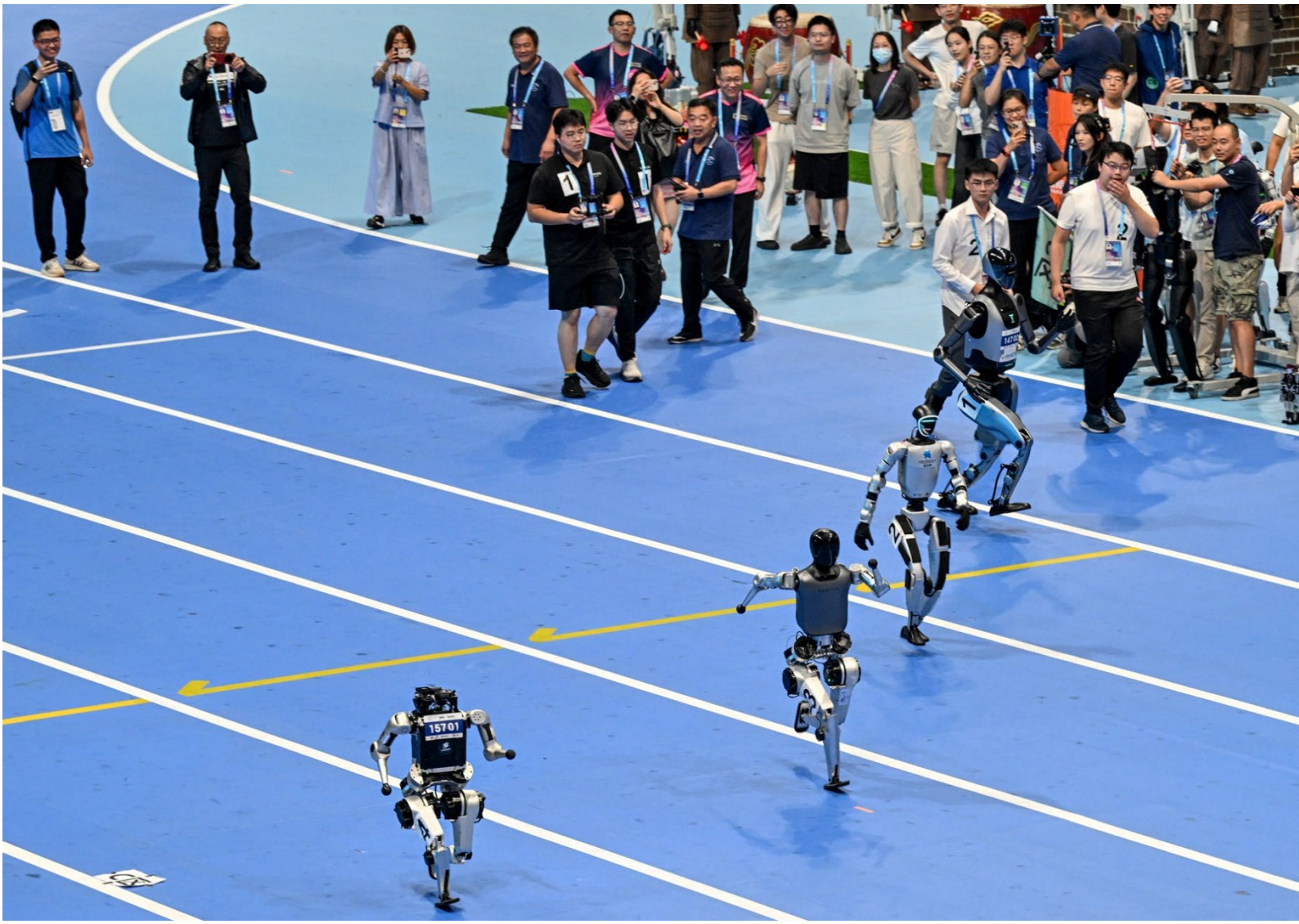
Rathenau Instituut

Geopolitics in Science Policy

Dilemmas for the mobilization of research



Exploratory Study

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Humanoid robots during the 100-metre sprint at the World Humanoid Robot Games in Beijing on 14 August 2025. (Photo: Adek Berry/AFP/ANP).

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Foreword

If you ask scientists, administrators, policymakers and politicians about the role of science in these geopolitically turbulent times, the answers vary. Take the dilemma of whether to collaborate with illiberal countries such as Russia, China, Iran, Israel, and – new to this list – the US.

One expert will argue that now, more than ever, we must continue to collaborate, as it provides access to talented researchers and state-of-the-art knowledge. A second calls for clear boundaries to cooperation to avoid becoming dependent. And a third wants to sever ties to prevent undesirable knowledge transfer.

All three have valid arguments. Every answer or perspective seems logical. Only when you zoom in do you realise that different public values lie behind the various perspectives.

In this exploratory study, the Rathenau Instituut lists the eight most common perspectives. These perspectives are employed, for example, by government departments, advisory bodies, knowledge institutions and other intermediary organisations.

Complex policy issues often involve multiple perspectives simultaneously. This gives rise to tensions regarding the direction and organisation of science. The current geopolitical climate only makes these tensions more urgent and complex. This creates complex dilemmas, such as whether = to collaborate with illiberal countries, and the need to safeguard open science versus prioritising military interests.

With this exploratory study, we aim to strengthen the public and political debate on science and science policy so that our country can make well-considered, balanced and, therefore, democratic decisions.

Prof. Dr. Eefje Cuppen
Director of the Rathenau Instituut

Summary

Technological and geopolitical developments, such as war in Europe and the rise of new world powers, are leading to changes in scientific research and science policy. We see these changes in the substantive priorities of research and in the organisation of research. The Netherlands and other NATO countries, for example, have agreed to invest significantly more in defence-related research in the coming years. There is also a more critical assessment of which countries and institutions are desirable partners for international research collaboration.

International collaboration and open science no longer seem to be a given. Some types of research, such as basic research or climate research, appear to be losing priority. On the contrary, other research domains – such as key enabling technologies – are receiving greater attention.

These changes are far-reaching and their consequences are uncertain. Moreover, they touch upon a number of key values in science, such as transparency, openness and the importance of international cooperation. Many people within and outside the scientific community are concerned. They feel that the changes in science are happening too quickly or, conversely, too slowly. At the same time, there is little clarity on the exact impacts of geopolitical unrest on science. This makes it more difficult to weigh policy options and pursue sensible policymaking.

Based on an exploratory study, the Rathenau Instituut presents an overview of how Dutch policymakers and practitioners understand the relationship between geopolitics and science. It also outlines the implications of these perspectives for the science system..

By ‘science system’, we mean the entirety of public organisations involved in the implementation, organisation and management of scientific research in the Netherlands. In addition to knowledge institutions, such as universities of applied sciences, universities and research institutes, the science system also includes the organisations responsible for management, funding and coordination, such as ministries, research funding bodies and advisory councils.

The present exploratory study yielded eight characteristic perspectives. These perspectives illustrate the various ways in which stakeholders interpret the changing geopolitical situation (the problem analysis) and the way in which they subsequently translate this interpretation into policy and action (possible solutions).

These perspectives embody assumptions and ideas about what science can and should be, and what it should do. Depending on the perspective of the beholder, certain changes to the science system are more or less desirable.

Each of the perspectives centres on a characteristic concept. These are: strategic autonomy, technological sovereignty, competitiveness, national security, knowledge security, sustainability transitions, academic freedom, and science diplomacy. Each perspective has its own views regarding the science system and, when dominant, has consequences for science policy. Which perspective is or will become dominant partly determines the shape of the science system.

By juxtaposing these perspectives, we can see emerging tensions and dilemmas. In part, these are existing dilemmas that are gaining relevance due to geopolitical developments. And in part, they are also new dilemmas.

The five key tensions and dilemmas are:

1. Open science versus military interests; concerning the implications and trade-offs surrounding the growing budgets for defence-related research.
2. European coordination versus national science policy; concerning the relationship between European and national coordination of the Dutch science system.
3. Applied versus basic research; on the extent to which the science system should align with changing political priorities and societal needs.
4. Security versus sustainability; on the extent to which research for security objectives can be effectively combined with research for sustainability objectives.
5. Whether to collaborate with illiberal countries; on the conditions for international collaboration with countries and institutions that do not share the same democratic or academic values.

We propose that people within the scientific community engage in dialogue with one another about these dilemmas and about the why, what for, what and how of science. Such a conversation or dialogue can foster mutual understanding and appreciation for the pluralistic values of science. Furthermore, this dialogue helps to guide, coordinate and organise scientific research in these times of geopolitical turmoil.

Contents

1 Introduction

For a long time, international students and staff at universities and universities of applied sciences were seen as a sign of quality and an opportunity for the Dutch labour market. Now, hundreds of foreign researchers and opportunities for collaboration are being turned away because they are deemed to pose too great a risk.[1] In the Science Vision 2025, drawn up over ten years ago, scientific collaboration with China was seen as an opportunity. The 2022 threat assessment on state actors states that 'China poses the greatest threat to Dutch knowledge security.'[2] In places where flyers on sustainability used to hang, we now see posters from the Ministry of Defence.[3] And during a recent opening ceremony, outgoing Prime Minister Schoof said that universities and universities of applied sciences 'train people [who] will soon become the best recruits for our armed forces.'[4] These are a few examples that show that the science system in the Netherlands has changed significantly in recent years as a result of geopolitical shifts.

