example, ERDF funding is used in the Netherlands to support innovation, though as the European Commission itself states, there is still a great deal of potential to exploit the synergies between Horizon Europe and the ERDF.³⁸ The EU rules on state aid also allow for the establishment of Important Projects of Common European Interest (IPCEIs).³⁹ These are integrated European projects which bring together several national, industry or research-institute projects from different EU Member States which are complementary, have potential synergy and contribute to strategic European goals.⁴⁰ An IPCEI must have the potential to resolve market or systemic shortcomings or societal

34. European Commission (2021b), *Horizon Europe. Strategic Plan 2021-2024*.

35. Regulation (EU) 2021/695 of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, OJEU 2021 L 170/1.

36. See e.g. European Commission (2022d), *European Partnerships in Horizon Europe*.

37. European Commission (2022c), *Key enabling technologies* policy; see also: AWTI (2020). *A more forceful choice for key technologies*, The Hague.

38. European Commission, Directorate-General for Research and Innovation (2022), *Synergies between Horizon Europe and ERDF programmes (Draft Commission Notice)*. C(2022), C 4747 final.

39. See Article 107, 3 (b), TFEU.

40. RVO (2021), *Important Project of Common European Interest (IPCEI)*. The synergies include the creation of regional value chains as part of the open strategic autonomy.

challenges which the market alone would be unable to address. Member States can fund the 'unprofitable top slice', i.e. that portion of the investment which cannot be earned back, without the EU regarding this as prohibited state aid. Although IPCEIs are an opportunity created by the EU, they must be implemented by collaborating Member States who invest national funds in the project.

Knowledge also important in large EU initiatives

Knowledge and innovation are also key factors in the attempts in recent years to give a major boost to the (competitive) position of the EU as a whole, for example through the InvestEU investment programme or Next Generation EU, the EU recovery plan for the post-Covid era, with a blended funding approach combining grants, loans and capital which can be provided to enterprises to help scale up their activities.

Conclusion: EU policy on STI is intertwined with the EU policy agenda

European STI policy, then, is steadily expanding and the policy instruments now cover the entire innovation trajectory. The content of EU STI policy is also no longer determined (and funded) solely by the Directorate-General for Research & Development, but is now combined with European industrial strategy or regional goals which the EU wishes to pursue. EU STI policy has thus become a mix of specific policy, aimed either at meeting a particular challenge ('thematic') or at a specific sector/technology ('sectoral'), as well as generic policy. A substantial part of EU STI policy is linked to a substantive direction. The growth in EU funding for STI is therefore not 'free' funding, but is tied to a growing number of conditions attached to its use.

2.1.3 Challenges

European STI policy is important for the EU and for the Netherlands. It contributes to the 'knowledge power' of Europe, and therefore also to the position of the Netherlands in the world. European policy promotes STI collaboration in Europe, in turn benefiting Dutch knowledge institutes and businesses. It also supports the thematic policy ambitions, for example in relation to the numerous societal challenges facing the EU and the Netherlands.

Nonetheless, seen from a Dutch perspective there are a number of challenges for European STI policy. The first concerns what the relationship should be in EU policy between basic and more applied research, innovation and market-focused instruments (such as investment funds). The second relates to the fact that the Netherlands has a culture of pursuing mainly generic policy to support research and innovation. The question then is how the Netherlands should address the evolution towards more specific and more targeted EU policy. Third, how can the EU and the Netherlands ensure that the newer Member States are included in (the successes of) EU policy on STI?

2.2 Dutch actors benefit from EU STI policy

Dutch knowledge institutes and companies have made good use over the years of the support offered by EU policy for research and innovation. In preparing this advisory report, AWTI commissioned a more detailed analysis of how Dutch actors participated in the most recently completed framework programme, The results are contained in the background study *Nederland in Horizon 2020* ('The Netherlands in Horizon 2020'), compiled by IDEA.⁴¹ A benchmark was also developed with a number of comparable regions in the EU,⁴² which are compared with the four Dutch NUTS-1 regions.⁴³ The main findings from the IDEA report are discussed below. Unless stated otherwise, all figures cited in this section about Horizon 2020 are in principle taken from this background study.

2.2.1 Horizon 2020

Horizon 2020 was the eighth EU framework programme for research and innovation.⁴⁴ It ran from 2014 to 2020 inclusive and had a budget of around EUR 77 billion. Most of the funding was assigned to three 'pillars': (1) Excellent Science (EUR 24 billion); (2) Industrial Leadership (EUR 17 billion); and (3) Societal Challenges (EUR 31 billion). Horizon 2020 also included a number of 'horizontal' programmes with smaller budgets.

The Netherlands made above-average use of Horizon 2020

Dutch participants obtained funding totalling EUR 5.37 billion from 6,149 projects under Horizon 2020, equivalent to 7.9% of the total Horizon 2020 budget (and almost twice the Dutch share of the EU budget of 4.1%). Dutch applicants have a relatively high success rate, with 16.9% of applications approved compared with an EU average of 12.4%.⁴⁵ Of all the proposals involving a Dutch participant, 61% were good enough to be eligible in principle for funding (i.e. the proposal assessed was 'above the threshold value'). That is higher than the average across the EU (around 50%). Only around a quarter of those proposals 'above the threshold value' ultimately actually received funding (due to budgetary constraints);⁴⁶ that means that three out of four 'good quality' proposals were

41. IDEA Consult (2023), *Nederland in Horizon 2020. Een kwantitatieve analyse voor de AWTI*, Den Haag: AWTI. This report takes the data from the IDEA report as a basis.

42. The benchmark regions are Estonia, the five German regions Oberbayern (Upper Bavaria), Baden-Württemberg, Nordrhein-Westfalen (North Rhine-Westphalia), Koblenz and Lüneburg, Sydsverige (Sweden), Flanders (Belgium), Basque Country (Spain) and Eastern Austria.

43. The four NUTS-1 regions are Northern Netherlands (Friesland, Groningen and Drenthe); Eastern Netherlands (Overijssel, Gelderland and Flevoland); Southern Netherlands (Noord-Brabant and Limburg); and Western Netherlands (Noord-Holland, Zuid-Holland, Utrecht and Zeeland).

44. Framework programme as referred to in Article 182 TFEU.

45. See Figure 4 (p. 27).

46. 27.5% of proposals involving a Dutch actor were assessed as above the threshold value; the average across the EU is 24.9%. For the differences per pillar and per theme, see IDEA Consult (2023), *Nederland in Horizon 2020*.

not successful, while five out of six of the total proposals submitted involving a Dutch participant were *not* successful (and across the EU seven out of eight). In other words, a great deal of energy is expended in preparing these project proposals.

The relative success of Dutch applicants in obtaining funding from Horizon 2020 is also evident from the benchmark analyses performed in the background study for this report, the results of which are shown in Figure 1. The figure shows the number of successful participations per 100,000 residents. The Basque Country in Spain is the most successful of the benchmark regions, with 109 participants in Horizon 2020 projects per 100,000 inhabitants. Next comes the German region of Oberbayern, with 86 participants, followed by Western Netherlands (82) and Eastern Austria (78). The figure for the Netherlands as a whole (64 participations per 100,000 inhabitants) is just below that of Estonia (68) and just above Flanders (56), but strikingly enough is much higher than the number for the German federal state of North Rhine-Westphalia, which is comparable with the Netherlands in terms of population size. In the charts comparing the Netherlands and the four Dutch NUTS-1 regions with the benchmark regions, the regions are ranked based on their 'score' on the European Regional Innovation Scoreboard 2021, or RIS score. This regional innovation index measures the innovative capacity of a region: the higher the score, the more innovative the region.⁴⁷

Good practice Basque Country: In our benchmark, the Basque Country performs very well – especially research institutes – not just in terms of number of projects and amount of funding, but also as regards the average number of Basque partners engaging in projects with Basque participation. This appears to be the result of specific policy in the Basque Country. As well as the creation of Tecnalia, a strong organisation for applied research, there is the Basque Research & Technology Alliance (BRTA), in which 17 Basque applied research institutes collaborate intensively, including with a view to participation in EU projects.

BRTA supports researchers and institutes in their positioning in European partnerships. It focuses on three elements: influencing the agenda for future programmes; giving training and advice to scientists; and providing specialist support with applications. It helps that the Basque policy priorities are chosen so that they parallel the European priorities as far as possible. Moreover, a performance-based funding system has been introduced for the participating organisations, with success in 'Europe' as one of the performance indicators.

47. European Commission (2021c), *Regional Innovation Scoreboard 2021*, Luxembourg.

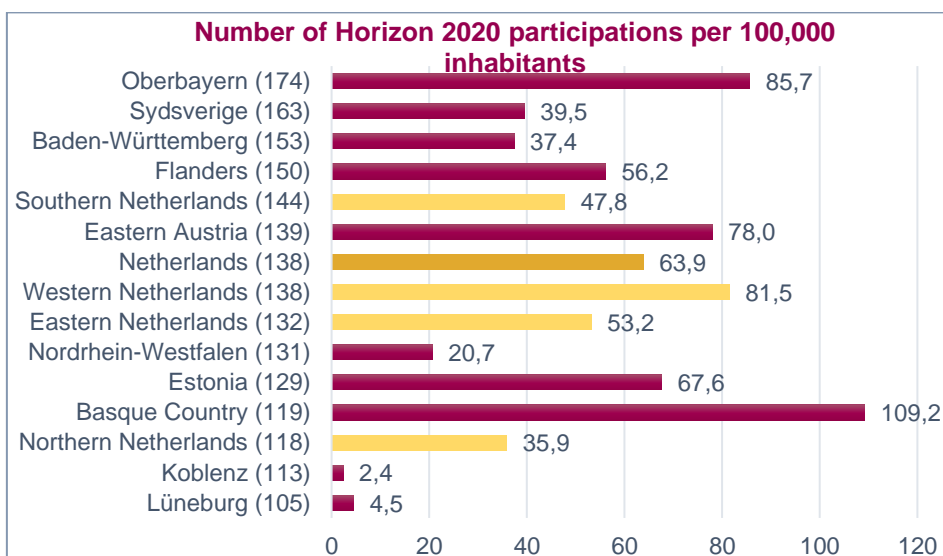


Figure 1 Number of successful participations in Horizon 2020 per 100,000 residents for the Netherlands, the Dutch regions and the benchmark regions; the regions are ranked by their RIS score for 2021 (between brackets)⁴⁸

Source: EU-Cordis Horizon 2020 database of funded projects 2014-2020

The Netherlands was successful not only in terms of the number of project applications granted, but also as regards funding. On a per capita basis, the Netherlands received funding totalling EUR 309 from Horizon 2020.⁴⁹ That is high compared with the larger EU Member States (Germany, France, Italy and Spain plus the United Kingdom received between EUR 95 and EUR 135 per capita). Among the top 15 countries in terms of total funding received from Horizon 2020, only Norway received more per capita (EUR 317). Denmark came in third place with EUR 304 per capita). Figure 2 shows the picture from our benchmark; only the highly innovative Oberbayern region in Germany (EUR 531 per capita) came ahead of the leading Western Netherlands region (EUR 403). Here again, the Basque Country scores very well (EUR 396) - roughly three times the average for the whole of Spain! Within the Netherlands, there are differences between the regions, with Western Netherlands, where the majority of knowledge institutes are located, standing out. Eastern Netherlands also received a fairly high level of funding, while Southern Netherlands and Northern Netherlands received slightly less funding from Horizon 2020.

48. For these RIS scores, see: European Commission (2021c), *Regional Innovation Scoreboard 2021*.

49. This refers to cumulative funding received from Horizon 2020 across the full term of the programme.

This was largely due to the fact that these regions are home to relatively fewer knowledge institutes.

