

Policy responses strengthening knowledge security: a comparative study of Austria and the Netherlands

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Abstract

Over the recent years, the global context for research and innovation has changed notably. The multilateral world order is under pressure and geopolitical tensions are rising. Knowledge institutes, national governments, and intergovernmental organisations around the world respond to the consequences of these geopolitical developments. However, there is a lack of knowledge on what is an effective policy response to safeguard and secure knowledge development in the current changing geopolitical context. The contribution of this comparative study is to describe and compare the policy responses in two European countries, namely the Netherlands and Austria. The findings can inform policymaking on secure knowledge development in a changing geopolitical context. The study makes three observations. First, the current policy mix in the two countries consists of a common set of measures based on European policy and other types of international agreements. Additionally, there is a new wave of more recent measures at the national level. This leads to a comprehensive, and at the same time rather uncoordinated policy response, including risks of overregulation, unalignment, and blind spots. A blind spot that is identified in this study is the need for opportunity recognition for safe collaboration. Second, the overview of measures and the additional insights from the interviews show that the awareness and action in the Netherlands can be considered higher than in Austria. This difference can lead to inconsistent and unaligned policy measures within the European Union, with unclear rules and guidelines for researchers as a consequence. Third, the study shows the importance of the national context to explain differences in terms of societal and policy responses to knowledge security. Together, these observations may support policymaking along three avenues. First, the differences between countries provide valuable potential for reciprocal learning between countries. Second, the differences between countries expose the need for capacity building at European level. Third, there is a potential need to create opportunities for safe and secure research collaboration.

1. Introduction

Over the recent years, the global context for research and innovation has changed notably. The multilateral world order is under pressure and geopolitical tensions are rising (Jones, 2017; MERICS,

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2022; The Economist, 2022). We can observe a proliferation of new global players that are challenging the leadership and power of ‘the west’, leading to visible and less visible conflicts between states. These developments question and limit international collaboration in research and innovation (Duszynski & Galvin, 2022; Hudson, 2021).² At the same time, global trade and international collaboration in research and innovation are higher than ever and a decoupling of different global regions in terms of research, innovation and trade would incur severe costs on quality of life and prosperity in these regions (Fuest, Flach, Dorn, & Scheckenhofer, 2022; Johnson, Adams, Grant, & Murphy, 2022). Moreover, mankind stands for some daunting global challenges, including climate change, inequality, and health.³ These global challenges require international collaboration in research and innovation more than ever. These somewhat incongruent and uncertain global developments pose some fundamental questions about how knowledge development should be organised in Europe to simultaneously maintain sufficient strategic autonomy and at the same time address the global challenges (Huotari & Jean, 2022; Wagner, Cao, Jonkers, Schwaag Serger, & Goenaga, 2021).

Knowledge development is used in this paper in a broad sense to encompass higher education, research, and development. We focus on public research organisations, including higher education institutions. Knowledge development is, by and large, characterised by openness, both for effectiveness (openness improves the quality of research and innovation) and ethical considerations (it is morally right to share knowledge⁴). The tensions in the world and the resulting calls for security and autonomy can be seen as challenging this openness (Fischer, 2022; van der Wende & Kirby, 2020).

Knowledge institutes, national governments and intergovernmental organisations around the world respond to the consequences of geopolitical developments on knowledge development, such as countering espionage, safeguarding national security, countering covert operations by state agents and other security threats (OECD, 2022). These activities, directed on knowledge development, can be summarised as strengthening knowledge security. Knowledge security is about preventing a series of unwanted consequences of international research collaboration. The article follows the Dutch working definition of knowledge security encompassing preventing or mitigating 1) the unauthorised transfer of knowledge and technology, 2) covert influence by state actors on higher education and research, and 3) ethical issues in research practices.⁵

2. Problem statement and aim of this study

While the topic of knowledge security is attracting increasing attention, little is known about what an effective policy response entails to safeguard and secure knowledge development in the current changing geopolitical context. It can be expected that the effectiveness of these interventions depends on the effectiveness of individual measures, their combination nationally, but also to a large

² See also the reporting of this investigative journalism <https://www.ftm.eu/collection/the-china-files>

³ <https://sdgs.un.org/goals>

⁴ <https://www.unesco.org/en/right-information>

⁵ <https://english.loketkennisveiligheid.nl/>

extent on the combination of measures across collaborating countries. As such, knowledge security requires some form of international alignment or coordination.