Geopolitics concerns international power relations between countries. In recent years, we have seen rapid changes in how countries and power blocs operate in relation to one another.[5] Geopolitics is not only about military power, but also about international power relations in other domains, such as the economy, food, raw materials, the media and international regulation (such as the UN or the International Criminal Court). Science and technology are increasingly becoming explicit elements of geopolitical relations.The Netherlands and Europe are confronting a new world order in which they feel significantly more vulnerable—economically, institutionally, and militarily—than before..

Science and technology play a significant role in the shifting geopolitical landscape. On the one hand, they act as a driving force behind these changes. China, for example, has developed into an economic and military superpower through years of targeted investment in science and technology. On the other hand, geopolitical shifts also have implications for how countries wish to manage, fund and organise their science systems. The Netherlands and other NATO countries, for example,

1 https://nos.nl/artikel/2560912-universiteiten-wijzen-honderden-buitenlandse-onderzoekers-en-samenwerkingen-af.
2 AIVD et al., 2022.
3 https://hvana.nl/nieuws/laat-de-hva-zich-voor-karretje-van-defensie-spannen .
4 'Just as the University of Twente and Saxion are training people here for research and development, with a view to eventually producing the best equipment for our armed forces and for the entire supply chain that contributes to this.' https://www.rijksoverheid.nl/documenten/toespraken/2025/09/01/toespraak-mp-schoof-bij-opening-hogeschool--en-academisch-jaar.
5 Scientific Council for Government Policy, 2024.

have agreed to invest significantly more in research and technology development for defence. And there is a more critical assessment of with whom international cooperation is desirable and under what conditions.

Consequences of the changing geopolitical landscape are already clearly visible in the way scientific research is organised in the Netherlands.[6] International cooperation is under greater pressure. The open science movement is facing restrictions due to knowledge security concerns.[7] Cuts are being made to basic research and education, whilst key emerging technologies and defence are being given higher priority and more funding.[8] There appears to be a consensus that adjustments are necessary, but a clear and widely supported plan is lacking.

These changes are therefore leading to uncertainty and a lack of clarity regarding the scope, direction and organisation of scientific research in the Netherlands. This complicates the political assessment of alternatives for the structure of the science system and the implementation of sensible policy.

Moreover, the changes affect a number of key values in science, such as transparency, openness and the importance of international cooperation in addressing global challenges, for example. There are serious concerns from various quarters about the consequences of geopolitical developments for science. Are we bidding farewell to the open and international character of science, and what do we stand to lose as a result?[9] Or had internationalisation actually gone too far?[10] Are we being too naïve in our cooperation with high-risk countries?[11] What is the role of universities and research institutes in a technological arms race, and what legal, political and ethical questions arise in relation to military research?[12] Which democratic and academic values are at stake?

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6 This is also in line with other OECD countries (OECD, 2025).

7 See the NWO website on knowledge security (https://www.nwo.nl/kennisveiligheid); the KNAW position paper on knowledge security (Royal Netherlands Academy of Arts and Sciences, 2023); and the AWTI advisory report on knowledge security (Advisory Council for Science, Technology and Innovation, 2022).

8 Examples of this include the National Technology Strategy (Ministry of Economic Affairs and Climate Policy, 2024); the new industrial policy (Ministry of Economic Affairs, 2025b); and the AWTI advice on knowledge for defence (Advisory Council for Science, Technology and Innovation, 2024a).

9 https://www.knaw.nl/nieuws/statement-van-de-knaw-wetenschap-kent-geen-grenzen-behoud-het-open-wetenschapssysteem; https://www.nrc.nl/nieuws/2025/03/25/wetenschap-floreert-bij-open-grenzen-het-huidige-beleid-gooit-de-grenzen-juist-dicht-a4887575.

10 https://www.ewmagazine.nl/nederland/opinie/2023/06/omtzigt-e-a-het-kabinet-moet-nederlands-weer-verplicht-stellen-op-universiteiten-1044058.

11 With China: https://hcss.nl/news/follow-the-money-ook-samenwerken-met-gewone-chinese-universiteiten-levert-risicos-op. Or with Israel: https://www.tudelft.nl/2025/tu-delft/nieuwe-samenwerkingen-met-israel-per-direct-opgeschort-bestaande-samenwerkingen-onder-herbeoordeling.

12 See, for example, https://universonline.nl/nieuws/2024/12/04/best-university-we-need-to-talk-about-militarisation or https://www.scienceguide.nl/2025/10/duitse-oppositie-wil-opnieuw-vredesclausules-tegen-militarisering-universiteiten-en-hogescholen.

Exploring the implications for the science system

The Rathenau Instituut conducts ongoing research into how developments in society and in science influence one another.[13] After all, it is important that scientific research is properly aligned with society's changing needs, expectations and demands regarding science. Geopolitical developments raise important questions about this alignment.

The first aim of this publication is to identify what the changing geopolitical relations mean (or will mean) for the Dutch science system (see Box 1 for an explanation of what we mean by the science system). Scientific *education* fell outside the scope of this research, but is of course closely intertwined with scientific research. The second aim is to explore the strategic questions to which science policy must find answers. This publication thus provides a basis for political debate and policy development, for example by working with stakeholders in the science system to further develop these strategic questions and dilemmas into actionable perspectives.

The central question in this exploration is:
How do geopolitical developments translate into changing priorities and organisation of the science system, and what strategic questions and considerations arise from this?

To answer this question, we investigated how policymakers and other stakeholders involved in the science system translate the changing geopolitical situation into different priorities for science, different policy approaches, and a different scale or distribution of public research funding.

To this end, we first conducted a document analysis of policy papers, letters, advisory reports and other documents. Additionally, we conducted a number of interviews with policymakers and policy implementers and participated in various external meetings, including dialogues and conferences. Furthermore, we studied the debate surrounding geopolitics and science by reading news articles and opinion pieces. For a more detailed explanation of the used methods, see Appendix 1.

13 Examples of this include a foresight study on science policy (Rathenau Instituut, 2024) and research into digital dependency (https://www.rathenau.nl/nl/digitalisering/naar-een-nieuwe-verhouding-tot-technologiebedrijven/van-digitale-afhankelijkheid-naar-digitale-autonomie).

Box:1 What do we mean by ‘science system’?

By ‘the science system’, we mean the collective body of public organisations involved in the implementation, organisation and management of scientific research in the Netherlands. The system comprises a broad mix of public knowledge institutions dedicated to academic and applied research. It includes universities, universities of applied sciences, research institutes for fundamental and applied research, university medical centres and all manner of other public and policy-oriented knowledge organisations. The researchers at these organisations conduct scientific research, organising themselves into projects, programmes, consortia and networks. The science system also includes the (policy) organisations and other bodies responsible for the management, funding and coordination of research. A key player is the Ministry of Education, Culture and Science (OCW), which is responsible for the research and science system. However, it also involves other ministries with knowledge or innovation policies, research funders such as NWO and ZonMw, coordinating bodies (such as programme committees) and advisory organisations (such as the KNAW and the AWTI).

Reading guide

Chapter 2 describes the perspectives through which various parties within the science system interpret the changing geopolitical relations and the implications this has for the governance, funding and organisation of science in the Netherlands. Chapter 3 then introduces five dilemmas for science policy arising from tensions within and between these perspectives. The final chapter, Chapter 5, calls for a joint search for answers to these dilemmas.