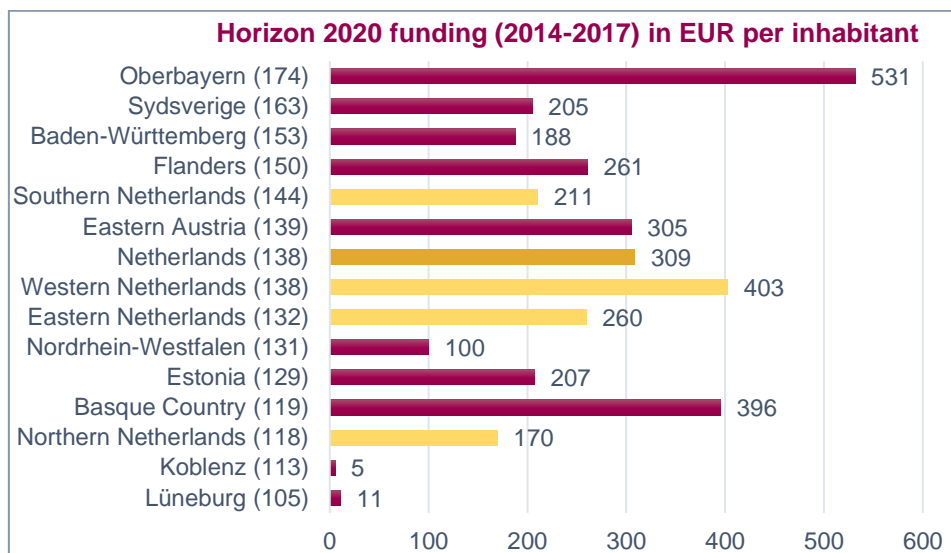


Figure 2 Horizon 2020 funding awarded per inhabitant (2014-2020, in EUR) for the Netherlands, the Dutch regions and the benchmark regions; the regions are ranked by their RIS score for 2021 (between brackets)

Source: EU-Cordis Horizon 2020 database of funded projects 2014-2020; population figures for 2020

Good practice Norway: Although not a Member State of the EU, Norway is a member of the European Economic Area (EEA), and also participates in the Horizon 2020 and Horizon Europe framework programmes. Calculated per head of the population, Norwegian partners secured more funding per participation in Horizon 2020 than Dutch participants. To help in securing funding from Horizon 2020, the Norwegian Research Council had set up two programmes to increase Norwegian participation. One of these programmes (PES2020) focused on boosting the quality and number of project proposals submitted from Norway for Horizon projects, both through co-funding of the project proposal and support for the positioning of Norwegian actors and mobilisation of partners. In the other programme, STIM-EU, Norway gives extra funding to (Norwegian) participants in EU projects over and above the EU contribution, among other things by covering certain overhead costs.

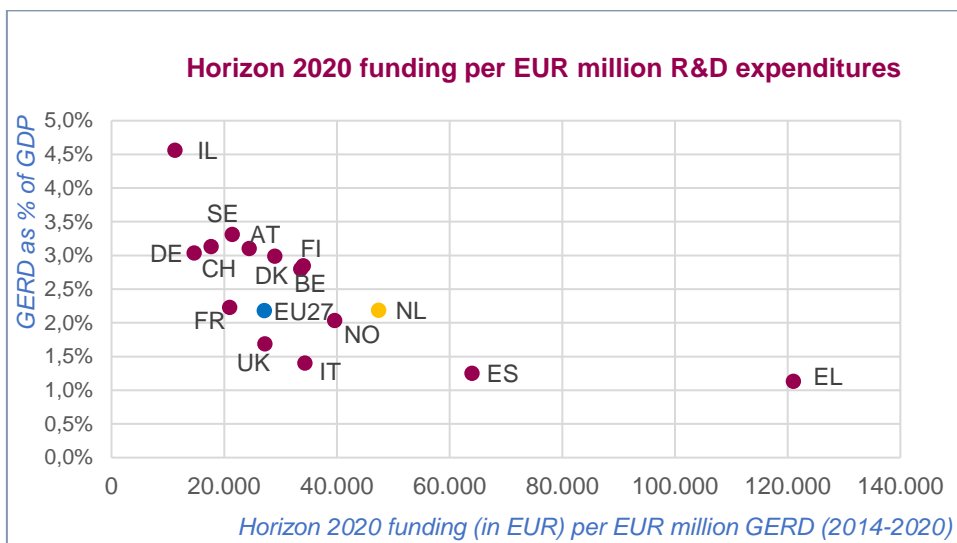


Figure 3 Horizon 2020 funding awarded per EUR million GERD (2014-2020, in EUR)
Top 15 countries with the highest total Horizon 2020 funding

Source: EU-Cordis Horizon 2020 database of funded projects 2014-2020.
For source of GERD and GDP see IDEA (2023)

We also calculated what share of all investments (private and public) in research and development ('GERD' in the terminology of the OECD)⁵⁰ came from Horizon 2020 for the top 15 recipient countries of Horizon 2020 funding. This is shown in Figure 3, with the position on the y-axis representing the share of research and development expenditure as a percentage of Gross Domestic Product (GDP). In the Netherlands, 4.7% of all investments (private and public) in research and development came from Horizon 2020, putting the Netherlands in third place among the top 15 recipient countries. Only the Southern European countries Greece and Spain derived a higher percentage of their research and development funding from the EU, but these countries also spend relatively less on these activities. Based on the share taken by EU funding in total research and development expenditure, the most successful of the benchmark regions are Estonia (10%) and the Basque Country (9%). By way of comparison, only 3% of R&D funding in Oberbayern came from Horizon 2020. It is also noteworthy that Dutch participants in Horizon 2020 projects received more on average, both as project coordinators and as

50. GERD = 'Gross domestic expenditure on R&D', defined as the 'total intramural expenditure on R&D performed in the national territory during a specific reference period'; see: OECD (2015), *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities*, Paris: OECD Publishing, DOI: <http://dx.doi.org/10.1787/9789264239012-en>.

'ordinary' partners, than the average across the whole trajectory of the Horizon 2020 programme. In other words, Dutch actors are also relatively successful on a 'per participant' basis.⁵¹

Universities and corporates are the main participants in EU projects; universities of applied sciences and SMEs have more difficulty

The lion's share of the funding for Dutch participants went to higher education institutions (EUR 2.7 billion, 51%), followed by the private sector (EUR 1.3 billion, 24%) and research organisations (EUR 1 billion, 18%). The remainder of the 'Dutch' funding went to public bodies and other organisations (see Table 1). The main beneficiaries in higher education were universities and university medical centres. Universities of applied sciences do not occur in the top 15 higher education institutes in terms of funds received from Horizon 2020. And although in the 'private sector' category the number of unique Dutch SMEs participating in Horizon 2020 projects is comparable with the European average as a proportion of larger companies (81% and 78%, respectively), we heard from several quarters that SMEs find it difficult to gain access to the opportunities offered by the EU.⁵² Our analysis also showed that relatively less use is made in the Netherlands of elements of Horizon 2020 aimed at SMEs. For example, the Dutch share of the total budget for the theme 'Innovation in SMEs' was 6.7%, compared with 7.9% across the whole Horizon 2020 programme.

Table 1 Distribution of Dutch Horizon 2020 funding across the five categories of actors

Total	Funding (EUR billion)	Share of total	Number of participations
Higher or secondary education institutions	2.72	50.6%	4336
Research organisations	0.99	18.4%	1743
Private sector	1.27	23.5%	3853
Public bodies	0.15	2.7%	430
Other	0,25	4,7%	758

51. See: IDEA Consult (2023), *Nederland in Horizon 2020. Een kwantitatieve analyse voor de AWTI*, Den Haag: AWTI.

52. SMEs do appear to derive a larger share of their research and development funding from EU instruments than large companies. In the Netherlands, roughly 33% of research and development expenditure by companies takes place within SMEs (see: <https://www.rathenau.nl/nl/wetenschap-cijfers/geld/wat-geven-bedrijven-uit-aan-rd-rd-uitgaven-van-bedrijven-nederland-naar>), while 71% of Horizon 2020 funding for Dutch companies went to SMEs (source: own communication with Netherlands Enterprise Agency - RVO).

A few organisations made very frequent use of Horizon 2020: a total of 21 unique participants from the Netherlands each participated successfully more than 100 times in Horizon 2020 projects. However, most organisations took part in only one project (63% of unique participants) or between two and five times (29% of unique participants).

Table 2 shows the top five Dutch organisations in each category in terms of funding received from Horizon 2020.⁵³ The biggest recipients are universities and applied research organisations (Netherlands Organisation for Applied Scientific Research (TNO), Wageningen Research). Each of these organisations participated in hundreds of Horizon 2020 projects.

Large organisations such as universities, TNO or large corporations often have a dedicated internal employee or department to seek out EU support schemes, form the right consortia and submit project proposals. In addition, the Netherlands Enterprise Agency (RVO) also provides support, and the Enterprise Europe Network supports SMEs in finding the right partners abroad.⁵⁴

One factor which may explain the difficulty SMEs evidently have in participating successfully in EU projects could be that most Horizon 2020 programmes were less suitable for them because of the complexity of the application process, the requirement to publish the results or the lack of an appropriate network. These factors can in fact also impede large, R&D-intensive organisations in making use of EU instruments for STI, for example because EU projects (must) have lots of different participants, whereas companies may prefer to work bilaterally with one knowledge institute and might prefer not to place the results of research in the public domain owing to its for their own competitive position. A further factor for universities of applied sciences is that a substantially smaller proportion of their activities is (currently) devoted to research.⁵⁵ They also have other sources of finance (for example national) from which they have a greater chance of securing funding.

53. We used the different legal entities as they appear in the EU database (Cordis). We did not aggregate potentially affiliated legal entities, such as the different Philips companies (two of which are in the top five), or a university with an affiliated university medical centre, for example.

54. See: <https://een.ec.europa.eu/>

55. It would be interesting to discover what the share of EU funding is in the total research budgets of universities and universities of applied sciences. This would be a 'pure' comparison. We were unable to do this because the precise size of the research budgets is not known with certainty.

Table 2 Top-5 Horizon 2020 funding recipients in the Netherlands by category

	Actor	H2020 funding in EUR million	Share within category	Number of projects
Higher or secondary education institutions				
1	Delft University of Technology	318.3	11.7%	538
2	Utrecht University	237.9	8.7%	344
3	University of Amsterdam	206.0	7.6%	304
4	Eindhoven University of Technology	195.7	7.2%	337
5	Radboud University	185.1	6.8%	294
Research organisations				
1	TNO	178.2	18.0%	359
2	GÉANT	153.3	15.5%	24
3	Wageningen Research	132.0	13.3%	223
4	Foundation for Dutch Scientific Research Institutes (NWO-i)	94.4	9.5%	180
5	Royal Netherlands Academy of Arts and Sciences (KNAW)	70.4	7.1%	122
Private sector				
1	ASML Netherlands BV	43.3	3.4%	11
2	Philips Electronics Nederland BV	31.4	2.5%	65
3	Avantium Chemicals BV	21.9	1.7%	22
4	Philips Medical Systems NL BV	18.9	1.5%	32
5	Lanzatech BV	18.6	1.5%	1
Public bodies				
1	National Institute for Public Health and the Environment (RIVM)	33.1	22.6%	63
2	Ministry of Economic Affairs and Climate Policy	18.9	12.9%	53
3	Ministry of Infrastructure and Water Management	12.5	8.6%	45
4	Municipality of Groningen	6.4	4.4%	10
5	Municipality of Amsterdam	5.6	3.8%	14
Other				
1	Climate KIC Holding BV	38.3	15.1%	8
2	EGI Foundation	26.2	10.4%	38
3	NLnet Foundation	19.0	7.5%	3
4	Lygature	10.9	4.3%	17
5	Prosafe	6.9	2.7%	4

Good success with 'Excellent Science' and 'Societal Challenges'

if we look at the various pillars of Horizon 2020, we find that Dutch participants score very well on 'Excellent Science' and 'Societal Challenges', with around 8.5% of the total budget going to Dutch participants in each pillar. In the pillar 'Industrial Leadership', by contrast, Dutch participants lagged behind, receiving 6.5% of the total budget – though that is still a higher percentage than the Dutch contribution to the EU budget (4.1%).