To inform policymaking on knowledge security in a changing geopolitical context, the aim of this comparative study is to describe and compare the policy responses in two European countries, namely the Netherlands and Austria. This contributes to reciprocal learning between the two countries and sheds light on the opportunities and challenges for a common, European approach.

The guiding question is: *what are the similarities and differences in policy responses to the concerns of knowledge security between Austria and the Netherlands and how can this inform future policy in the two countries and the EU?*

Note that this study fits with, and is inspired by other comparative research on this topic, and in particular d’Hooghe & Lammertink (2022).

2.1. Case selection, background, and national context

The comparison of Austria and the Netherlands is suitable to the aim of this study because these countries are comparable in terms of wealth, innovativeness⁶, academic freedom, and political interests towards the EU on certain topics.⁷ At the same time, Austria and the Netherlands differ on several aspects, related to knowledge security. First, a difference is observed in terms of the policy priority on strategic dependency on China, an important partner but also systemic rival of the EU (European Commission, 2021a). Figure 1 shows that in both countries there is a significant concern about dependencies, but the policy priority and thus the policy responses differ.

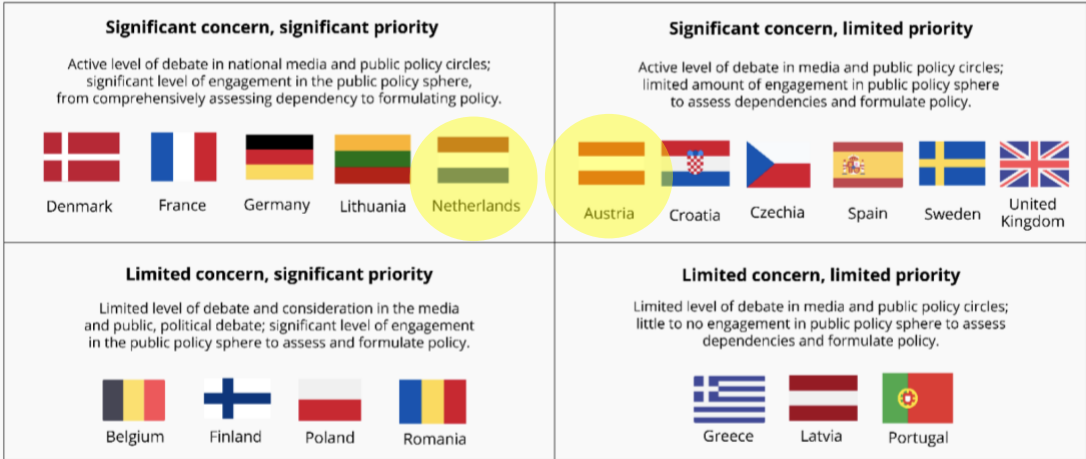


Figure 1. Levels of debate and action on strategic dependence relative to China in Europe (Seaman et al., 2022).

⁶ Both a strong innovator according to the European Innovation Scoreboard 2021 (Hollanders, Es-Sadki, & Rantcheva, 2021).

⁷ Both countries are part of the ‘Frugal Four’ https://en.wikipedia.org/wiki/Frugal_Four, which consists of Austria, Denmark, Sweden and the Netherlands and are characterized by, among other things, their fiscally conservative stance.

Second, while in both countries there have been sensitive cases of research collaboration, the political interest and the media attention are quite different. In the Netherlands, we have seen several incidents or reports that have gathered attention in the national media and in the parliament. For example, two research projects at the Erasmus University were flagged and the articles were retracted after media stated that the DNA that was used in the study was possibly not voluntarily shared (Li et al., 2019; Wee & Mozur, 2021). Another infamous case in the Netherlands was a research centre at the Free University of Amsterdam studying human rights across the world. The centre was surprisingly mild about the human rights situation in China and was also found to be heavily funded by a Chinese research organisation. This has been flagged as a case of foreign interference in research and the centre was closed. Also, investigative journalism reported that more than 90 Chinese military scientists have gathered knowledge at Dutch universities and many more at other European universities (See Figure 2, below).⁸ This study also found collaboration between Austrian universities and the Chinese defence universities, although less than in the Netherlands. Still, these collaborations between Chinese and Austrian universities have gathered no public attention in media or parliament. In sum, the media and political attention for the risks of international collaboration in research and innovation seems to be much higher in the Netherlands than in Austria.