2 Changes in the science system

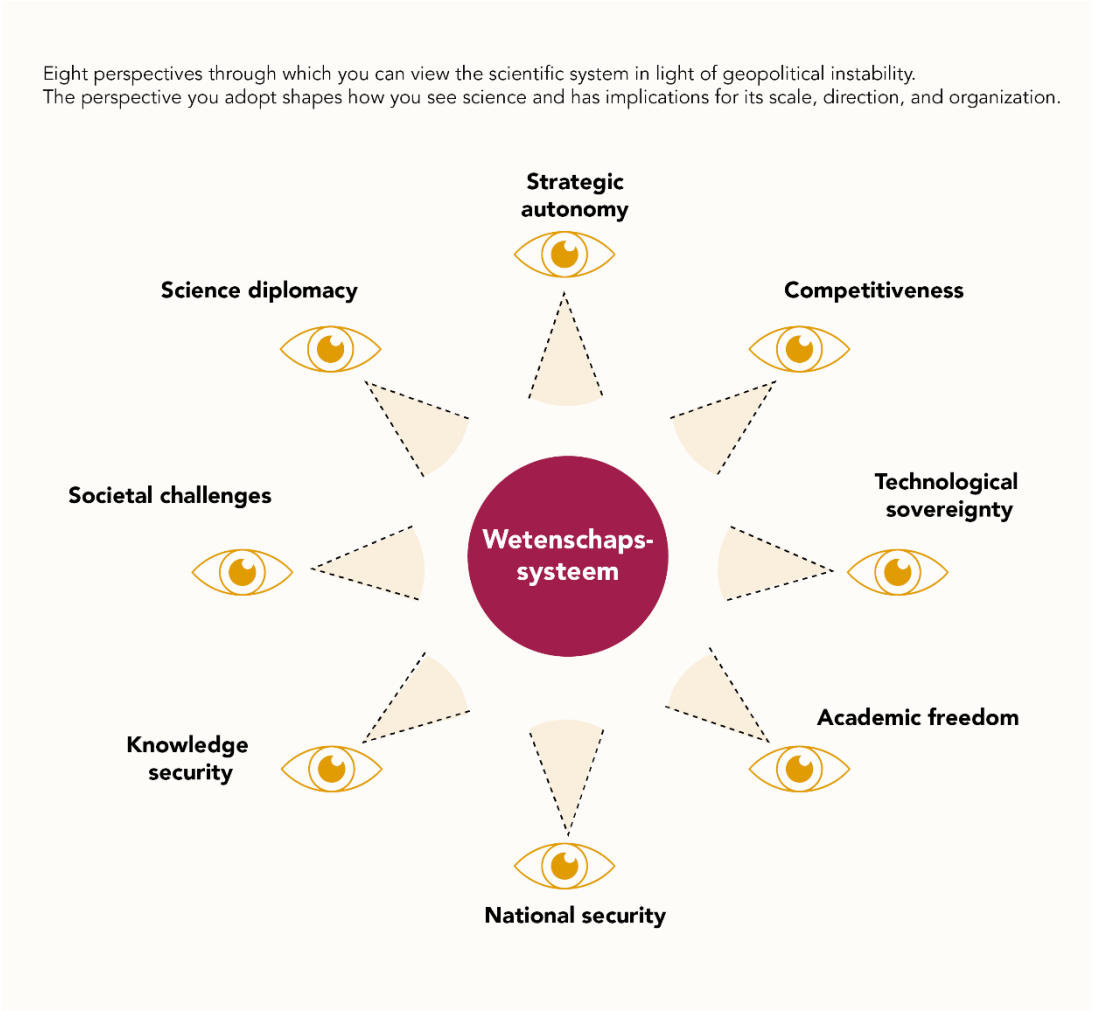
The rapidly changing geopolitical landscape is leading to divergent reactions among the various policymakers and other parties involved in the governance, coordination and funding of science in the Netherlands. Our exploratory study found that different stakeholders interpret the geopolitical context in diverse ways, leading to varying expectations, knowledge needs, and demands for science..

We identified eight recurring perspectives that characterised the way in which parties interpret the changing geopolitical situation (the problem analysis) as well as the way in which they subsequently translate this interpretation into different or new priorities and approaches with which the Netherlands should steer, fund and organise the national science system (the solution direction). We use the concept of *perspectives* to gain insight into the way in which actors define changing situations and problems and formulate corresponding solution approaches.

These perspectives embody assumptions and ideas about what science can and should be, and about which geopolitical developments matter and are most urgent. Perspectives are also linked to which values come to the fore and which fade from view. They also influence the allocation of resources – i.e. the instruments, rules and programmes deemed acceptable or desirable. Which perspectives receive attention therefore has real consequences for the science system (see also Figure 1).

The eight perspectives:
1. Strategic autonomy (section 2.1).
2. Technological sovereignty (section 2.2).
3. Competitiveness (section 2.3).
4. Academic freedom (section 2.4).
5. National security (section 2.5).
6. Knowledge security (section 2.6).
7. Societal challenges (section 2.7).
8. Science diplomacy (section 2.8).

Figure1 Eight perspectives on the science system



Eight perspectives through which you can view the science system in the light of geopolitical unrest. The perspective you adopt influences how you view science and has consequences for its scope, direction and organisation. Source: Rathenau Instituut.

In the following sections, we describe each perspective by outlining which aspects of changing geopolitical relations it emphasizes, the values it prioritizes, the actors that commonly adopt it, the policy domains it informs, and the adjustments to the science system associated with it. We distinguish between adjustments in the scale of research funding, the governance and direction of research, and the organisation of research.

In practice, as our exploratory study shows, some perspectives overlap. A summary of the perspectives and the accompanying analysis is provided in Table 1 at the end of this chapter.

2.1 Strategic autonomy

The first perspective focuses on strategic autonomy. It refers to a country's ability, as a global player and in collaboration with international partners, to safeguard its national interests and public values based on its own insights and choices, and to remain resilient in an interconnected world.[14] In the EU and the Netherlands, the concept *of open strategic autonomy* has been embraced to emphasise the importance of open trade and international cooperation.[15] For the European Commission in particular, strategic autonomy plays a central role in the perspective through which it translates the changing geopolitical situation into other policy priorities and policy approaches for science, technology and innovation. In the Netherlands, strategic autonomy characterises the perspective through which the Ministry of Defence, the Advisory Council on International Affairs and the Ministry of Economic Affairs translate geopolitical developments into different priorities and approaches for research and innovation policy.

From the perspective of *strategic autonomy,* it is important that scientific research and education contribute to the knowledge and technology needed to make independent strategic choices across a wide range of fields. A key feature of this perspective is the call for larger R&D budgets, both for R&D in general, but particularly in strategic domains such as research for innovation in defence, energy or the microchip sector.[16] Because the Netherlands is too small to compete at the forefront of science across all fronts, this perspective advocates choosing strategic niches. A niche may be an industrial hub, such as the ecosystem surrounding ASML, but it may also have a scientific focus, such as large-scale scientific infrastructure or an excellent research group. Leadership in strategic niches improves the geopolitical balance of power relative to other countries, as it can serve as a means of exerting pressure or as strategic leverage in mutual relations.

One policy strategy in which this perspective is clearly evident is the National Technology Strategy. It identifies ten technology domains as priorities in light of two geopolitical developments: increased international technological competition, and other countries' strategic focus on strategic technology domains. For example, it

14 Letter from the government on open strategic autonomy (Ministry of Foreign Affairs et al., 2022).

15 'For the government, the European Union's open strategic autonomy represents its *ability, as a global player and in cooperation with international partners, to safeguard its public interests and remain resilient in an interconnected world, based on its own insights and choices*.' (Ministry of Foreign Affairs et al., 2022, p. 3).

16 For example, the AWTI advisory report on a 'knowledge offensive' for defence (Advisory Council for Science, Technology and Innovation, 2024a), the AIV advisory report on 'smart industrial policy' (Advisory Council on International Affairs, 2022); and the news item from the national government on 'Project Beethoven' (https://www.rijksoverheid.nl/actueel/nieuws/2024/03/28/nederland-investeert-25-miljard-euro-in-sterk-ondernemingsklimaat-voor-microchipsector-brainport-eindhoven).

states that for the Netherlands, 'it is important to (…) continue to participate in the rapid global technological developments.'[17]

Furthermore, from this perspective, there is a call to reduce existing dependencies in science. From this perspective, science and technology have become part of a geopolitical power struggle[18] , in which rival power blocs undermine the scientific and technological sovereignty of other regions through interference, espionage and strategic takeovers. Based on this reasoning, the Ministries of Education, Culture and Science (OCW), Economic Affairs (EZ) and Justice and Security (J&V), and the Advisory Council for Science, Technology and Innovation (AWTI) advocate countering interference, undesirable knowledge transfer in science, foreign mergers, and investments and acquisitions of strategic, knowledge-intensive companies.[19]

From this perspective, the main challenge facing society – and (indirectly) the scientific community – is that, due to significant dependencies in the technological, economic and military spheres, Europe's geopolitical position of strength is diminishing in relation to other power blocs that are, at least in some respects, rivals. Think, for instance, of China (raw materials and goods), Russia (gas) or the US (digital technology, defence). These dependencies undermine the ability to safeguard national interests based on our own insights and choices. Furthermore, they can lead to a loss of control over key European values, for example where technology infringes on privacy or when sustainability depends on raw materials to which we have no access. Conversely, strategic autonomy also involves creating and exploiting dependencies amongst rivals.[20] Values that are important to parties within this perspective include (broad) prosperity, national and economic security, innovation, speed, (in)dependence, competition and cooperation.

2.2 Technological sovereignty

Technological sovereignty is the ability of a country, or a group of countries, to develop and use technologies that are important for its own well-being, potentially in collaboration with others, without being unilaterally or structurally dependent in the

17 Ministry of Economic Affairs and Climate Policy, 2024, p. 7.
18 Scientific Council for Government Policy, 2024.
19 Oberon and Dialogic, 2024; Advisory Council for Science, Technology and Innovation, 2022; Ministry of Education, Culture and Science, 2024. See also a news report on the takeover of control of Nexperia by outgoing Minister Karremans of Economic Affairs (https://nos.nl/artikel/2586846-chinees-exportverbod-op-cruciale-chips-voor-auto-industrie-hoe-nu-verder).
20 TNO Vector, 2024.

process.[21] This perspective has received considerable attention in recent years as a result of the increased dependence of governments in the digital domain, the changed stance of the US towards the EU, and the COVID-19 pandemic.

As the above definition already shows, there is a significant overlap between technological sovereignty and strategic autonomy (section 2.1). Nevertheless, we also see differences between the two perspectives. Not only in the priorities that arise from them, but also in the consequences for the science system and the parties that adopt these perspectives. The starting point for technological sovereignty is that the Netherlands or the EU must possess the technological capabilities in-house to safeguard vital functions and services, such as healthcare, food and security, and thus to reduce dependencies. Consequently, the focus is primarily on its own functioning and well-being. Strategic autonomy has a different focus, with a stronger emphasis on safeguarding national interests through a country's strategic options for action vis-à-vis other countries.