Differences per theme

Zooming in more closely on the constituent programmes or themes, we find that Dutch participants received the largest amount in absolute terms from the European Research Council (ERC) (EUR 1.2 billion), followed by the societal challenge 'health' (EUR 0.8 billion; pillar 2) and the Marie Skłodowska Curie Actions (MSCA) (EUR 0.5 billion). The ERC and MSCA were the biggest programmes in the 'Excellent Science' pillar. As regards the 'relative share' of the funding, i.e. the share of 'Dutch' funding in total EU funding, the Netherlands received the most funding for research infrastructures (13.5%, first pillar) and the themes 'health' (13%) and 'biotech' (11%) in the second pillar.⁵⁶

In terms of the success rate of Dutch applicants, there also are few themes which stand out clearly above the EU average for that theme. The top three are biotech, environment and food. The Dutch success rate in the biggest programme (ERC) is also roughly a third higher than the EU average (18.1% versus 13.7%).

The success rates for each pillar in Horizon 2020 are shown in Figure 4. The figure shows that, although the Netherlands 'scores' less on average in the pillar 'Industrial Leadership' pillar in terms of the amount of funding received, the success rate for projects involving Dutch actors within this pillar is much higher than the EU average (15.2% versus 8.8%). There are moreover also themes within the 'Industrial Leadership' pillar where the Netherlands is highly successful in terms of funding received. ICT stands out here in an absolute sense, though in relative terms the Netherlands scores best on 'biotechnology', with a share of 11% of the total EU budget for this theme and a success rate that is 2.5 times higher for applications involving a Dutch participant compared with the EU average in this segment.

56. A detailed overview of the different themes can be found in IDEA Consult (2023), *Nederland in Horizon 2020. Een kwantitatieve analyse voor de AWTI*, Den Haag: AWTI.

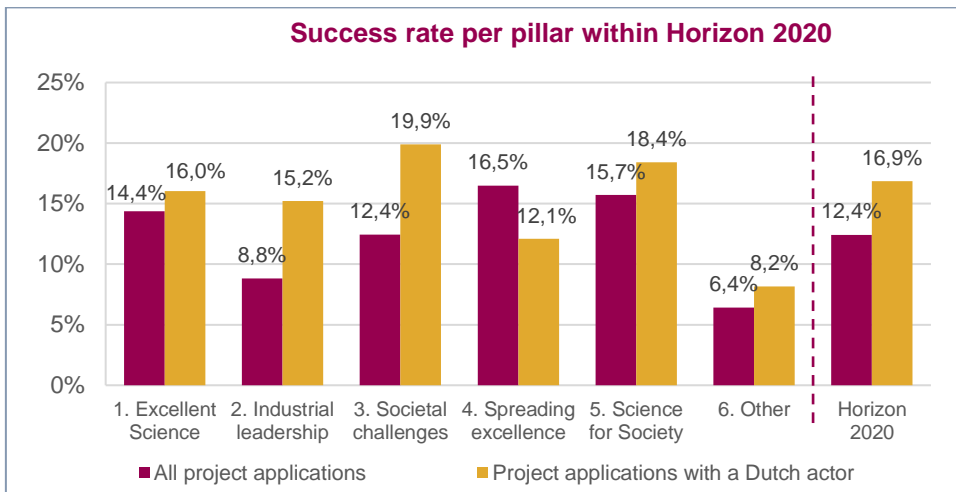


Figure 4 Success rates per pillar within Horizon 2020 (2014-2020)

Source: EU-Cordis Horizon 2020 database for 2014-2020, number of project applications = 285,602

Western Netherlands the big winner, Southern Netherlands strong on industry

We looked at the four Dutch NUTS-1-regions (the regions into which the EU divides the Netherlands for its regional policy): Northern, Eastern, Western and Southern Netherlands.⁵⁷ Western Netherlands, where roughly half of Dutch universities are based, participated most in Horizon 2020 in absolute terms, and also received the highest funding per capita, namely EUR 400 (compared with the national average of EUR 309).⁵⁸ Figure 5 shows the distribution of Horizon 2020 funds received per pillar per region (the benchmark regions and the Dutch NUTS-1 regions). It is interesting that in Northern and Western Netherlands, the lion's share of the funding received falls within the 'Excellent Science' pillar (52% and 44%, respectively), while in Eastern Netherlands the biggest slice of funding was in the 'Societal Challenges' pillar (49%). Southern Netherlands received the most funding in the 'Industrial Leadership' pillar (37%). This distribution reflects the regional differences, with Southern Netherlands as an industrial heartland housing Brainport Eindhoven, for example, while Eastern Netherlands, with its universities such as Wageningen and Twente, has a solid tradition of research (in partnership with companies and other organisations) focusing on societal challenges. Similar differences can also be seen in the benchmark regions (see Figure 5).

57. Northern Netherlands incorporates the provinces of Groningen, Friesland and Drenthe; Eastern Netherlands the provinces of Overijssel, Gelderland and Flevoland; Western Netherlands the provinces of Noord-Holland, Zuid-Holland, Utrecht and Zeeland; and Southern Netherlands the provinces of Noord-Brabant and Limburg.

58. See Figure 2 on p. 21 for a list of the Dutch regions and benchmark regions.

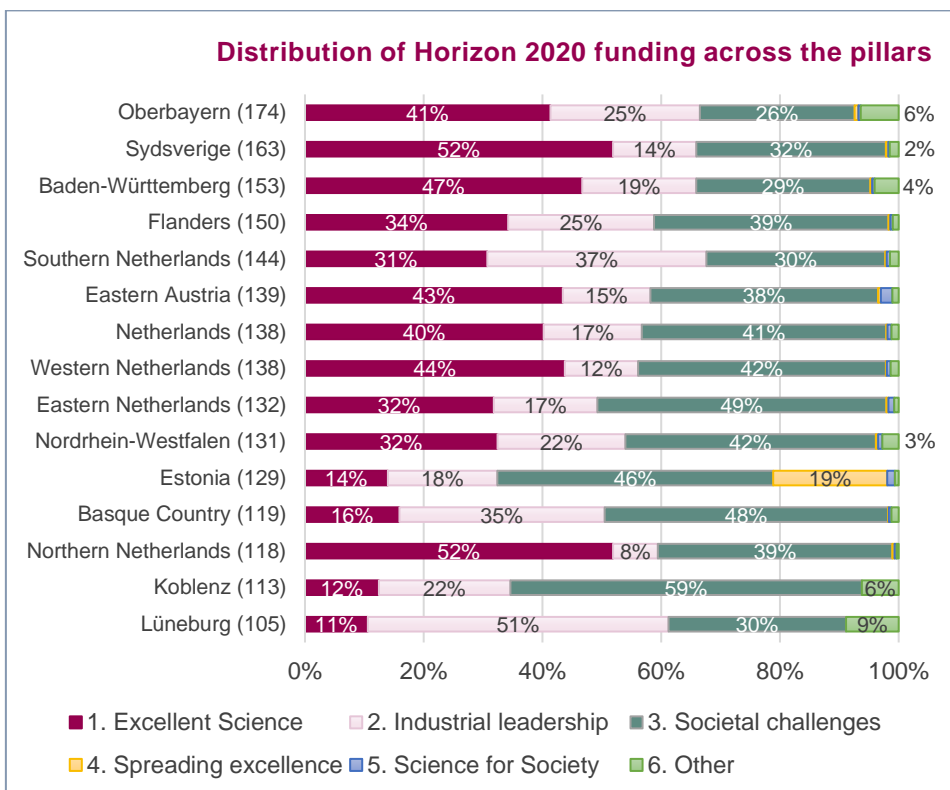


Figure 5 Distribution of Horizon 2020 funding across the pillars for the Netherlands, the Dutch regions and the benchmark regions; the regions are ranked by their RIS score for 2021 (between brackets)

Source: EU Cordis Horizon 2020 database of funded projects 2014-2020.
For the RIS scores, see: European Commission (2021c)

Collaboration with other countries

One of the aims of European STI policy is to promote collaboration. Consequently, many projects involve partners from different countries working together. Figure 6 shows the partners with which the Netherlands collaborates frequently. The figure shows the number of partners from the listed countries with which Dutch actors collaborate *on average* in a single project that has more than one participant.⁵⁹ Dutch actors work mainly with partners from Germany, France, Spain, Italy and the United Kingdom. It is notable that in the ‘Scientific Excellence’ pillar, Dutch partners frequently collaborate with

59. Since projects with only one participant do not have collaborating partners, these were filtered out of the sample for this analysis of partnerships.

knowledge institutes from the United Kingdom and Switzerland,⁶⁰ making these two countries key partners for the Netherlands. These countries participated in Horizon 2020, but are not (or no longer) members of the European Union, and their participation in the current Horizon Europe Framework Programme has still not been settled.⁶¹ If it transpires that they are not able to participate, the Netherlands will lose a key means of forging partnerships with the (often highly renowned) knowledge institutes from those countries. Collaboration between Dutch and Belgian partners is most common in the 'Societal Challenges' pillar. It is notable that in the partnerships with the United Kingdom, Ireland and Denmark, the partners are often higher education institutes (universities).

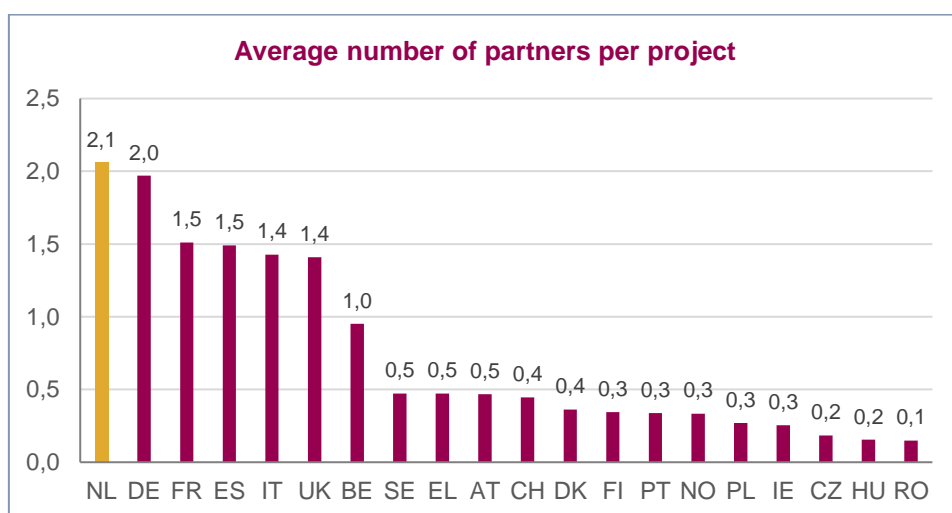


Figure 6 Average number of partners per country in successful projects with more than one participant and at least one Dutch participant, for the top 20 countries in Horizon 2020 (2014-2020)

Source: EU Cordis Horizon 2020 database of funded projects 2014-2020; total number of projects with more than one participant, one of which was Dutch = 4,694

Collaboration with UK has collapsed; that with other countries has grown

We compared collaboration in the first half of the term of Horizon 2020 with that in the second half. Virtually across the board, Dutch parties collaborated more with partners from other countries in the second half of Horizon 2020, especially with Greece, Spain and Belgium. Dutch parties also collaborated more often with partners from the newer

60. See IDEA Consult (2023), *Nederland in Horizon 2020. Een kwantitatieve analyse voor de AWTI*, Den Haag: AWTI.

61. In February 2023, the United Kingdom and Switzerland were still in negotiations about potential associative membership of Horizon Europe. Both countries did provisionally provide their 'own' funding for domestic parties taking part in Horizon Europe projects.

eastern EU Member States. By contrast, collaboration with partners from the United Kingdom fell sharply during the second half of the Horizon 2020 programme, possibly because of uncertainty around the impact of Brexit.