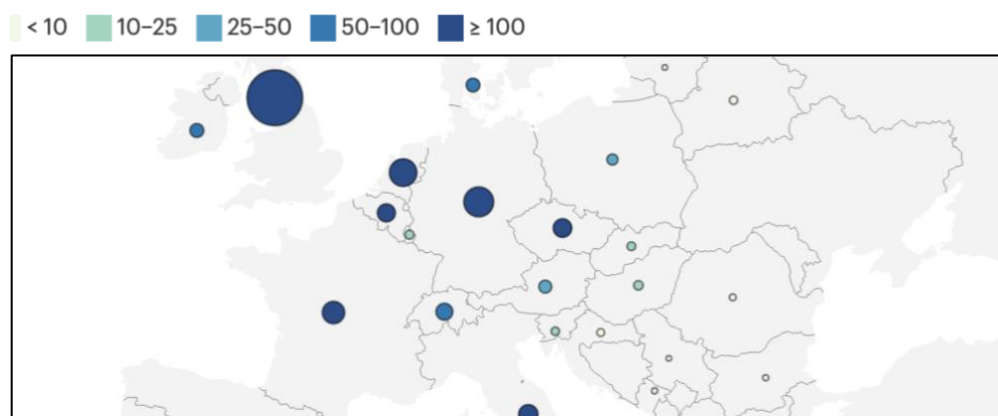


Figure 2 Number of studies at European universities in which there was collaboration with Chinese researchers affiliated to Chinese universities that were linked to the military.⁹

Third, a difference can be observed in the sentiment around internationalisation in higher education. Both the Netherlands and Austria are popular countries for international students. In 2020, about 125 thousand international students were enrolled at Dutch higher education institutions and about 75 thousand in Austrian higher education institutions. Zooming in on the country of origin, we see in Austria relatively many students from Europe and in the Netherlands relatively more from Asia (data from 2019 from UNESCO and CBS sources)¹⁰. Internationalisation has long been seen as a strategic priority and a sign of excellence, as it is related to research quality, reputation and solving global problems (Van den Broek, Braam, Hampsink, & Kommers, 2014). However, in the Netherlands it has recently been increasingly problematised, partly in the light of knowledge security (VSNU & VH, 2018). As such, internationalisation is viewed much more critically in Dutch universities and society

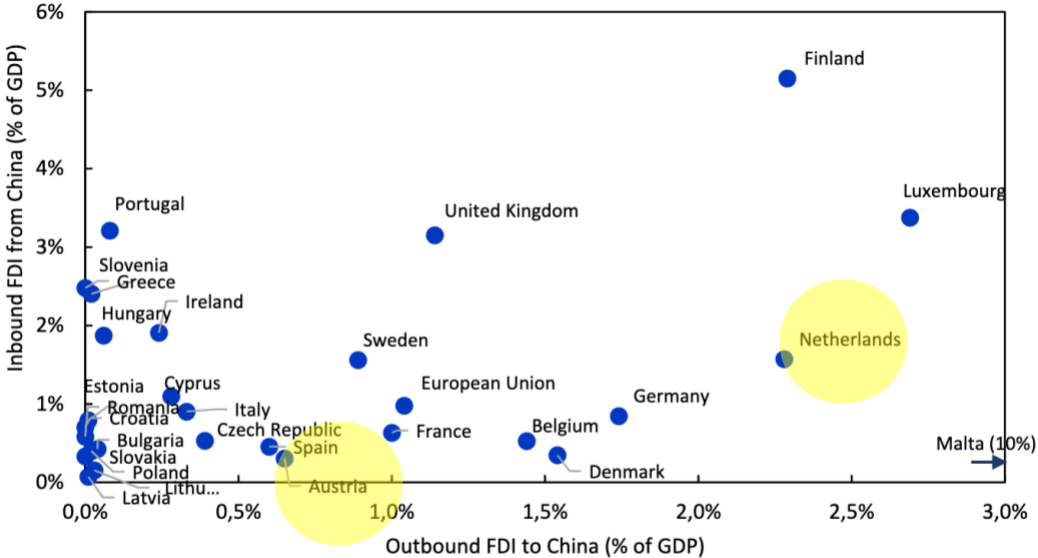
⁸ <https://www.ftm.eu/collection/the-china-files>

⁹ <https://www.ftm.eu/collection/the-china-files>

¹⁰ <http://data.uis.unesco.org/index.aspx?queryid=169#>

these days. In Austria, internationalisation is mainly seen as a good thing (Gaisch, 2016; Montan Universität Leoben, 2021), although accessibility for Austrian students is part of the discussion.