A focus on technological sovereignty has at least three relevant implications for science.[22] The first implication is that, from this perspective, it is important to be actively involved in research areas necessary for safeguarding vital functions and services. This is because different countries may have different approaches to organising matters such as healthcare, education and security. The idea behind technological sovereignty is that by conducting research yourself, you *are in the driver's seat* and can design and use technology in a way that is in line with a country's interests and values.

The second implication for science is that, under technological sovereignty, research priorities stem from what is needed to better safeguard vital functions and services and reduce any dependencies. This contrasts with strategic autonomy, in which national and public interests can also be achieved through dominance in a number of strategic niches. An example of research priorities being derived from what is needed to safeguard vital functions and services – in this case healthcare – is the way in which ZonMw currently funds medical research. In this context, a

21 Edler et al. (2023) define technological sovereignty as 'the ability of a state or a federation of states to provide the technologies it deems critical for its welfare, competitiveness, and ability to act, and to be able to develop these or source them from other economic areas without one-sided structural dependency.' Technological sovereignty therefore involves a combination of reliable access to technology or relevant components, which can be ensured both through domestic provisions (own capabilities) and through relationships with other economic regions (external networks). Lee et al. (2023) emphasise that technological sovereignty should not be equated with 'technonationalism' and protectionism. No single country can master a technology in all its components. Similarly, March and Schieferdecker (2023) also argue that technological sovereignty should not be confused with a pursuit of autarky and nationalism. International cooperation and trade are, in fact, important for strengthening technological sovereignty.

22 Related interventions that fit within this framework include a greater emphasis on public procurement, technology regulation and import duties.

budget is made available for research into a relevant issue, and scientists from various disciplines are invited to submit proposals.

The third implication for science is how this perspective advocates for the protection of knowledge development. The focus here is not so much on the undesirable transfer of knowledge to rival states, but rather on undesirable external influence, as this undermines our own capabilities.

In the Netherlands, alongside the European Commission, it is primarily government departments that are actively addressing this issue, such as the Ministry of the Interior and Kingdom Relations for digital technology, the Ministry of Defence for military technology, and the Ministry of Climate and Green Growth for energy technology. The Ministry of Economic Affairs and TNO also apply this perspective to some extent in the National Technology Strategy (NTS) (and likely in the forthcoming industrial policy). As mentioned, technological sovereignty also touches on knowledge security, in which the Ministry of Education, Culture and Science plays a major role. As with strategic autonomy, there is a shared awareness among these parties that most Member States cannot achieve technological sovereignty on their own, and that the Netherlands will therefore also become more dependent on European cooperation in technology development.

Society is deeply intertwined with technology. How that technology works influences how society functions: from the way we interact with one another to our production and consumption. Technological sovereignty reveals which public values are strengthened or compromised due to our own (deficient) technological capabilities. One example is the concern for privacy in certain digital communication technologies originating from China, such as 5G technology. If we lack sovereignty over this technology, citizens' privacy and the security of the Netherlands may be compromised. Which values are important therefore depends partly on the technology in question. In general terms, the values of sovereignty, independence, competition and broad prosperity (of people and businesses) are important to those involved in this field.

2.3 Competitiveness

A third perspective revolves around the concept of competitiveness. Competitiveness describes the extent to which the Netherlands or the EU can offer products and services on the market that are more attractive than those of competing countries or power blocs. Although this perspective is certainly not new, we are seeing a renewed appreciation of it in times of geopolitical unrest, particularly thanks to the influential report written by Mario Draghi on behalf of the

European Commission.[23] Key stakeholders adopting this perspective include, alongside the EC, the Ministry of Economic Affairs, TNO and business lobby groups such as VNO-NCW.

From the perspective of *competitiveness*, the mobilisation of research for economic strength, productivity and growth markets is central. Sometimes stakeholders speak of a knowledge reservoir, which can be tapped for economic growth and prosperity.[24] Concrete examples include calls for: increasing R&D expenditure, strengthening public-private partnerships in R&D, stimulating technological breakthroughs for economic gain, and the importance of creating space for innovative, fast-growing companies, for example through commercialisation policy and attractive regulations for knowledge-intensive start-ups.[25] The idea that technological development is a race that society wants to win is clearly reflected in this perspective.

The thinking is that competitiveness leads to economic growth and that the economic benefits can then be used to deliver public services and thus ensure resilience – socially, economically and militarily. In this way, we could protect our European, democratic values. Those within this perspective attach great importance to the values of economic growth and (broad) prosperity. This requires a strong business climate, entrepreneurship, technological innovation, and the ability to attract international talent.

2.4 Academic freedom

The fourth perspective concerns academic freedom. Academic freedom is ‘the principle that staff at academic institutions are free to conduct their scientific research, publish their findings and teach’.[26] Academic freedom, often alongside freedom of expression, is regarded as an essential pillar of the democratic legal order, and concerns both the freedom of scientists and that of academic institutions. Key stakeholders that uphold this perspective include the Royal Netherlands Academy of Arts and Sciences (KNAW), the Ministry of Education, Culture and Science, UNESCO, UNL and AWTI. Various developments, including geopolitical ones such as the direct undermining of academic freedom in, for example, the United States, , have led to renewed attention being paid to the importance of and safeguarding academic freedom.

23 Draghi, 2024.
24 Advisory Council for Science, Technology and Innovation, 2020.
25 Ministry of Economic Affairs, 2025a.
26 Royal Netherlands Academy of Arts and Sciences, 2021 .

This perspective focuses specifically on science and has a number of important implications for the direction and organisation of the science system. In terms of direction, it advocates freedom for scientists and institutions to make their own choices through sufficient unrestricted funding. This does not mean that scientists *simply do as they please*; after all, academic freedom is not absolute but is bounded by professional standards of scientific practice as laid down in the Dutch Code of Conduct for Scientific Integrity. These standards are determined by five principles: honesty, diligence, transparency, independence and responsibility. In terms of organisation, it is important for parties within this perspective that careful consideration is given to the implications of measures relating to collaboration with third parties, such as policies on knowledge security and international cooperation.

The perspective of academic freedom is at odds with some of the other perspectives described in this chapter. This tension arises when, from a different perspective, there are calls for more conditions, restrictions and control. This may jeopardise academic freedom. Consequently, concerns are being raised and critical questions asked about the demarcation, restriction and isolation of knowledge institutions, research and education. At the same time, it is also recognised that science must be protected against undue external influence, whether from businesses, the government or foreign actors. To this end, additional measures are sometimes indeed necessary. Important values associated with this perspective, alongside freedom, are: democracy, human rights, international cooperation and multilateralism.

2.5 National security

The fifth perspective focuses on national security. National security is the ability of a country's government to protect its citizens, economy, values and other institutions. For example, the AIVD website states: 'We stand for the security of the Netherlands and for protecting democracy against national and international threats'[27] . In addition to the obvious protection against military attacks, national security in the 21st century increasingly involves various aspects such as physical, digital, economic, energy, domestic, cyber, human or environmental security. Key bodies adopting this perspective include the Ministry of Defence, the Ministry of Security and Justice (including the National Coordinator for Security and Counter-Terrorism) and the security services, namely the AIVD and MIVD. The Military Police, the Ministry of Foreign Affairs (including the network of diplomatic missions) and the police are also key stakeholders.

27 www.aivd.nl, accessed on 27 November 2025.

The implications for science are, first and foremost, the prioritisation of research that serves national security. In particular, the importance of defence research stands out. Scientific research and technological development serving defence are crucial from this perspective. To illustrate this, the Ministry of Defence recently announced an additional €35 million ‘for research to maintain a combat advantage’.[28]

In addition, there are significant implications for the organisation of science that overlap with the perspective of knowledge security (see section 2.6). This involves limiting vulnerabilities in national security through science by preventing the undesirable transfer of sensitive knowledge that could undermine national security. Examples of such sensitive knowledge include technological knowledge of drones, missiles or naval vessels, but also knowledge about critical infrastructure, such as waterways, railways and digital networks. In addition to preventing the undesirable transfer of knowledge, national security also involves preventing foreign interference in science. This too relates to the perspective of knowledge security (see section 2.6). Science can potentially be used to disrupt societal domains, such as education, energy supply, elections and journalism, in order to sow internal unrest.

From the perspective of national security, the idea is that our country’s democratic values must be protected against internal and external threats. Recently, there has been a particular focus on external threats in the form of state and non-state actors, with the emphasis on conflict between nations. Consequently, a key element of this perspective is the idea of a race, a competition. National security then easily becomes a zero-sum game: the security of one comes at the expense of another, and vice versa. Within this perspective, alongside the value of security, attention is paid to values such as freedom, the international legal order, broad prosperity, a strong armed forces, economic resilience, technological leadership, a strong defence industry, stability and sovereignty.

2.6 Research security

Reserach security concerns the international risks associated with scientific research. In particular, it involves preventing the unauthorised transfer of knowledge and preventing undue interference. The unauthorised transfer of knowledge includes, for example, espionage, theft or the illegal use of knowledge,

28 https://www.defensie.nl/actueel/nieuws/2025/11/07/extra-35-miljoen-voor-onderzoek-om-voorsprong-in-het-gevecht-te-behouden. The research programmes are organised through NWO. With this investment, the Ministry of Defence and NWO are acting on the recommendation of the Advisory Council for Science, Technology and Innovation (2024a).

but also legal knowledge exchange that, intentionally or unintentionally, jeopardises national security. Consider, for instance, the sharing of knowledge about critical infrastructure or technology that could be used for military purposes. Undue interference occurs when scientists are pressured with the aim of influencing the scientific process, for example by not publishing certain findings.[29] Sometimes, promoting ethical conduct in international cooperation is also seen as part of knowledge security. Consider, for instance, preventing the exploitation of inadequate enforcement of environmental or human rights in countries for the purpose of conducting research. Key parties that adopt this perspective include the Ministry of Education, Culture and Science, as well as the Ministry of Economic Affairs, Justice and Security, the AWTI and the KNAW.