Also collaboration between Dutch partners

In the 6,149 Horizon 2020 projects involving one or more Dutch participants, there were a total of 11,120 participations from the Netherlands. This equates to an average of 1.81 Dutch participants per project with Dutch participation. That is high compared with the benchmark regions (only the Basque Country comes anywhere near, at 1.69). If we look at the Dutch NUTS-1 regions, the figure in Western Netherlands is still relatively high (1.55 participants from Western Netherlands).⁶² The other regions are comparable with the better-scoring benchmark regions (around 1.35 from the same region). It thus appears that Dutch parties also work with other Dutch participants in European projects, often from the same region. If we zoom in on those projects with Dutch participation in which there was more than one participant (see Figure 6), we see that on average just over two Dutch parties were involved in these projects.

Partners from 'Romance' countries less often work with Dutch coordinators

Coordination of EU projects in the Netherlands is often taken on by (higher) education institutes. Strikingly, where a Dutch party acts as coordinator, partners from Spain, Italy and France are less often represented, whereas Dutch parties do work on projects coordinated from those countries.⁶³ It is unclear whether Dutch coordinators are less inclined to seek partners in Spain, France or Italy, or whether partners from those countries are less keen to work with a Dutch coordinator.

62. This figure for the (Dutch) regions is probably lower than for the Netherlands as a whole, since we are concerned with the number of partners from the same region in a project involving at least one participant from that region. For the Netherlands as a whole, this is (also) the case where one party is from Delft (Western Netherlands) and one from Groningen (Northern Netherlands), but within a region it only applies if the partner of the participant from Delft is also from Western Netherlands.

63. See IDEA Consult (2023), *Nederland in Horizon 2020. Een kwantitatieve analyse voor de AWTI*, Den Haag: AWTI.

Good practice Sweden: VINNOVA is a Swedish organisation with its own budget, which it coordinates through various programmes relating to collaboration, capacity-building and thematic research. VINNOVA has a clear role with regard to EU programmes, providing support for all European applications. In addition, VINNOVA not only has offices in Sweden, but also in Brussels, Silicon Valley and Tel Aviv. This means that VINNOVA can also help parties find the right partners outside Sweden (and also outside the EU). There is a special agency for the SME sector which supports and proactively helps Swedish SMEs to participate in European programmes. It does this through direct support (both one-to-one and through workshops), and via incubators and science parks.

Cooperation also outside EU projects

EU research and innovation programmes promote international collaboration, but international collaboration also takes place outside the framework programmes and other programmes. This was recently mapped by the Rathenau Instituut,⁶⁴ which looked at joint publications (by authors in the Netherlands in collaboration with authors from elsewhere) in the period 2018-2021. This showed that most collaboration takes place with the United States, the United Kingdom and Germany. We tried to estimate the impact of collaboration within EU projects on the total collaboration between (partners from) the two partner countries. To do this, we determined the relationship between the number of partnerships within EU programmes on the one hand and the number of joint publications by authors from the two partner countries on the other. The higher this ratio, the greater we consider the influence of EU projects on collaboration between (partners from) the two countries to be. This exercise appears to show a major impact of collaboration with Spain and Greece, in particular, within Horizon 2020, and to a slightly lesser extent with Austria and Norway. A European framework programme thus appears to have a decided positive impact on collaboration with such countries.

2.2.2 Other EU instruments in support of STI

As well as framework programmes such as Horizon 2020 and Horizon Europe, investments in STI also reach Dutch parties through other programmes and funds, for example the European Regional Development Fund (ERDF). Compared with the less developed regions in the EU, the Netherlands receives relatively little funding from this structural fund. That is partly due to the design of the Fund, which focuses specifically on helping less-developed regions to further their development. The ERDF funds which do

64. Rathenau Instituut (2022c), *Samenwerkingslanden Nederland*, reference date 02-09-2022.

reach the Dutch regions have to be spent on innovation. Policy and fund distribution are determined by the relevant regions themselves. They are required to develop a ‘smart specialisation strategy’, in which they set out the specific targets for their region (matching the strength and ambition of the region). There are four ERDF regions in the Netherlands: Northern Netherlands, Eastern Netherlands, Western Netherlands and Southern Netherlands. Each region has a management authority to administer the programme.⁶⁵

The European Commission has also rolled out the more mission-driven, temporary Next Generation EU programme. This provides funding with a clear objective and is focused in part on innovation. Examples of funding available under this programme are the Just Transition Fund (EUR 567 million to support the Dutch regions in achieving a climate-neutral, circular economy) and the Recovery and Resilience Facility (a total of EUR 4.7 billion for the Netherlands, part of which is intended for sustainable and green recovery following the Covid crisis). Another programme providing funding for STI is Interreg, which focuses on cross-border regional collaboration. Here again, the funding is distributed (and the policy developed) by the (inter)regional authorities.

IPCEIs (Important Projects of Common European Interest) are another instrument deployed by the EU. They are large, ground-breaking projects involving partners from different Member States. In an IPCEI, Member States are permitted to provide more financial support to companies than the state aid rules would ‘normally’ allow. However, the funding for such projects must come from the Member States concerned themselves; the EU does not itself provide separate funding. Although the Netherlands is currently involved in four such projects, finding the (national) budget to pay for them is difficult.⁶⁶ As a result, the Netherlands is by no means in the lead in exploiting the opportunities offered by this instrument.

2.3 EU policy makes sub-optimal contribution to Dutch ambitions

The EU is making increasing amounts of funding available to support STI, from which Dutch actors are benefiting relatively well. Money alone is not the aim of STI policy, however; the focus on STI is of course intended to achieve the underlying ambitions. The

65. For Northern Netherlands this is the Northern Netherlands Alliance (www.snn.nl/en), for Eastern Netherlands: EFRO Oost (<https://www.efro-oost.eu/>), for Western Netherlands: Kansenvoor West (www.kansenvoorwest2.nl/nl/), and the programme for Southern Netherlands is ‘OPZuid’ (administered by Stimulus Programmamanagement: <https://www.stimulus.nl/opzuid-2021-2027>).

66. See also (in Dutch): Kamerbrief (*Letter to the House of Representatives*) Minister Adriaansens. *Kamerbrief strategisch en groen industriebeleid*. 8 July 2022 (ref. DGBI-TOP / 22266731), *Kamerstukken II 2021-2022*, 29 826, nr. 147.

most important question is therefore to what extent the EU programmes for STI contribute to the achievement of European or national ambitions.

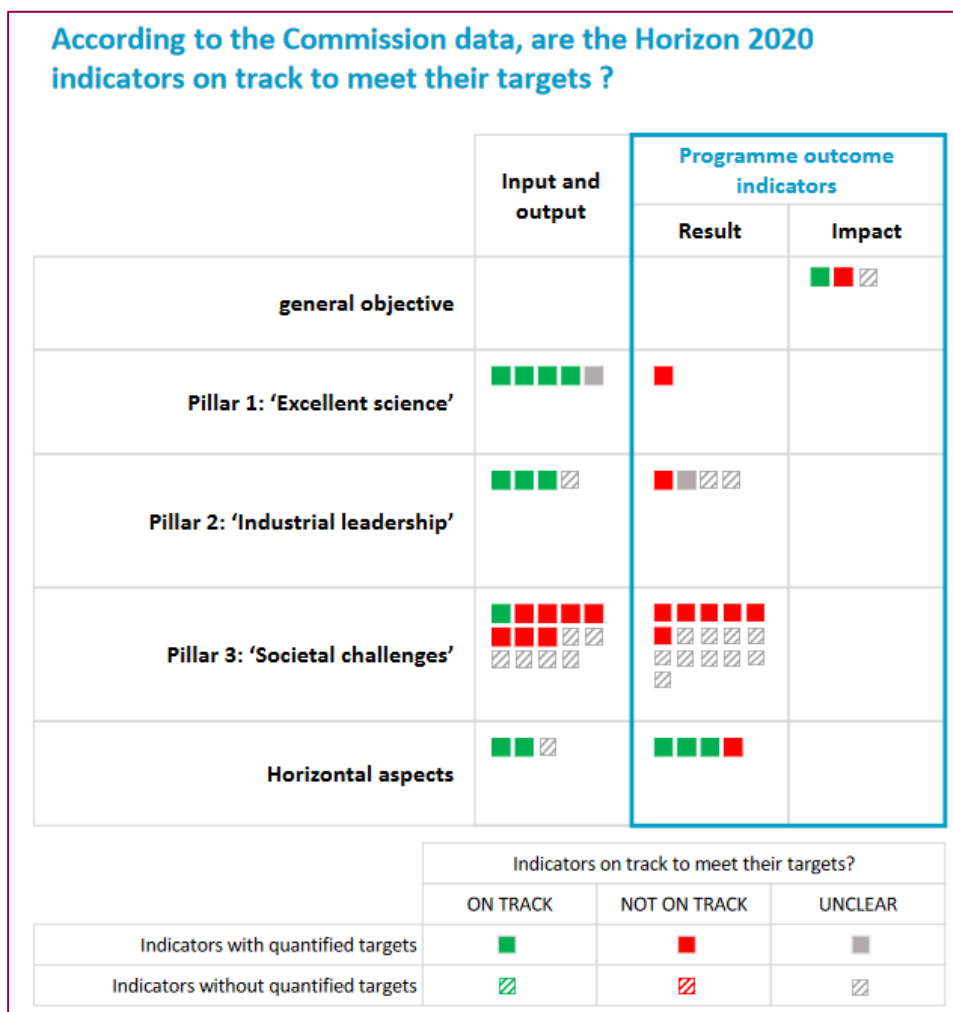


Figure 7 Progress of Horizon 2020 against targets for the various pillars

Source: Figure 2.4 (Overview of all the Horizon 2020 indicators in the programme statement) European Court of Auditors (2020).⁶⁷

67. European Court of Auditors (2020), *Report of the European Court of Auditors on the performance of the EU budget — Status at the end of 2019*, Luxembourg: Publications Office of the EU.

European Court of Auditors critical on Societal Challenges pillar

The European Court of Auditors (ECA) looked at this at EU level. In 2019, the ECA carried out a performance review which included the Horizon 2020 Framework Programme. The results are shown in Figure 7. Briefly summarised, according to the ECA, 14 indicators are 'on track', 17 are not on track and for 23 indicators it is unclear whether they are on track. Strikingly, it is unclear for all indicators without quantified targets whether or not they are on track. The clearest progress is in the 'Excellent Science' pillar, for which four of the six indicators are green. On 'Societal Challenges', however, 13 indicators are not on track; only one is on track and there are 16 for which it is unclear. This is a pillar with a strong Dutch participation. The ECA is very critical regarding whether the envisaged objectives are being achieved at EU level. The ECA makes no pronouncement on the situation at the level of Member States, but if the ECA feels that an indicator (at European level) is unclear (i.e. progress cannot be readily determined), that will often also be the case at national level. This is a particular problem in the 'Societal Challenges' pillar.

The ECA also makes several other interesting observations. The success rate in Horizon 2020 was just 12%, which means that many efforts to bring together partners and set up proposals failed to bear fruit. The 'Seal of Excellence' for proposals which, though of good quality, did not receive funding, also failed to have the envisaged effect: it is virtually ignored in national programmes. The ECA also notes the difficulty in obtaining an overview of all funding instruments for research and innovation, commenting that SMEs face even more impediments in the application process or additional burdens in implementation.