Fourth, Figure 3 below shows the investment ratio intensity of European countries with China. China has both inbound as well as outbound a higher share of FDI with the Netherlands than with Austria.



Note: Value of aggregate FDI transactions from and to China over the 2001-2021 period, as a percentage of GDP. Malta is not represented on the graph, with 0,3% of inbound FDI and 10% outbound FDI as shares of GDP

Figure 3 The intensity of investment relations with China varies starkly across member states (FDI flows as a share of GDP, 2001-2021) (Huotari & Jean, 2022)

These similarities and differences provide insight on the variance of policy responses of two countries and the (in)possibilities to arrive at a coordinated European policy response.

3. Approach of the study

Against this background, the aim of the study is to identify, compare and analyse the relevant policy responses in the two countries. Since knowledge security is an emerging policy themes, albeit related to longstanding domains, this study takes a wide and explorative approach to identify possible measures.

To identify the different measures, I took the following steps. First, an analysis of policy documents was done. Then, a series of interviews was carried out with experts and stakeholders in both countries. In total, 18 interviews were done in the period April – July '22, distributed across different policy levels, policy areas, and across both countries (see Table 1, below). The interviews were guided by three topics: introductory discussion on the description of knowledge security, identification of policy measures by government or knowledge organisations; reflection on the desirability and possibility of potential measures that were not mentioned. During interviews, respondents pointed towards policy documents, which were then also assessed.

Table 1 Number of interviews with experts and stakeholders. Abbreviations: AT = Austria, NL = the Netherlands.

	Organisational	National	International	Total
AT	2	6		8
NL	3	4		7
International			3	3
Total	5	10	3	18

3.1 Analysis

As an analytical lens to organise and compare the empirical findings, I adopt three dimensions:

1. First, we distinguish between policy responses that are taken at different levels, i.e., international, national, and organisational. The policy responses that are relevant for knowledge security that are taken at the international level per definition apply to both countries.
2. Second, we use the conceptual categorisation knowledge security measures that can be taken at these different levels (d’Hooghe & Lammertink, 2022):
 - Raising awareness, which involves increasing stakeholders’ and practitioners’ awareness for the risks associated with international collaboration in knowledge development.
 - Identifying risk, which involves the identification of knowledge security risks in international collaboration.
 - Mitigating risks, which involves actively taking measures to reduce the risks. Note that it is not about minimalizing or preventing risks.
 - Identification of opportunities, which involves green listing certain research areas or research partners for which the risks are non-existent or acceptable.
3. Third, we distinguish between voluntary or binding measures. Other studies have shown that countries usually take a combination of both legally binding and non-mandatory regulations.

4. Empirical results

This section is an overview of policy responses that are taken to stimulate knowledge security. First, subsection 4.1 describes the policy frameworks taken at the international level that apply to both countries. Subsection 4.2 describes the measures taken at the national and organisational level (we combine these analytical levels, as they are often strongly related).

4.1 Common frameworks and policy

First, EU export control regulation on dual-use goods intends to mitigate risks related to knowledge security. Export control mitigates the risk of undesired transfer of sensitive knowledge. Under this European legislation, organisations require a licence to export goods, services and knowledge that falls this legislation. Export is seen here in a broad sense, including ‘digital export’, such as through e-mail or internet cloud services. The sensitive topics are defined in an extensive list, based on international agreements, such as the Wassenaar agreement, CWC, and the Australia Group (European Commission, 2023). While basic research (TRL-level 1 and 2) is exempt, this regulation does apply to more applied knowledge, including technical assistance. There is a significant share of research at universities and other research organisations that fall under this regulation. The list of topics is regularly updated and is increasing in length and detail (Gildea & D’Alessandra, 2022). While

export regulation is traditionally seen as a topic for the ministries of economic affairs or foreign affairs, the translation to the science system is not always made. However, an increased attention and enforcement at knowledge institutes is observable. In Austria, a special document has been drafted for the research and science sectors by the ministry of economic affairs, together with the national security agency and the national bank (BMDW, 2021). In the Netherlands, the regulation is highlighted in the national guidelines for knowledge security (UNL et al., 2022). At universities and other knowledge institutes, this regulation is implemented by compliance officers or security officers. It seems, based on a limited number of interviews, that in the Netherlands the awareness and felt responsibility of this regulation at universities is somewhat higher than in Austria.