This perspective focuses directly on scientific research and has implications primarily for the organisation of science. The National Knowledge Security Guidelines[30] and teams and committees at universities are seeking to raise awareness.[31] A research programme and the Knowledge Security Helpdesk are working to improve the level of knowledge among researchers and institutions. And in early 2025, a bill was submitted for consultation with knowledge institutions regarding the screening of researchers and students working in sensitive research areas.[32]

The call for 'open where possible, closed where necessary' is central to European and national policy[33] and fits well with this perspective. This call captures the tension and balance between openness and closure; two key values in this context. This perspective fits well with how geopolitics and science are viewed from the standpoint of national security, strategic autonomy and competitiveness, particularly where the prevention of undesirable knowledge dissemination is concerned. Furthermore, the perspective aligns with academic freedom and institutional autonomy, insofar as it addresses how external parties (companies, countries) interfere in research.

2.7 Societal challenges

In this perspective, the importance of mobilising science to address major societal challenges is central. For over twenty years, scientists – spurred on by government, international agreements and/or intrinsic motivation – have been working alongside

29 The Clingendael Institute (2020) conducted a study into China's influence on education in the Netherlands.
30 Central Government et al., 2022.
31 Ministry of Education, Culture and Science, 2024.
32 https://www.rijksoverheid.nl/actueel/nieuws/2025/04/07/screening-voor-wetenschappers-die-met-sensitieve-kennis-willen-werken.
33 Central Government et al., 2022.

governments, civil society organisations and companies to tackle challenges such as climate disruption, biodiversity loss, health, resource shortages and social inequality.[34] A characteristic of many societal challenges is that there are differing views on exactly what the problem is and what the best solution would be. Innovation can be used to improve existing systems, but also for radical renewal and systemic change. The perspective that places societal challenges at the centre focuses on the consequences of geopolitical developments (such as war, authoritarian leadership and protectionism) for the substantive priorities for which science is mobilised and for the scope scientists have to collaborate internationally.

In recent years, science and innovation policy has increasingly focused on specifically stimulating research to tackle societal challenges. For instance, the Ministry of Economic Affairs and Climate Policy introduced the mission-driven top sectors and innovation policy (MTIB) to direct research and innovation towards societal issues in the fields of energy, food, water, healthcare and security. In the EU, a substantial part of the Horizon Europe programme was linked to the European Green Deal. Within NWO, for example, the Dutch Climate Research Initiative was established to mobilise scientific knowledge for transitions towards a climate-neutral and climate-resilient society.

From this perspective, the focus is particularly on the implications of shifting geopolitical relations for the direction and organisation of mission-oriented research. Is political interference in knowledge and innovation agendas changing? Are funding conditions and requirements regarding who may collaborate on projects changing?[35] Are different priorities being set? How much scope is emerging, or remains, for *transformative* innovation policy aimed at just sustainability transitions? What shifts are occurring in the attention and scope that research funders have for matters such as socially responsible research and innovation, action research, transdisciplinary research or citizen science?[36]

It remains unclear how changing geopolitical relations will affect the government's priorities and its approach to directing research toward societal challenges. It is possible that working on societal challenges will no longer be seen as a global task, but primarily as part of national security or sovereignty. A growing focus on security issues could come at the expense of research into other societal

34 The UN Intergovernmental Panel on Climate Change (IPCC) states that accelerated transitions in our economic and social systems (such as food, energy and cities) are needed to limit global warming to a 'safe' limit of 1.5 degrees, to adapt to the inevitable consequences of climate change, and to remain within planetary boundaries. The Climate Act stipulates that the Netherlands must be climate-neutral by 2050.

35 See, for example, the (provisional) agreement intended to make it easier to fund dual-use innovation within Horizon Europe: https://www.consilium.europa.eu/en/press/press-releases/2025/11/05/eu-investments-in-defence-council-and-parliament-agree-to-support-faster-more-flexible-and-coordinated-investments-in-european-defence.

36 Rathenau Instituut, 2025.

challenges such as climate change and biodiversity loss. On the other hand, it could also lead to greater attention being paid to research into the circular economy and the energy transition in order to reduce strategic dependencies on raw materials and fossil fuels.[37]
For example, the European Commission is exploring how to pursue the policy objectives of sovereignty and sustainability simultaneously within its research and innovation policy.
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2.8 Science diplomacy

Science diplomacy describes the various practices in which science and diplomacy converge. Three forms of science diplomacy are generally distinguished.[38] Science *for* diplomacy, which involves utilising scientific cooperation to strengthen diplomatic relations and serve political objectives. Science *in* diplomacy encompasses the idea of *evidence-based* foreign policy, in which research leads to better foreign policy. And diplomacy *for* science, which concerns the deployment of diplomatic actions to promote scientific cooperation.

As both science and diplomacy are under pressure due to geopolitical changes, science diplomacy is receiving renewed attention. Organisations adopting this perspective include the International Science Council, the European Commission, UNESCO, the Dutch Ministries of Education, Culture and Science and Foreign Affairs, NWO, the British Royal Society and the American Association for the Advancement of Science (AAAS). A recent development in the science system is the co-creative design and publication of a new European framework for science diplomacy.[39]

From the perspective of science diplomacy, science is viewed, on the one hand, as a means by which (groups of) countries can exercise and expand their power vis-à-vis other countries.[40] For example, in a new European framework for science diplomacy, the EC writes: ‘As science and technology have increasingly become a geopolitical bargaining chip, science diplomacy is emerging as a key element in leveraging our strength and partnerships for a global Europe.’[41]

37 European Parliamentary Research Service, 2022.
38 The Royal Society & The American Association for the Advancement of Science, 2010.
39 European Commission: Directorate-General for Research and Innovation, 2025. See also the news item announcing the report: https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/european-framework-science-diplomacy-2025-02-13_en.
40 https://www.scienceguide.nl/2025/09/nederland-moet-dringend-investeren-in-academische-samenwerking-met-mondiale-zuiden.
41 European Commission: Directorate-General for Research and Innovation, 2025.

On the other hand, science diplomacy is also an opportunity to tackle shared challenges that affect multiple countries or even the entire planet. In this capacity, science is precisely a means of improving and normalising relations between (groups of) countries and pursuing shared interests. Based on these two seemingly contradictory goals, those who adopt this perspective therefore advocate above all for the promotion of international scientific cooperation.
This primarily results in policy adjustments to the organisation of scientific research, rather than to its direction.
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Within this perspective, various, sometimes conflicting values come into play, as the values of science and those of diplomacy converge here. Collaboration is a key value: between international researchers, between researchers and policymakers, and between countries. At the same time, national interests and security are, from a diplomatic perspective, precisely what matters, and this creates tensions with regard to the openness and freedom that are crucial for science and scientists.

Famous examples of where diplomacy and science converge include CERN and the IPCC. Multiple forms of cooperation are at play simultaneously. At CERN, researchers from all over the world work together, even from countries at war with one another. The IPCC is an example of where diplomatic efforts, via the UN, have resulted in international scientific cooperation on the cross-border issue of climate change, which in turn can contribute to international climate policy.

Table1 Eight perspectives summarised and analysed

	Strategic autonomy	Technological sovereignty	Competitiveness	Academic freedom
Central focus	A country's ability to safeguard its national interests and public values based on its own insights and choices, and to remain resilient in an interconnected world.	A country's ability to develop and use the technologies it deems necessary itself, without being overly dependent on external actors.	The extent to which the Netherlands or the EU can offer products and services on the market that are more attractive than those of competing countries or power blocs.	The principle that scientists are free to conduct their research, publish their findings and teach.
Key actors	EC (and Draghi), EZ, AIV, AWTI, Defence	Sectoral ministries (Defence, Home Affairs and Kingdom Relations, Infrastructure and Water Management, Agriculture, Nature and Food Quality, Climate Policy), Ministry of Economic Affairs, Ministry of Education, Culture and Science, European Commission.	EC, EZ, TNO, VNO-NCW	OCW, KNAW, UNESCO, UNL, AWTI.
Perspective on public values	Economic and industrial; National security; Sustainability	Economic and industrial; National security; Academic freedom and institutional autonomy; Democratic rule of law and human rights; Transitions and major societal challenges.	Economic and industrial	Academic freedom and institutional autonomy; Democratic rule of law and human rights; International cooperation and multilateralism.
Impact on science (expenditure)	Intensification	Intensification	Intensification	Sufficient, but not necessarily any more.

	Strategic autonomy	Technological sovereignty	Competitiveness	Academic freedom
Impact on science (direction)	Focus on strategic sectors, such as defence, energy or manufacturing	A greater focus, particularly on STEM fields and research into vulnerabilities and dependencies.	No political bias; rather, research agendas tailored to the business community and technological excellence.	Explicitly no external influence.
Influence on science (organisation)	Countering interference and undesirable knowledge transfer in science	Countering interference and undesirable knowledge transfer in science	Public-private partnerships and economic valorisation through new companies.	Primarily basic research, protection against interference.