Do the EU programmes contribute to the achievement of Dutch STI ambitions?

The funding in Horizon 2020 and Horizon Europe is distributed by the European Commission in the context of the policy objectives at EU level. The European Court of Auditors looked at this and concluded that it is unclear whether some (European) Horizon 2020 targets will be achieved. In this report we examine to what extent the deployment of EU funds contributes to the achievement of Dutch targets and ambitions for STI.

Netherlands Court of Audit critical of insight into contribution of EU funding to Dutch ambitions

The Netherlands Court of Audit recently investigated the extent to which EU funding which is jointly administered by the EU and the Netherlands contributes to the Dutch policy ambitions.⁶⁸ The review did not include the European framework programmes (Horizon), but did include funds such as the ERDF. Dutch recipients of EU grants report

68. Algemene Rekenkamer / Netherlands Court of Audit (2022), *The Added Value of EU Grants in the Netherlands*, Den Haag: October 2022.

that they benefited from the monies received. They did find the administrative burden onerous, however, and two-thirds brought in external support for the application. The Netherlands Court of Audit is however highly critical of the added value of this EU funding for the achievement of the Dutch ambitions (notwithstanding the fact that the Netherlands is party to the decision on distribution). The link between the focus in the (national implementation of) programmes and the underlying problems the programmes seek to address is often unclear or poorly substantiated. Moreover, where indicators are used, these are generally focused on output (achievements) rather than outcome (impact). The studies by the European and Dutch Courts of Audit thus both reveal a limited insight into the effectiveness of EU programmes and whether those programmes actually contribute to resolving the underlying problems they seek to address.

Ambitions for 'Excellent Science' run parallel, but lack of clear coordination

When it comes to science and basic research, the ambitions of the Netherlands and those in the 'Excellent Science' pillar in the framework programmes are reasonably in parallel. The aim in both cases is the generic promotion of excellent science with a view to boosting the position of Europe (or the Netherlands) as a knowledge power. However, a few caveats can be applied to the implementation. In the Netherlands, the Dutch Research Council (NWO) plays a key role by providing many individual grants to talented researchers. How is the NWO policy 'coordinated' with what the European Research Council is doing at European level in terms of individual grants?⁶⁹ In addition, the Netherlands does little or nothing with the 'Seal of Excellence' awarded by the EU to research proposals which, whilst excellent, have been unable to secure EU funding due to budgetary constraints.⁷⁰

Lack of Dutch industrial policy impedes alignment with 'Industrial Leadership'

The Netherlands scored 'poorly' in Horizon 2020 in the 'Industrial Leadership' pillar, or at least, Dutch parties received relatively less aggregate funding than in the other two pillars. The Netherlands also lacked a specific industrial policy in that period (in contrast to generic 'enabling policy' and the Top Sectors policy, with their bottom-up agendas).⁷¹ As a result, the Netherlands had no clear agenda for industrial policy in 'Brussels', making it more difficult to operate successfully in this pillar (the government recognised this

69. The amount received by Dutch researchers in European ERC grants is now roughly equal to that in the NWO Talent programme; see Rathenau Instituut (2022b).

70. See Diepstraten, F. (2021), '2 op 3 excellente MSCA-voorstellen niet gefinancierd', which reports that in the Netherlands, only the LUMC in Leiden funds researchers 'from its own pocket' who have received a Seal of Excellence (SoE) from Brussels. The European Commission Directorate-General for Research and Innovation (2022) offers suggestions on the use of the SoE.

71. AIV (2022), *Slimme industriepolitiek: een opdracht voor Nederland in de EU*, Den Haag.

implicitly in its recent industrial policy brief).⁷² And without clear policy ambitions, it is difficult to conclude whether European STI policy has contributed to the achievement of the Dutch ambitions.

Announcement of Dutch industrial policy an important first step...

A sea change has recently taken place in this regard, with the recent government announcement of plans to pursue an 'active industrial policy'. The Dutch government believes it is important to ensure good, proactive links to what is happening in the EU. Another essential is a good national agenda to help steer developments in 'Brussels' in the desired direction. It helps if the various parties 'on the ground' in the Netherlands collaborate effectively and are therefore able to operate more effectively in Brussels in the various EU forums.⁷³ The government is thus outlining important ingredients to try and ensure that EU policy on research, technology development and innovation makes a more effective contribution, in combination with industrial policy, to the realisation of Dutch ambitions.

...which (still) needs to be translated into specific actions ...

One caveat here is that this is still very much a paper exercise and, although the direction of travel is good, it is now important to ensure the linkage with EU policy actually happens in practice. All too often, policy documents describe in lofty terms the importance of 'seeking linkage with EU policy', with no follow-up implementation. Most of the Top Sectors, for example, lag far behind in developing an international strategy, despite this being their responsibility since their launch.⁷⁴ It is also important that this international strategy is more than just an export strategy; it must also emphatically embrace international collaboration in research, development and innovation.

... and for which a budget must be made available

Although the letter to the Dutch Parliament on industrial policy states the need to align with EU instruments, much remains unclear regarding how that link is to be achieved in practice. There is in reality also a lack of the funds needed to genuinely achieve those ambitions: as the government itself admits, the money is not simply there for the taking.⁷⁵ For the IPCEIs, the government is eyeing the National Growth Fund as a substantial

72. Kamerbrief (*Letter to the House of Representatives*) Minister Adriaansens. *Kamerbrief strategisch en groen industriebeleid*. 8 July 2022, *Kamerstukken II 2021-2022*, 29 826, nr. 147.

73. Ibid, p. 21-22

74. See also AWTI (2017), *STI Diplomacy*, The Hague, in which AWTI already pointed out that most Top Sectors still had no internationalisation strategy, whereas the development of such a strategy was once again cited recently (in July 2022) as an action still to be implemented in the letter to the House of Representatives on industrial policy (*Kamerbrief over het industriebeleid*) (*Kamerstukken II 2021-2022*, 29 826, nr. 147).

75. Kamerbrief (*Letter to the House of Representatives*) Minister Adriaansens. *Kamerbrief strategisch en groen industriebeleid*. 8 July 2022, *Kamerstukken II 2021-2022*, 29 826, nr. 147.

source of structural funding. However, the question is how this 'claim' relates to the discretionary power that the National Growth Fund Committee has. In its letter to Parliament, the government also set only one concrete ambition, namely the creation of European Digital Innovation Hubs. In practice, therefore, the linkage with the EU is still far from a reality.

Strengthening earning capacity requires broader focus on neighbouring countries and EU

The National Growth Fund Committee itself observed that the proposals submitted in the first and second round were very 'national' in terms of partners and focus.⁷⁶ The Committee believes that is a risk, because the success of projects undertaken in the Netherlands also depends to a large extent on what is happening in other countries. In the Committee's view, Growth Fund projects also benefit from alignment with European initiatives, and the Committee felt this was insufficiently reflected in the proposals.

Unclear whether EU support for 'Societal Challenges' helps achieve ambitions

The picture for the Societal Challenges pillar is more complex. On the one hand, the Netherlands 'scores' well in terms of projects and funding secured by Dutch parties (in Horizon 2020); but on the other hand, as already observed by the European Court of Auditors, it is very difficult to determine how much those projects actually contributed to the underlying policy ambitions. It is moreover not always clear whether the Dutch and European ambitions and objectives are aligned with each other.

Divergent ambitions of the Netherlands and the EU

As an example, the Netherlands has its own, mission-driven innovation policy for which the missions were defined in 2019. Within EU policy, the missions form part of Horizon Europe, which launched in 2021. A total of 25 missions have been identified in the Netherlands, compared with five in the EU policy. With so many missions, there is admittedly some overlap, but we still see no real sign that the content of the Dutch mission-driven innovation policy is in any way 'coordinated' with the relevant EU mission(s), despite recommendations from AWTI to make a clear choice in advance for a few missions which are relevant for both the EU and the Netherlands.⁷⁷ This lack of coordination was recognised by the government in 2021, which cited as an area for improvement that the mission-driven top sectors and innovation policy 'could be

76. Commissie Nationaal Groeifonds (2021), *Rapport eerste beoordelingsronde*, p. 19 and Commissie Nationaal Groeifonds (2022), *Rapport tweede beoordelingsronde*, p. 30.

77. Letter from the Chair of AWTI (2018) to the Minister of Education, Culture and Science, 18 January 2018 with 'suggestions for missions' ('Suggesties voor missies') (kenmerk: 0009/18/ri).

broadened [...] by aligning with or jointly programming other research and innovation programmes [such as] the European research agendas.⁷⁸

The Dutch plans and agendas do sometimes refer to the opportunities (funding) offered by EU policy, but no action plan or strategy is formulated (or applied in practice) to give any tangible form to this alignment. The Top Sectors have been assigned a key role in Dutch innovation policy in recent years, but most of the Top Sectors have long had a very strong national focus (despite it being part of their brief to develop an international agenda).⁷⁹

A few years ago, AWTI also stressed the importance of ensuring that (national) programmes focusing on key technologies be well aligned with international developments and initiatives.⁸⁰ More recently, in its report on industrial policy AIV called for close alignment between national and European innovation and industrial policy.⁸¹

Good practice Austria: Austria also scores well in our benchmark for Horizon 2020. The Austrian Research Promotion Agency (*Forschungsförderungsgesellschaft* (FFG)) is an active central organisation which not only promotes research and innovation through national funds/programmes, but also actively engages to help ensure success for Austrian researchers within the EU programmes. The Agency not only offers project-specific support, but also support in the strategic positioning of Austria and Austrian researchers in the European research and innovation environment. It is also interesting to see that policymakers in Austria consciously align the national research priorities with the European priorities: based on Austria's strengths and weaknesses, a few priorities are selected from the EU focus areas to which Austria then assigns a higher priority. The national research, technology and innovation strategy also stresses the ambition to create 'leverage' between EU policy and Austrian policy.⁸²

Synergy between EU policy and Dutch practice begins with targeted focus from the start...

The chance that making use of EU STI policy will contribute to the realisation of Dutch national ambitions increases if the Netherlands engages at an early stage with 'Brussels'

78. Kamerbrief Minister Blok. *Kamerbrief over Missiegedreven Topsectoren- en Innovatiebeleid*. 15 October 2021, p. 30 (*Kamerstukken II 2021-2022*, 33 009/32 637, nr. 102).

79. This is implicitly confirmed in the letter to Parliament from the Minister of Economic Affairs and Climate Policy dated 8 July 2022, 'Het verschil maken met strategisch en groen industriebeleid' ('Making the difference with strategic and green industrial policy'), in which the government announces that the Top Sectors will now really develop an internationalisation strategy.

80. AWTI (2020), *Krachtiger kiezen voor sleuteltechnologieën*; in English: 'A more forceful choice for key technologies', Den Haag.

81. AIV (2022), *Designing smart industrial policy: new departures for the Netherlands within the EU*.

82. Federal Government Republic of Austria (2020), *RTI Strategy 2030. Strategy for Research, Technology and Innovation of the Austrian Federal Government*, Vienna.

based on a clear agenda. A medium-sized country like the Netherlands cannot help shape the entire agenda and will therefore need to prioritise and target its efforts. Influencing the EU agenda will be more effective if the Netherlands has a clear national agenda in the relevant fields.⁸³ That will help focus attention and effort within the Brussels processes.⁸⁴ The Dutch Ministry of Foreign Affairs has itself concluded that there is a deficiency of Dutch 'Europe policy':⁸⁵ there is no detailed strategic framework for engagement with Brussels, while the political direction and definition of a strategic standpoint are limited. This picture was confirmed in various interviews we conducted with individuals with a good insight into the processes in 'Brussels'. The impression is that the Netherlands is not doing enough to get 'ahead of the curve' in the Brussels policy process early enough to achieve coordination between the various ministries involved and then, through judicious choices and prioritisation, to forge a strong position in Brussels. According to the Ministry of Foreign Affairs, more selectivity and flexibility are needed for a more effective stance in Brussels.