	National security	Knowledge security	Societal challenges	Science diplomacy
Core focus	The protection of a country, its citizens, infrastructure and interests against threats from within and without.	Preventing the unauthorised transfer of knowledge, preventing undue interference, and promoting ethical conduct in international cooperation.	Mobilising research to address major societal challenges, such as the transition to a sustainable, healthy and just society.	Practices and activities where science and diplomacy intersect; this collaboration is initiated from both sides.
Key actors	Ministry of Defence, Ministry of Justice and Security, AIVD, MIVD, NTCV	Ministry of Education, Culture and Science, Ministry of Economic Affairs, Ministry of Justice and Security, AWTI, Royal Netherlands Academy of Arts and Sciences	Ministry of Education, Culture and Science, Ministry of Economic Affairs, Ministry of Infrastructure and Water Management, LVVN, NWO, SIA	UNESCO, International Science Council, EC, Ministry of Education, Culture and Science and Ministry of Foreign Affairs, NWO
Perspective on public values	National security	National security; Economic and industrial perspective; Academic freedom and institutional autonomy	Cooperation, equality, ethics, sustainability, justice, planetary health, human and animal rights, change	Cooperation, academic values (openness, integrity, independence), but also (preservation and strengthening of) national interests and security

Impact on science (expenditure)	Sufficient for national security, but competes with other defence expenditure	Not applicable	Intensification	Not applicable
Impact on science (direction)	Focus on areas relevant to national security.	Not applicable	Focus on understanding and addressing societal challenges	Not applicable
Impact on science (organisation)	Preventing the undesirable transfer of knowledge to rivals.	Preventing interference and the undesirable transfer of knowledge within science, and promoting ethical practices	Encouraging new collaboration between different actors and sectors (e.g. through transdisciplinary research)	Embassy Science Fellowships (NWO), Science Diplomacy Fund

Source: Rathenau Instituut

3 Five dilemmas

In the previous chapter, we introduced eight perspectives that frequently feature in discussions about the relationship between scientific research and geopolitical developments. These perspectives are employed by various stakeholders, such as government departments, advisory bodies, research institutions and other intermediary organisations. Many parties combine multiple perspectives: the Ministry of Education, Culture and Science takes into account both the focus of research on transitions (such as it is set out in the NWA) and academic freedom. This means that policy often refers to multiple perspectives as well. Horizon Europe, for example, is aimed at 'tackling climate change, achieving the Sustainable Development Goals, and contributing to Europe's competitiveness and growth.'[42]

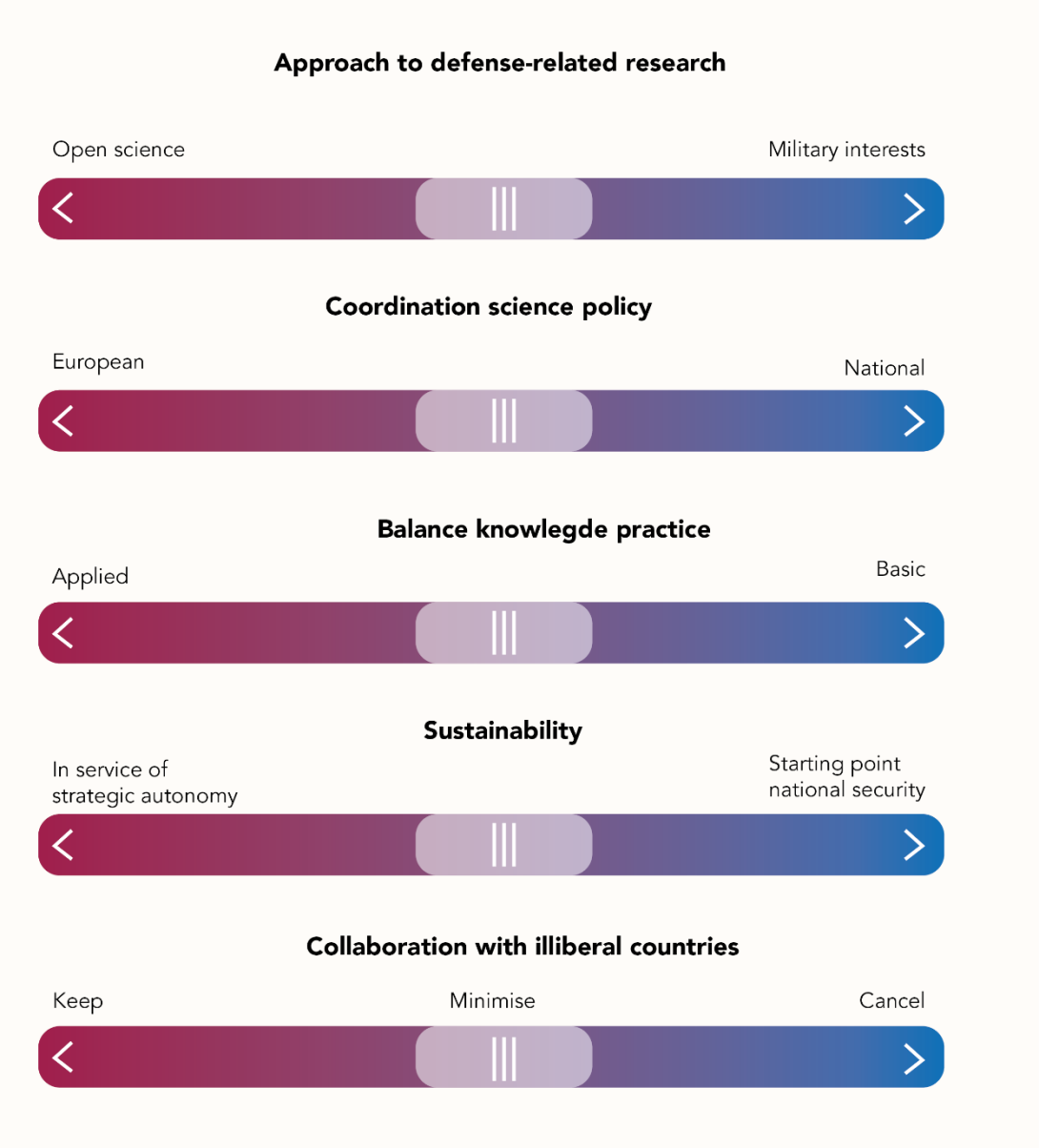
Each perspective emphasises certain aspects and facts, makes assumptions about how these are interrelated, and prioritises certain values in doing so. Because multiple perspectives apply to complex policy themes such as geopolitics and science, tensions arise regarding the governance (direction and organisation) of science. In this chapter, we outline five key dilemmas that have implications for science policy. These dilemmas stem from our analysis and are also highlighted and examined in the grey and academic literature and by organisations around us, such as the AWTI and KNAW. They concern, in turn, the organisation of defence research, the role of Europe, the importance of basic research, the waning focus on sustainability, and international cooperation.

The five dilemmas in brief (see also Figure 2, below):

1. Open science versus military interests (section 3.1).
2. European coordination versus national science policy (section 3.2).
3. Applied versus basic research (section 3.3).
4. Security versus sustainability (section 3.4).
5. Collaboration with illiberal countries (section 3.5).

42 https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/horizon-europe_en .

Figure2 Five dilemmas surrounding geopolitics in science policy



The five dilemmas in science policy are somewhat like sliders on a volume control. Source: Rathenau Instituut

3.1 Open science versus military interests

A key response to geopolitical developments is the increase of investments in defence-related or military research. This encompasses both the development of weapons and other technology used in warfare, and the development of knowledge

regarding strategic intelligence, social resilience, and science diplomacy.[43] This makes the Ministry of Defence a key player in national science policy, with growing influence over, and responsibility for, the governance, funding and organisation of the Dutch science system.

Examining this development from different perspectives and underlying value orientations reveals a clear tension.[44] This debate currently takes place within the European Union in response to the draft of the new Horizon Europe Framework Programme for R&D, under which dual-use research projects may also be eligible for funding.[45] On the one hand, there is a desire to better align the civilian sector of the science system with the knowledge needs of the Ministry of Defence and the defence industry. On the other hand, there is a desire to safeguard academic freedom and open knowledge practices at universities and universities of applied sciences, and there are serious ethical issues surrounding the development of knowledge, technology and innovations that are used to kill people.[46]

Some MEPs are questioning whether the budget increase is really such a gift for the scientific community if it comes with restrictions and stricter conditions regarding how and with whom the research is conducted.[47] Defence-related research often requires knowledge practices in which openness and international cooperation are subject to restrictions.[48] Could or should such knowledge practices also be organised within universities and universities of applied sciences? Or is it better to organise this in separate (departments of) knowledge institutions?

This raises the question of the extent to which the science system—whether in part or as a whole—should be mobilised in support of military knowledge and innovation agendas, and what the short- and long-term implications of such a shift would be. .[49] Many (key enabling) technologies have both civilian and military applications, and it is difficult to draw a clear distinction between civilian and military knowledge and technology development. How do we prevent the civilian and military spheres

43 One estimate suggests that an additional €6 billion per year would be allocated to defence-related research and innovation. https://esb.nu/de-nieuwe-navo-norm-zit-innovatiebeleid-in-de-weg.