The conclusion was also that the focus in determining Dutch standpoints is more 'inward-looking', concerned with reaching national consensus, so that less account is taken of the power relations in Brussels. This is despite the fact that the positions of the European Commission, European Parliament and the other Member States have such a big impact in determining the course of the negotiations. It is therefore important to forge a pragmatic link, based on the national agenda, with what is happening in Brussels. How can the Netherlands contribute to the ambitions of the EU? The Dutch Advisory Council on International Affairs (AIV) also referred to this when recommending that the Netherlands should focus earlier and more forcefully on the lines of force in 'Brussels'.⁸⁶

Good practice Flanders. Flanders, the Dutch-speaking region of Belgium, also scores well in the benchmark. An interesting initiative is the 'Flemish platform for European programmes', or EU Platform.⁸⁷ The Platform is made up of representatives of governments, knowledge institutes, industry and civil society (quadruple helix). Its

83. See also Recommendation 1 from AIV (2022), p. 7.

84. In the letter to Parliament on industrial policy, the government announced a 'focused internationalisation agenda', and also highlighted the importance of good coordination between national and regional agendas (*Kamerstukken II 2021-2022*, 29 826, nr. 147).

85. Ministerie van Buitenlandse Zaken, Directie Internationaal Onderzoek en Beleidsevaluatie (2021), *Tactisch en praktisch. Naar een toekomstbestendige coördinatie van het Nederlandse Europeabeleid*, Den Haag: December 2021.

86. See e.g. Recommendation 2 ('Use the language of European public interests...'), Recommendation 5 ('Seek EU allies ...') and Recommendation 6 ('Seek closer alignment with Berlin and Paris') in AIV (2022), p. 7-8.

87. <https://www.ewi-vlaanderen.be/onze-opdracht/excellerend-onderzoek/internationale-samenwerking/eu-platform>

purpose is to strengthen the collaboration between relevant actors based on clear role divisions and transparent agreements. This is achieved by coordinating the participants and delivering input for Flemish policy. This helps both with the Flemish input into the development and subsequent implementation of EU policy. The EU Platform is regarded in Flanders as an example of good practice for stakeholder management. Although it enables Flanders to respond well and in good time to developments in Brussels, its impact on determining the standpoints of Belgium as a whole within the EU is less clear-cut, because it is a federal standpoint, whereas input from Wallonia or the Brussels Capital region also plays a role in determining a national standpoint.

... and demands a judicious balance between generic and specific policy

One problem here is that the Netherlands has a tradition of developing generic policy in many fields, whereas the EU policy for STI is largely specific and increasingly linked to thematic or sectoral EU policy. The Netherlands needs to find a considered answer to this. In general, however, the Netherlands has difficulty making choices. This trait is an impediment to engagement in Brussels, because it is not possible to achieve everything there, so choices have to be made. But with whom should the Netherlands form coalitions in Brussels? Here again, a clear agenda and assessment framework⁸⁸ could help. The Dutch government did recently take a first step in developing an assessment framework for (participation in) IPCEIs.⁸⁹ A subsequent question is whether the Netherlands, once the European policy has crystallised, dares to make targeted choices in national policy in order to align it better with European policy. Making choices demands knowledge and daring, both of which are a challenge for the government. Those targeted choices can relate both to the choice to align national and European programmes ('mutually reinforcing') or for national and EU programmes to supplement each other ('complementary') (where the national focus is deliberately on different goals from the EU goals). The latter may be relevant, for example, if the government wishes to support a discipline or economic sector in which the Netherlands excels but which is less prominent in the rest of Europe.

Financially cautious and sometimes hesitant attitude is an impediment

Finally, the Netherlands often lacks the (financial) capacity or political striking power to engage fully with European actions. For example, the initial response from the Netherlands to the European Universities Initiative was hesitant, and the parties

88. Recommendation 3 in AIV (2022), p. 7, which is further fleshed out in chapter 5 of that report.

89. Kamerbrief (*Letter to the House of Representatives*) Minister Adriaansens. *Kamerbrief strategisch en groen industriebeleid*. 8 July 2022 (kenmerk DGBI-TOP / 22266731), p. 39-43 (*Kamerstukken II 2021-2022*, 29 826, nr. 147).

concerned (universities) ultimately took action themselves. And in the case of the IPCEIs, where Member States themselves have to put up the funding,⁹⁰ the Netherlands tends to adopt a wait-and-see approach and in reality also lacks the budget to engage in a meaningful way. Budgets for participation in IPCEIs always have to be sought on an ad hoc basis, despite the government's ambition to 'invest adequately in European industrial projects.'⁹¹ The disadvantage of this approach is that the Netherlands does not really secure a decisive place at the table in the initial phase of such initiatives and therefore misses out on opportunities to steer those initiatives in a direction that is favourable for the Netherlands.

'Distance' from Brussels STI policy also impedes effective coordination

The two Dutch government ministries with primary responsibility for research and innovation policy – the Ministry of Education, Culture and Science and the Ministry of Economic Affairs and Climate Policy – have a reasonable awareness of the opportunities offered by the EU for STI. However, because more and more sectoral or thematic EU policy also has an STI component, it is becoming more important for other ministries also to be aware of this in order to optimise the development of Dutch policy. The same applies for the Dutch provinces and all regions, though it is a difficult challenge for them because of a more limited awareness of the Brussels policy and processes. Provinces and regions do probably have an awareness of instruments such as ERDF and Interreg, which are implemented via the regions, but will have less knowledge of the framework programme, for example. The result is that the opportunities offered by EU STI policy for meeting Dutch ambitions will not be sufficiently incorporated in the policy of Dutch government ministries, regions or provinces.

2.4 Conclusion: Dutch research and innovation benefits from EU funding, but a lack of joined-up policy means its impact on the achievement of ambitions is still too limited

European policy for STI is steadily expanding and becoming ever more intertwined with the EU's other policy priorities. European STI policy has become a highly relevant factor alongside national STI policy. Ideally, EU and national STI policy should reinforce or complement each other, but the alignment between them is not all it could be: in practice, they are fairly 'separate' from each other. That is illustrated in Figure 8, which visualises the 'problem' addressed in this report, by showing the 'dominoes' of EU STI policy and

90. Member States can potentially also use funds from the EU Recovery and Resilience Facility (see Article 18, paragraph 4(b) or Regulation (EU) 2021/241).

91. Kamerbrief Minister Adriaansens. *Kamerbrief strategisch en groen industriebeleid*. 8 July 2022 (kenmerk DGBI-TOP / 22266731), p. 5 (*Kamerstukken II 2021-2022*, 29 826, nr. 147).

Dutch STI policy each falling in different directions. On the one hand, too little thought is given in the Netherlands to how Dutch policy can contribute to the EU ambitions, while on the other hand the Netherlands often lacks a clear national agenda, and as a result is less effective in Brussels in seeking to ensure that EU STI policy is closely aligned with Dutch national ambitions and policy. It is moreover no easy task to ensure good alignment between the often generic policy (or policy tradition) in the Netherlands and the more specific sectoral and thematic programmes emanating from Brussels.

Despite these limitations, Dutch actors such as knowledge institutes, companies and research organisations make good use of the opportunities offered by EU policy. They have secured above-average levels of funding in recent years from EU programmes for STI, and have also had a higher success rate than average. This is also shown in Figure 8 by the 'domino' representing EU STI policy setting off lots of 'activities' in research, development and innovation. The EU policy leads to a lot of output in the Netherlands. It does however appear that certain types of organisations in the Netherlands have more difficulty in accessing EU programmes, such as universities of applied sciences or SMEs.

Because EU and Dutch policies for STI are currently 'separate' from each other, it is unclear whether the STI activities undertaken by Dutch actors and supported by the EU policy actually make a 'substantive' contribution to the underlying ambitions. In other words, we have no clear insight into whether the policy contributes to the desired outcome. This is shown in Figure 8 by the fact that the dominoes representing the policy and the activities it triggers fall *alongside* the domino representing the ambitions. There is much to be gained here in terms of whether STI policy genuinely contributes to the underlying (policy) ambitions, which in turn could increase the impact of European STI policy in combination with the equivalent Dutch policy (national and regional).

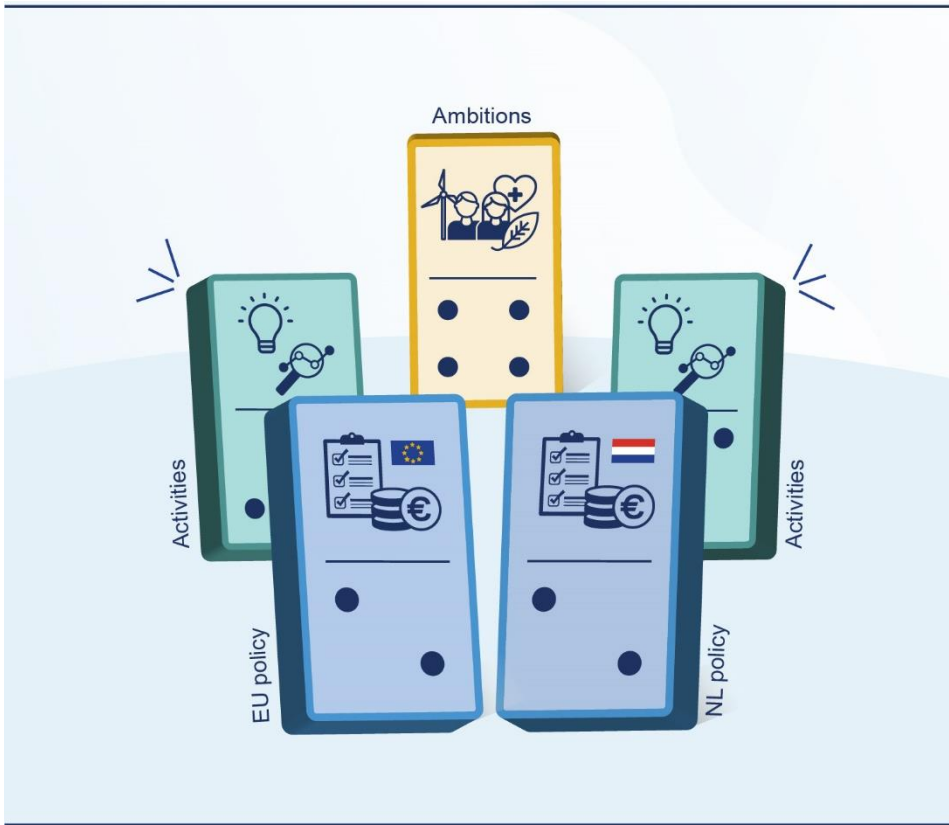


Figure 8

Problem: Lack of joined-up policy undermines STI contribution to achievement of the ambitions



Figure 9

Advice: Ensure a coherent mix of European and Dutch STI policy aimed at achieving the ambitions

Recommendations

Ensure that EU and Dutch policy for science, technology and innovation (STI) go hand in hand and either reinforce ('leverage') or complement each other. Also ensure that the promoted STI activities genuinely contribute to achieving the underlying ambitions.

Advice: Ensure a coherent mix of European and Dutch STI policy aimed at achieving the ambitions

This advice is visualised in Figure 9. Unlike Figure 8, which illustrates the current situation in which Dutch and European STI policy each go in different directions, the dominoes of EU and Dutch policy in Figure 9 stand shoulder to shoulder: reinforcing or complementing each other. The policy now also triggers activities aimed at achieving the underlying ambitions.