44 See also a background article in *De Morgen* 'Flemish universities push for more military research: "The circumstances have changed"' (Author: Simon Tibo), 30 July 2025, https://www.demorgen.be/nieuws/vlaamse-universiteiten-sturen-aan-op-meer-militair-onderzoek-de-omstandigheden-zijn-gewijzigd~b5962024/.

45 Dual-use means that the knowledge (or the item) has both a civilian and a military application; research into drones is a clear example. In practice, the dividing line between what is and is not dual-use is often unclear.

46 See, for example, a column on the collaboration between Amsterdam University of Applied Sciences and the Ministry of Defence: https://hvana.nl/nieuws/laat-de-hva-zich-voor-karretje-van-defensie-spannen.

47 https://sciencebusiness.net/news/dual-use/dual-use-undermines-promised-horizon-budget-increase-says-mep-repasi.

48 https://www.demorgen.be/nieuws/vlaamse-universiteiten-sturen-aan-op-meer-militair-onderzoek-de-omstandigheden-zijn-gewijzigd~b5962024.

49 See, for example, the case of a Norwegian professor who ended up in prison after unsuspectingly inviting four Iranian PhD students into a laboratory that also housed a scanning electron microscope: https://www.universityworldnews.com/post.php?story=20220914104835727.

of knowledge production and technology development within the science system from becoming too intertwined, and ensure that this does not come at the expense of academic freedom and open science?[50] And how might we ensure synergy where possible?

Another aspect of this dilemma is that defence investment budgets can also be used to strengthen strategic autonomy and economic resilience.[51] An example of this is the call to use the broader part of the new NATO standard for dual-use R&D with and for the chip industry.[52] Encouraging public-private partnerships between public knowledge institutions and the defence, arms or high-tech industries is viewed by some as a matter of strategic autonomy and national security. Economic and military interests can reinforce one another and thus play a proportionally greater role in the governance, funding and organisation of the science system. This may jeopardise other values of science, such as academic freedom and open collaboration for the sake of sustainability transitions.

3.2 European coordination versus national science policy

Many of the documents we have studied highlight the importance of the EU and European cooperation for strategic autonomy, technological sovereignty, competitiveness, science diplomacy and knowledge security. To date, Europe has played a relatively modest role in the governance, funding and organisation of national science systems. However, geopolitical developments raise questions about the relationship between national and European science policy.[53] Indeed, Europe's role is expected to grow in the coming years.[54]

According to the latest plans for the Tenth Framework Programme for R&D, the European Commission is set to invest significantly more in R&D. The Commission is also seeking to play a more active role in various policy areas that are important for science, technology and innovation, such as industrial policy, security policy and science diplomacy. In short, the trend is that the European Commission will play a more prominent role in the governance of the Dutch science system. Until now, that

50 Markussen, 2025.
51 Incidentally, there are also concerns that these investments do not contribute to autonomy and competitiveness at all, as Europe is heavily dependent on the US militarily. Only with a well-considered framework for assessment can the enormous additional defence expenditure actually benefit strategic autonomy, economic prosperity and the sustainability of our planet. https://esb.nu/de-nieuwe-navo-norm-zit-innovatiebeleid-in-de-weg.
52 https://esb.nu/gebruik-bredere-gelden-defensie-voor-investeringen-in-chipindustrie.
53 https://www.consilium.europa.eu/en/press/press-releases/2025/11/05/eu-investments-in-defence-council-and-parliament-agree-to-support-faster-more-flexible-and-coordinated-investments-in-european-defence.
54 https://www.nrc.nl/nieuws/2025/09/25/de-kracht-van-europas-zwakte-a4907231.

role has mainly been complementary to national science policy. However, certain developments raise the question of whether national sovereignty and resources should be transferred to Europe in order to achieve greater innovative capacity? If so, which parts and in what way? [55]

From the perspective of strategic autonomy and technological sovereignty, one would wish to coordinate and organise the research that contributes to these ambitions at European level. For example, through the strong clustering of high-quality European research in specialised centres or at European universities capable of competing with the major American universities. On the other hand, universities and universities of applied sciences are also part of a national and regional culture, economy and political accountability. They play an important role in regional and national ecosystems with regard to policy, businesses and civil society organisations. The question is what constitutes a good mix between European, national and regional governance of the science system. And whether there should be more attention for knowledge institutions that organise themselves at European level. The Netherlands is a medium-sized country in Europe, and it is not self-evident how the Netherlands should position itself in relation to large Member States with bigger R&D budgets.

3.3 Applied versus basic research

The science system in the Netherlands is highly diverse, with an assortment of universities, universities of applied sciences, research institutes and other public knowledge organisations. It provides room for all kinds of knowledge production required to meet society's various knowledge needs. In some parts of the science system, universities for example, there is a strong emphasis on basic and fundamental research in which PhD students and postdoctoral researchers play a key role. In other parts such as applied research institutes, universities of applied sciences, government knowledge institutions, there is a strong emphasis on application and collaboration with knowledge users in industry, government and society, and the research is mostly carried out by permanent staff.

The changing geopolitical situation raises the question of what the right balance is between the various knowledge practices, now that national priorities appear to be shifting.[56] On the one hand, for example, there is a need to mobilise researchers more strongly for research that contributes to societal challenges such as the transition to a climate-neutral and climate-resilient society, tackling social inequality,

55 European Commission: Joint Research Centre, 2024a.
56 Von Schomberg, 2025.

improving health, and strengthening economic and military resilience. On the other hand, there is a need to cherish the academic freedom and institutional autonomy of universities and universities of applied sciences in order to perpetuate their independent role in the democratic constitutional state. And sometimes it is precisely the unfettered, fundamental research that leads to technological breakthroughs (for example in the field of quantum technology), which is desirable from the perspective of technological leadership. What is a good balance between basic and applied strategic research?

3.4 Security versus sustainability

In recent years, there has been a trend in the Netherlands and Europe to dedicate part of science policy to sustainability transitions, as articulated, among other things, in the United Nations Sustainable Development Goals.[57] This involves conducting (action oriented) research that contributes to fundamentally changing production and consumption systems so that they become sustainable. In Europe, the European Green Deal served as a key guiding principle for European research and innovation policy. Both the EU and the Netherlands introduced mission-driven innovation policy to achieve sustainability goals. Within NWO, the Climate Research Initiative Netherlands (KIN) was established to conduct research into sustainability transitions. In addition to giving greater priority to the climate theme, appropriate research methods were developed, centring on open and inclusive collaboration, not only between different scientific disciplines but also with societal partners.

There are now concerns that increased geopolitical unrest and rivalry are leading to sustainability challenges being pushed into the background within the science system.[58] Tensions between security and sustainability arise, for example, from the strong link between defence and fossil fuels. Research aimed at phasing out the fossil fuel industry may thus conflict with research into national security.[59] The increased importance of secrecy for security reasons can also hinder the dissemination of knowledge that could benefit sustainability. After all, an efficient energy supply can be regarded as strategic. And a leadership positions in clean technology is part of a technology race with rival nations. At the same time, synergies are also possible between research for security and research for

57 https://sdgs.un.org/goals
58 Green European Foundation (2024)
59 The tension between food security and sustainability is also addressed in this article in *De Telegraaf*, ‘Striking statement from Brussels: European Commissioner Hansen says livestock numbers do not need to shrink further’, 20 March 2025, https://www.telegraaf.nl/binnenland/opvallend-geluid-uit-brussel-eurocommissaris-hansen-zegt-dat-veestapel-niet-verder-hoeft-te-krimpen/64069368.html.

sustainability. Climate change and security risks are closely interlinked.[60] And the solutions can also be synergistic. Research and innovations in areas such as sustainable energy, food or the living environment could also lead to the Netherlands becoming less dependent on rival nations in the field of fossil fuels and raw materials. Public procurement could seek to harness this synergy. Furthermore, long-term processes that guide the response to global environmental changes nd social inequality could be linked to peacebuilding.[61]

One question is how the perspectives of sustainability transitions and strategic autonomy can or should be combined into a joint approach to the governance, funding and organisation of the science system.[62] What form and degree of coordination is necessary and desirable between the various policy areas and ministries responsible for sustainability challenges and those responsible for strategic autonomy and national security?

Furthermore, we see that participating in and leading the way in technological development plays a significant role in many responses to geopolitical unrest. However, for an effective approach to sustainability and security challenges, a focus on technical sciences is too narrow: the social sciences and humanities are also indispensable for making the Netherlands more sustainable and secure.[63] That is why recent efforts have centred on societal missions, socially responsible research and innovation, inter- and transdisciplinary partnerships, and citizen science.[64] These organisational changes within the scientific community should ensure that research serves societal challenges and becomes part of solution pathways that genuinely make society more sustainable and safer.[65] A strong emphasis on participating in and leading the way in technology races can result in research into the societal embedding of these new (and disruptive) technologies being given lower priority. This carries the risk that money and time will be invested in technological applications that ultimately do not serve a sustainable society. So how do we ensure that research and innovation on security issues are also carried out in a responsible manner?

60 Middendorp, 2022.
61 See also the CIPGeS project (2024–2026), which links analyses of the rapidly changing geopolitical and security context to the future development of a challenge-driven innovation policy. (https://www.syke.fi/en/projects/cipges).
62 European Commission: Joint Research Centre, 2024b.
63 Advisory Council for Science, Technology and Innovation, 2024b.
64 See, for example, Rathenau Instituut (2019; 2025)
65 https://sshraad.nl/mentale-gezondheid-jeugd-nnr.

3.5 Collaboration with illiberal countries

One of the most visible consequences of rising geopolitical tensions is the issue of international cooperation with research institutions in illiberal countries such as Russia, China, Iran, Israel and, more recently, the US.[66] How, if at all, should we collaborate with research institutions in countries that violate democratic and academic values, human rights, the laws of war or other international law?[67] There are arguments from various perspectives and parties within the scientific community for maintaining, limiting or severing institutional research collaborations with such countries.

The perspectives outlined in the previous chapter shed a different light on international cooperation in scientific research. Viewed from the perspective of strategic autonomy, competitiveness, technological sovereignty and national security, international cooperation is both necessary and risky. It is necessary to gain access to international state-of-the-art knowledge and talented researchers and knowledge workers who help to strengthen domestic economic and military capabilities and resilience. However, it must not lead to interference, undesirable knowledge transfer, through espionage, for example), or unilateral dependencies on rival nations.[68]

Viewed from the perspectives of academic freedom and sustainability transitions, open and international cooperation is seen as a crucial, but not absolute, component of science, and knowledge institutions (especially universities) are positioned as bastions of moral integrity.[69] Furthermore, international cooperation is seen as crucial for effectively tackling global problems, such as climate change and biodiversity loss. From these perspectives, there are therefore arguments both for and against freezing formal and institutional collaborations with foreign knowledge institutions. In the days following the Russian attack on Ukraine, for example, institutional collaborations were frozen following an urgent appeal from the Minister of Education, Culture and Science, as the attack was seen as an ‘attack on freedom and democracy, the fundamental values on which academic freedom and collaboration are based.’[70] In response to this decision, many academic institutions

66 Rathenau Instituut, 2021; https://www.clingendael.org/event/reconnect-china-conference-2025, and https://www.trouw.nl/binnenland/bedrijven-van-nederlandse-universiteiten-werken-met-israel-aan-omstreden-technologie~b93b5ca6.
67 https://english.wrr.nl/latest/news/2025/09/29/book-presentation-navigating-a-fragmenting-world-order.
68 https://www.scienceguide.nl/2025/07/nederlands-hoger-onderwijs-onverminderd-doelwit-van-spionage and https://www.scienceguide.nl/2025/10/belgische-wetenschap-werkt-steeds-meer-mee-aan-chinese-militaire-opbouw.
69 https://www.universityworldnews.com/post.php?story=20250116112443619, and Shih and Wagner, 2024.
70 https://www.universiteitenvannederland.nl/actueel/nieuws/4-maart-2022-nederlandse-kennisinstellingen-bevriezen-samenwerkingsverbanden.

highlighted the importance of maintaining contact with individual students and researchers, particularly in times of war and conflict.

From the perspectives of knowledge security and science diplomacy, we might seek a balance between openness and closedness regarding international cooperation and exchange. In knowledge security, the motto is ‘open where possible, closed where necessary’. In science diplomacy, international cooperation in science is seen as a means (*soft power*) of maintaining international relations with other countries.

Therefore, an overarching question is how and whether we can promote and safeguard international cooperation in scientific research whilst taking these different values, interests and international law into account.[71] One possible solution, which we are in fact already seeing in practice, is a differentiated approach. Under this approach, knowledge institutions make distinctions based on different research areas, along the fundamental-applied research axis (TRL levels), by type of knowledge institution, or by the nature of the cooperation partner. However, this approach raises questions about how we make and justify the choice of who we do and do not collaborate with (e.g. ad hoc, on a project-by-project basis, strategically or, conversely, comprehensively), and what selective collaboration or boycotts mean for trust in science, discrimination and the image of universities as *neutral*.

71 Huang and Soete, 2025.

4 Next steps

This exploratory study shows how geopolitical developments affect the Dutch research system. These developments raise fundamental questions about the governance, funding and organisation of scientific research. By comparing the eight different perspectives, it becomes clear that there are multiple arguments for what changes are needed, and that each perspective entails its own problem analysis, normative considerations and potential solutions.

This gives rise to five dilemmas concerning the government's public duty with regard to the science system. This exploratory study is not intended to provide definitive answers to these dilemmas, but is intended as a prelude to further debate and dialogue. In a way, then, the current geopolitical situation can be viewed as an urgent invitation to engage in dialogue about the why, what for and how of science. The search for what needs to happen and change has only just begun. In this concluding chapter, we highlight two elements that are important for this search.

Diversity and complexity as a starting point
In the quest to determine what needs to happen and change, it is important to take the diversity and complexity of the science system as a starting point. We note that most perspectives adopt an instrumental view of science, whereby research or public funding for research is placed at the service of (geo)political goals. At the same time, it is evident that not all scientific research within the science system should be mobilised for this purpose. There must also remain scope for curiosity-driven, independent, non-instrumental research.

This may point to a possible solution: different components (institutions, disciplines) of the science system can be organised and managed in different ways. The organisation of scientific education, which is inextricably linked to scientific research, must be taken into account in this regard. Regional differentiation may also play a role here. At the same time, such a differentiated approach is not without its challenges: What does it mean if values only apply in some cases?

Clarifying layered concepts
A second building block is clarification of what different parties mean by complex, layered concepts such as strategic autonomy, technological sovereignty or (national) security. What exactly is meant by these objectives, and how and by whom are these definitions and the path towards them determined?

Behind every perspective there are underlying values. Geopolitical pressures may lead to the emphasis on certain perspectives in lieu of others. How do we ensure that we keep important values in mind? And who gets to decide which values are important?

We have noticed that various (political) parties share ambitions such as security, resilience or sustainability to a certain extent, but when it comes down to it have something else in mind. That is precisely where the problem lies, and that is what public debate should focus on. The overview of perspectives and dilemmas that we provide in this exploratory study can support this discussion.

Appendix 1 Approach used

To gain an understanding of how geopolitical unrest influences the science system, we investigated the points within the system where this change might take shape. The science system comprises all manner of actors, at various levels, who fulfil different roles (see box below). The key actors in the science system collectively shape the science system. As these are primarily public organisations, their strategies and plans are often readily accessible. These strategies and plans are set out in various documents.

Box2 Three levels in the science system

It is possible to distinguish three levels within the science system.

1. The policy level, with policy arenas in which politicians and policymakers in ministries develop political priorities and policy strategies.
2. The intermediate level, with arenas and bodies in which knowledge agendas and programmes are developed, and research funding is allocated.
3. And the implementation level, in which researchers and knowledge organisations organise themselves into concrete projects and partnerships (knowledge ecosystems).

The final governance structure is established through a combination of top-down policy implementation and bottom-up responses from researchers and intermediary organisations to opportunities and possibilities they identify for (funding of) research they consider important.

As a first step, we have identified which organisations are active within the science system. Which organisations play a major role in shaping science policy, research programming, funding, and its implementation? This concerns the actual formulation of policy and its implementation, but also the provision of advice in this regard. This led to a list of seventeen organisations, namely government bodies (Ministry of Economic Affairs, Ministry of Education, Culture and Science, NWO, SIA, LVVN, Ministry of Defence and the European Commission), advisory councils (WRR, AWTI, AIV), bodies representing science in the Netherlands and abroad (UNL, KNAW, TNO, LERU, ISC), and international organisations (UN, G7).

The second step was to identify a number of key documents from these key players and make a selection for interviews. Key documents reflect how the organisations view and influence the science system, such as letters to parliament, advisory reports, position papers, strategic agendas, visions for the future, and action plans. These are indicated in the list of sources with an asterisk (*). In addition to the documents themselves, we also sought out news articles, opinion pieces or interviews to provide further context.

For each of the key documents, we created a fact sheet (short summary) based on eight predefined categories:

1. What are the (revised) priorities for the science system?
2. What is the (revised) organisation of science?
3. What are the (revised) funding arrangements for science?
4. Which geopolitical developments are cited as the reason for the (revised) policy?
5. What definitions are used for new key concepts, such as strategic autonomy, technological sovereignty, knowledge security, etc.?
6. Which public values are mentioned in the document?
7. Which actors were involved in the drafting of the document?
8. What else stands out?

The interviews focused on similar topics, albeit in a slightly different order.

The third step was to produce a synthesis based on these categories. In particular, we identified:

1. what the geopolitical developments were;
2. what policy changes stood out;
3. which terms, concepts and perspectives recurred frequently; and
4. which values were mentioned.

In this synthesis, we found that these findings could consistently be grouped into eight perspectives. These were more or less coherent combinations of:

- a specific interpretation of geopolitical developments;
- terminology;
- science policy; and
- values.

Each of these perspectives had its own view of science, with implications for the scope, organisation and direction of scientific research. This constituted a key finding of the research.

It then became apparent that, although each perspective told a more or less coherent story, there were clear and not always easily reconcilable differences between them. These tensions were also partly highlighted in the interviews we conducted. These observations were supported by secondary material we found in opinion pieces and policy documents on this subject.

We thus identified five urgent issues and dilemmas for the science system, arising from geopolitical unrest. We explored these issues and dilemmas in greater depth, which constituted a second key finding of the research.

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