The Netherlands and Europe have much to gain from each other in STI

We believe that this alignment of European and Dutch STI policy is perfectly possible. The themes that are important for Europe are often also high on the Dutch agenda (such as energy/climate and digitalisation). The general importance of a strong knowledge base and good-quality research is also undisputed, both in Brussels and The Hague. These themes which are on the agenda in both the EU and the Netherlands generally require international collaboration. European projects strengthen that collaboration. Our analysis shows that Dutch actors are interesting partners in this collaboration, with a good track record in jointly securing substantial financial support from the EU for science, technology and innovation, in collaboration with parties from many countries.

The challenge for the Netherlands is to remain an interesting partner in the future – that is not guaranteed – and to ensure that European and Dutch policy complement each other and together contribute to achieving the underlying objectives of STI policy. With this in mind, AWTI puts forward the following six recommendations.

3.1 Ensure good alignment between Dutch and EU policy on STI so that they reinforce or complement each other

Recommendation 1: *Treat Dutch and European STI policy as a single whole. Maintain a clear view of the ambitions and create a coherent policy mix which serves those ambitions. Ensure that Dutch and EU policy instruments (including fiscal policy) reinforce or complement each other.*



Figure 10 Recommendation 1: Ensure good alignment between Dutch and EU policy on STI so that they reinforce or complement each other

Ideally, within the total policy mix, the Netherlands will manage to link the various instruments to other (national and regional) instruments in such a way that they reinforce each other. This will create leverage, substantive and/or financial (e.g. in the form of co-investment). An alternative is national policy which complements European policy, for example for themes which are of great importance for the Netherlands but not so much within the EU. The fiscal instruments must not be forgotten here; although tax affairs are devolved to national level, the EU sets the framework in relation to setting a minimum level of corporate taxation.⁹² It is important that this continues to incentivise European companies to carry out research and development and that this aligns with the other policy.

92. Council Directive (EU) 2022/2523 of 14 December 2022 on ensuring a global minimum level of taxation for multinational enterprise groups and large-scale domestic groups in the Union (OJ 2022, L 328).

To put this recommendation into practice, we advise the Dutch government when developing Dutch STI policy to carry out a preliminary ‘EU check’ to ascertain which EU programmes exist in the field concerned and to use this as a basis for a considered choice on how national policy can align with those programmes, either by making parallel choices (reinforcing) or through complementarity. The latter could mean that a country or region deliberately focuses on a given sector or theme that is not covered by EU policy. This should be combined with ex-post evaluation of the entire policy mix (incorporating both EU and Dutch policy instruments), with the emphasis on the interplay of the different measures. This makes it possible to identify where different programmes reinforce or oppose each other, or where there are still gaps. It is also possible to evaluate the relationship between generic and specific policy instruments: do they complement each other or is there too much emphasis on one or the other?⁹³

3.2 Take a proactive and strategic stance in Brussels with a focused agenda

Recommendation 2: *Be more effective in Brussels by delivering more strategic, selective and targeted input into the EU policy processes. At national level, develop a good assessment framework and a clear agenda for what the Netherlands wishes to achieve via the EU. Operate proactively and take into account the Brussels playing field. Also reinforce the Dutch input in the phase of fleshing out EU STI instruments so that they are better aligned with the Dutch policy and agenda.*

To improve the alignment between European and Dutch policy for STI, it is important to influence EU policy as early and as effectively as possible, for example by helping determine which themes the EU chooses and how these are subsequently fleshed out. More effective influence demands more strategic and selective linkage of the national and European agendas than happens at present. A medium-sized country like the Netherlands cannot shape the entire agenda and will therefore need to prioritise its efforts. This requires better coordination between the different government departments, leading to choices and priorities on which efforts can be targeted in ‘Brussels’. An assessment framework will be helpful here in determining when a topic is found that is worth picking up via the EU and what role is envisaged for the Netherlands. It is also important to take more account of developments on the EU playing field and the positions adopted by different countries. The Netherlands should work with other countries and reflect on how the Netherlands can make an active contribution to the EU’s ambitions –

93. Cf. VARIO (2022), *Visie op een goede beleidsmix tussen vrije en thematische steun voor O&O in Vlaanderen*, Brussels.



Figure 11 Recommendation 2 Take a proactive and strategic stance in Brussels with a focused agenda

not just because in order to achieve anything in Brussels it is essential to ‘bring something to the table’, but also because collaboration within the EU offers many opportunities for Dutch research and innovation and because more impact can be achieved together in realising the ambitions.

3.3 Continue to support basic research in the EU and link it more effectively to innovation

Recommendation 3: *The Netherlands should continue to provide generous support for basic research within the EU STI policy and should advocate strengthening the links between basic research and (the instruments for) the application of knowledge where relevant.*



Figure 12 Recommendation 3 Continue to support basic research in the EU and link it more effectively to innovation

The EU has provided a major boost for basic research with its STI policy in recent years (including via the European Research Council (ERC) in the last 15 years). That continues in the current framework programme. Support for basic research will need to remain as an important pillar of EU STI policy in the future, because it contributes to maintaining and developing Europe as a ‘knowledge power’. The Netherlands will (have to) engage with this in ‘Brussels’.

As European STI policy has the explicit ambition of supporting the entire chain of research and innovation, support for basic research will always stand alongside support for more applied research and other activities (such as upscaling). Where *possible* and *meaningful*, it is important to create good links between the different types of research and development. The Dutch government should therefore aim to improve the linkage between the different EU instruments, for example by strengthening the links between the

instruments of the European Research Council (ERC) and the European Innovation Council (EIC). That will lead among other things to more interaction between researchers and entrepreneurs, something that is essential in closing the gap between the development and application of knowledge.⁹⁴

European STI policy, like its Dutch counterpart, is emphatically a 'both... and' narrative. There is no magic formula governing the relationship between support for basic research, applied research and upscaling. The assessment framework for the role of the EU (see Recommendation 2) will have to serve as a guide for how big a role the Netherlands sees for the EU in supporting the different types of activities, possibly focused on specific themes or sectors. The EU policy (like the national policy) is also a combination of generic and specific instruments. It is important to realise that activities which support generic policy (can) also contribute to certain specific objectives. 'Generic *versus* specific' is thus not a black-and-white opposition. This must be made clear by carrying out an ex post analysis of how generic funding is spent: to which themes, sectors or challenges did the research contribute?⁹⁵ For example: a certain percentage of the (generic) budget was spent on climate-related research. This fits in very well in the evaluation of the policy mix advised above (see Recommendation 1).

3.4 Create regional links with EU STI policy

Recommendation 4: *To enable the regions to make better use of the opportunities offered by EU policy and to ensure that regional and EU policy reinforce or complement each other, it is important to:*

- (a) take account of the relevant EU policy in the regional innovation agenda;*
- (b) spend the regional EU funds in such a way that they reinforce other STI policy;*
- (c) help regional actors to make use of EU instruments;*
- (d) link regional ecosystems to promote inter-European collaboration.*

The regions are where research and innovation take place. Moreover, many regions develop their own policy for innovation. AWTI has previously advised the regions to develop regional innovation ecosystem agendas.⁹⁶ These should also incorporate the opportunities offered by EU policy. The regions, too, should therefore carry out a preliminary 'EU check' (see Recommendation 1). There are direct opportunities to link the

94. European Research Council (2022), *Annual Report on the ERC activities and achievements in 2021*, Luxembourg: Publications Office of the EU, p. 27.

95. Cf. VARIO (2022), *Visie op een goede beleidsmix tussen vrije en thematische steun voor O&O in Vlaanderen*, Brussel.

96. AWTI (2021), *Samen de lat hoog leggen. Regio en rijk bundelen krachten voor innovatie*, summary in English: 'Raising the bar together. Regional and central government working together for innovation', Den Haag.

regional and EU agendas with instruments such as ERDF and Interreg, the funding from which is distributed via regional organisations. But the regions also need to be aware of the opportunities offered by other EU instruments, such as the framework programmes. Here too, the opportunities offered by EU policy need to be fully dovetailed with what is happening in the region. One caveat here is that the complex Brussels playing field is not easy for individual regions to navigate; collaboration between regions and with bodies such as the Netherlands Enterprise Agency can help improve the clarity of sight on developments and opportunities in Europe.



Figure 13 Recommendation 4 Create regional links with EU STI policy

The regions could potentially also play a role in reducing the ‘innovation gap’ between the generally more innovative regions in the ‘old’ EU Member States on the one hand and the less innovative regions in many of the newer EU Member States on the other. Wide scope should be created here for the pilot projects which were recently launched through the Partnerships for Regional Innovation.⁹⁷ These should be properly evaluated and the experiences gained put to good use.

3.5 Provide support in making use of EU instruments

Recommendation 5: *Ensure that Dutch actors such as knowledge institutes and companies are able to make maximum use of the possibilities offered by EU instruments for STI, by ensuring well-organised support. Focus government support on those actors which (still) have more difficulty accessing EU instruments. Apart from support with applications, this also means support in growing these actors’ relevant networks.*

Some Dutch actors are able to access the EU programmes effectively; they are aware of the possibilities and have the right networks to enable them to submit joint proposals. Actors that currently find it difficult to access EU programmes, such as SMEs and universities of applied sciences, need to be helped here, and this support is crucial. The government efforts must as a minimum focus on those groups which find it more difficult to gain access to EU instruments.

The help they receive will need to be focused in the first instance on increasing their familiarity with the opportunities offered by EU instruments. In addition to information, participation in the right networks can be important here, helping set parties such as knowledge institutes and companies on the right track towards accessing the specific opportunities offered by EU policy. Support from the government in this strategic network-building is useful and effective. In the Basque Country, we saw the positive impact of alliance-building between top research institutes, and actors in Norway and Sweden receive support in finding the right network partners. Another example is the Enterprise Europe Network (of which the Netherlands is a member),⁹⁸ which focuses particularly on helping SMEs to find suitable international partners for innovation commercialisation. In addition to information and network-building, parties can also benefit from support, both administrative and financial, in compiling project proposals for EU instruments. The combination of support activities such as these will lower the threshold and probably also

97. <https://s3platform.jrc.ec.europa.eu/pri>

98. <https://een.ec.europa.eu/> and specifically for the Netherlands: <https://www.rvo.nl/onderwerpen/een>



Figure 14

Recommendation 5 Provide support in making use of EU instruments

increase the success rate, especially for those parties which currently find it difficult to access EU instruments.

3.6 Safeguard opportunities for collaboration with attractive non-EU partners

Recommendation 6: *The Netherlands must make efforts to keep open the opportunities for collaboration with partners from the United Kingdom, Switzerland and Israel within the EU STI programmes. If this fails at any point, the Netherlands must work on bilateral options for collaboration where this offers clear added value.*

Being a member of the right networks of domestic and international partners has clearly added value for research and innovation. Several analyses show that Dutch actors work well with partners from within and beyond the Netherlands. EU STI policy provides important support for this. Recent years have seen growing collaboration with partners from Southern and Eastern European countries. At the same time, however, Dutch actors also collaborate frequently with reputed partners from non-EU countries such as the United Kingdom, Switzerland and Israel. It is in the interests of Dutch STI and its impact that collaboration with partners from those countries remains possible, preferably – as in recent years – within EU programmes. Israel's recent associate membership of Horizon Europe is a positive development.⁹⁹ Negotiations are still ongoing for the United Kingdom, although the UK is currently funding its own domestic actors if they are successful within Horizon Europe.¹⁰⁰ Switzerland also currently has no associate membership and qualifies as a 'third-party country'; it funds successful Swiss actors itself.¹⁰¹ If it proves impossible to promote collaboration with these countries through the framework of EU programmes, the Netherlands will need to look to bilateral arrangements as a safety net.

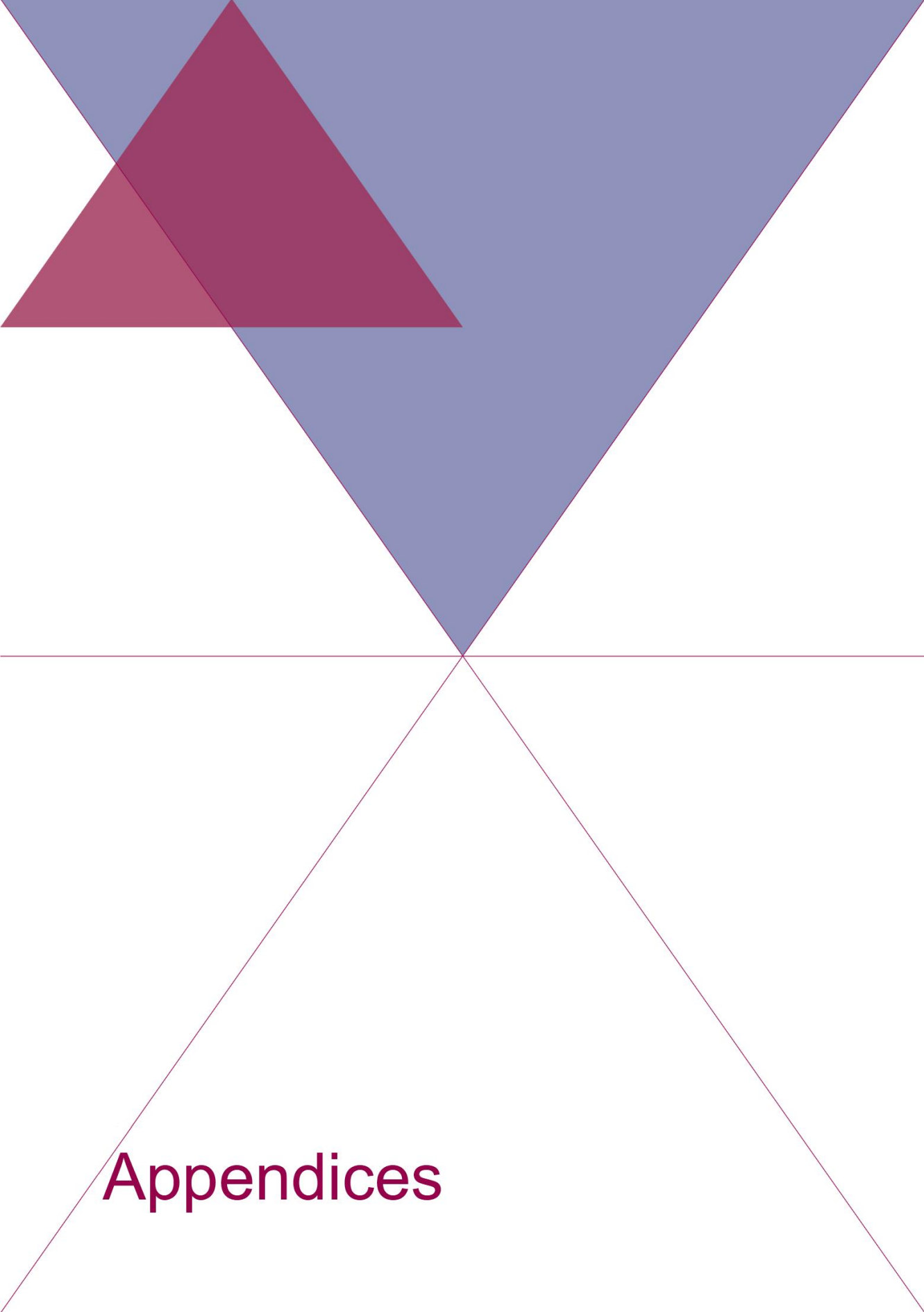
99. European Commission, Directorate-General for Research and Innovation (2021b), 'Israel joins Horizon Europe research and innovation programme', News Article dated 6 December 2021: https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/israel-joins-horizon-europe-research-and-innovation-programme-2021-12-06_en

100. Department for Business, Energy & Industrial Strategy (2022), 'Government extends Horizon Europe financial safety net', press release dated 19 December 2022: <https://www.gov.uk/government/news/government-extends-horizon-europe-financial-safety-net--2>

101. Federal Department of Economic Affairs, Education and Research - State Secretariat for Education, Research and Innovation (2023), *Status Update: Swiss participation in Horizon Europe and related programmes and initiatives, Information as of 30 January 2023*, accessed at: https://www.sbf.admin.ch/dam/sbf/en/dokumente/2019/02/horizon-europe.pdf.download.pdf/Fact-sheet_Horizon_en.pdf



Figure 15 Recommendation 6 Safeguard opportunities for collaboration with attractive non-EU partners



Appendices

Appendix 1 Request for advice



Ministerie van Onderwijs, Cultuur en
Wetenschap

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Contactpersoon

Onze referentie
33848237

Datum **22 SEP. 2022**

Betreft Adviesvraag benutting Europese WTI-beleid

Geachte heer Bruins,

De huidige geopolitieke verschuivingen en de veranderingen binnen de EU hebben beide hun weerslag op het Europese WTI-beleid en de aansluiting daarvan op het Nederlandse beleid voor wetenschap, technologie en innovatie. Hierbij vraag ik, mede namens mijn ambtsgeenoot van Economische Zaken en Klimaat, de AWTI om een advies uit te brengen op de vraag:

Hoe kan Nederland optimaal gebruik maken van het Europese WTI-beleid ten behoeve van de versterking van de impact van wetenschap, technologie en innovatie in en vanuit Nederland?

Bij deze vraagstelling zou in het bijzonder ingegaan kunnen worden op de volgende onderwerpen:

- 1) De borging van de waarde van een Europees kaderprogramma specifiek gericht op (fundamenteel) onderzoek en innovatie tegen de achtergrond dat Europese sectorale en cross-sectorale prioriteiten gericht op maatschappelijke transitie steeds meer de overhand krijgen.
- 2) Het bewaken van evenwicht tussen het belang van fundamenteel excellent onderzoek enerzijds (pijler 1 Horizon Europe: 'excellente wetenschap') en opschaling en impact anderzijds (pijler 3 Horizon Europe: 'innovatief Europa'), binnen een Europees kaderprogramma voor onderzoek en innovatie.
- 3) De rol van onderzoeks- en innovatie-ecosystemen bij het dichten van de innovatiekloof, mede in het licht van de vraag of er thema's en sectoren voor Nederland zijn waar nog onbenutte Europese samenwerkingsmogelijkheden liggen. Tevens de vraag of projecten die gefinancierd worden vanuit het Nationaal Groeifonds hier een rol bij kunnen spelen.

Met vriendelijke groet,

de minister van Onderwijs, Cultuur en Wetenschap,

Robbert Dijkgraaf

[Translation of the letter in English]

Ministry of Education, Culture and Science

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Research and Science Policy

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Contact

Our ref.
33848237

Date: 22 SEP. 2022

Re.: Request for Advice on utilising European STI policy

Dear Dr Bruins,

The current geopolitical shifts and the changes taking place within the EU both have an impact on European STI policy and its alignment with Dutch policy for science, technology and innovation. On my own behalf and on behalf of my colleague at the Ministry of Economic Affairs and Climate Policy, I am writing to request advice from AWTI concerning the following question:

How can the Netherlands make optimum use of European STI policy in order to strengthen the impact of science, technology and innovation within and from the Netherlands?

In addressing this question, particular attention could be given to the following topics:

- 1) Embedding the value of a European framework programme specifically aimed at (basic) research and innovation in a context where European sectoral and cross-sectoral priorities focusing on societal transition are acquiring increasing prominence.
- 2) Monitoring the balance between the importance of excellent basic research on the one hand (pillar 1 in Horizon Europe: 'Excellent Science') and upscaling and impact on the other (pillar 3 of Horizon Europe: 'Innovative Europe'), within a European framework programme for research and innovation.
- 3) The role of research and innovation ecosystems in closing the innovation gap, partly in the light of the question of whether there are themes and sectors for the Netherlands where as yet untapped opportunities for European collaboration exist. Also whether projects that are funded from the National Growth Fund could play a role here.

Yours sincerely,

The Minister of Education, Culture and Science,

[signed]

Robbert Dijkgraaf

Appendix 2 Reviewers

In the final phase of compiling this report, a draft version was submitted to 2 external reviewers. They were asked to reflect on the consistency of the draft report and identify any gaps. The reviewers' comments were then incorporated under the responsibility of the Council.

The reviewers for this report were:

- ▶ Dr J.J.H. (Jan) van den Biesen MBA, Adviser on European Research Policy and Research & Innovation Strategies at EUROPOLARIS
- ▶ M.A. (Marc) Holtkamp, Senior adviser in strategic collaboration at Leiden University

Appendix 3 Interviewees

▶ Muriël Attané	EARTO
▶ Christine Balch	Netherlands Organisation for Applied Scientific Research (TNO)
▶ Gaby Bes	ASML
▶ Michael Binder	Forschungsförderungsgesellschaft (FFG)
▶ Nora van Bracht	Ministry of Education, Culture and Science
▶ Marjolijn Brussaard	ArtEZ; Netherlands Association of Universities of Applied Sciences
▶ Erik Drop	Netherlands Organisation for Applied Scientific Research (TNO)
▶ Servaas Duterloo	TU Delft
▶ Werner van Eck	MEP Communicatiesystemen
▶ Thomas Geernaert	Flemish Council for Science and Innovation
▶ Audrey Goosen	Permanent Representation in Brussels
▶ Lisa Gorter	UNL
▶ Dolf Grasveld	Permanent Representation in Brussels
▶ Marc Holtkamp	European Commission (at the time of the interview)
▶ Joep Houterman	Fontys; Netherlands Association of Universities of Applied Sciences
▶ Ineke Hoving-Nienhuis	Ministry of Economic Affairs and Climate Policy
▶ Linda Hulspas	Netherlands Enterprise Agency (RVO)
▶ Jasper Jans	Dutch Education Council
▶ Hans Kamphuis	RVO Enterprise Europe Network
▶ Doenja Koppejan	Ministry of Education, Culture and Science
▶ Arco Krijgsman	ASML
▶ Melle Kromhout	Royal Netherlands Academy of Arts and Sciences (KNAW)
▶ Marjolein Lauwen	Ministry of Education, Culture and Science
▶ Veerle Linseele	Flemish Council for Science and Innovation
▶ Emy Margarittha	Netherlands Enterprise Agency (RVO)
▶ Frank Nouwens	Beefy Green

▶ Juliët van Oudenhoven	TU Delft
▶ Koen de Pater	Ministry of Economic Affairs and Climate Policy
▶ Bart Pierik	UNL
▶ David van der Plas	Ministry of Economic Affairs and Climate Policy
▶ Stephan Raes	OECD
▶ Danielle Raspoet	Flemish Council for Science and Innovation
▶ Elie Ratinckx	Flemish Council for Science and Innovation
▶ Jurgen Rienks	Neth-ER
▶ Karin Roelofs	Radboud University; Association of ERC Grantees
▶ Patrick Schelvis	Ministry of Economic Affairs and Climate Policy
▶ Wijnand van Smaalen	Province of Zuid-Holland
▶ Jan Reint Smit	Netherlands Enterprise Agency (RVO)
▶ Robert-Jan Smits	TU Eindhoven
▶ Luc Soete	Maastricht University
▶ Talitha Stam	Dutch Education Council
▶ Meindert Stolk	Province of Zuid-Holland
▶ Merei Wagenaar	Ministry of Foreign Affairs
▶ Margot Weijnen	Dutch Research Council (NWO)
▶ Olga Wessels	European Consortium of Innovative Universities
▶ Jack de Wit	RijkZwaan

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