A second relevant EU policy area is that of foreign direct investments (FDI). While FDI is generally seen as a sign of heightened potential for the economy, there is increased attention for the risks associated with investments from non-EU states. The reason is that it may hinder the strategic autonomy or sovereignty of EU member states. It relates to knowledge security because FDI is used to gain control over recently spun-out companies that are based on sensitive knowledge from universities and other knowledge institutes. Consequently, we see an increase in the screening of foreign direct investments (FDI) in European countries, to mitigate risks of knowledge security. The EU has laid out the legislative groundwork for countries to develop their own screening regulations (European Commission, 2020).

Relatedly, the EU is developing anti-coercion regulation to limit foreign states' influence on decisions or behaviour of the EU or its member states. Namely, state actors may try to obtain certain policy outcomes by restricting investment or access to their markets or by threatening to do so (European Commission, 2021b). Creating anti-coercion regulation is focussed on mitigating the risk of unwanted foreign interference, also in the research and innovation sectors.

At a more practical level, the EU has developed a staff working document that contains a toolbox for tackling foreign interference in research and innovation (European Commission. Directorate General for Research and Innovation., 2022). It conceptualises foreign interference, discusses different types of risks and compiles an inventory of possible tools to mitigate these risks. While the policy initiatives above have a legal, binding basis, the implementation of insights from this document functions on a voluntary basis.

Also, a mutual learning exercise (MLE) is taking place on the topic of research security and foreign interference (started in 2023). The MLE will involve a selected group of countries, among which the Netherlands and Austria, that is willing and interested in sharing lessons on this policy area. This initiative feeds into policy making at the national level and can potentially contribute to all areas of knowledge security. It can contribute to raising awareness, identifying risks, mitigating risks, and creating opportunities. The MLE is a voluntary activity.

From a different policy area, international collaboration for countries within the EU is shaped by the research and innovation programmes of the EU. In particular, the framework programmes (Horizon Europe), ERA and the Important projects of Common European Interest (IPCEI)¹¹ have a significant

¹¹ https://competition-policy.ec.europa.eu/state-aid/legislation/modernisation/ipcei_en

influence on developments and practices in research and innovation in general. For example, Horizon Europe dictates with which non-EU countries research collaborations are allowed and which additional criteria or rules apply. As such, the more general research and innovation programmes also affect knowledge security. They increase the awareness for undesirable forms of collaboration and identify opportunities for safe collaboration.

More implicit, but also relevant, are the more general policy documents, such as around strategic autonomy (Borrell, 2020), a global approach to research and innovation (European Commission, 2021a), and the work of the special committee of the European parliament on foreign interference in all democratic processes, including academia. Similarly, the EU has announced to strengthen the resilience of critical entities, involving vital services for citizens and markets (European Commission, 2022a). These policy initiatives increase awareness and enable further policy making, but don't directly identify or mitigate risks.

Another set of measures relevant for this study are international sanctions by the UN and EU, that both Austria and the Netherlands have signed.¹² There are two main knowledge embargo's that are directed at Iran and North-Korea and are both related to the development of nuclear weapons. The embargo is implemented through the assessment of individuals that want to study or research certain technological fields. Individuals that come from Iran and North-Korea are not allowed to work (i.e., study at master's level, perform research, provide technical assistance) in a selected list of disciplines or knowledge fields that are related to nuclear weapons. These knowledge embargos are legally binding and contribute to mitigating risks of knowledge security, in particular the undesirable transfer of sensitive knowledge.

Furthermore, with the Russian invasion to the Ukraine, there has been a call to freeze all collaboration with knowledge organisations in Russia (Upton, 2022). The European Commission also suspends cooperation with Russia on research and innovation (European Commission, 2022b). In the Netherlands, the minister of science requested all Dutch knowledge organisations to freeze all formal relationships with knowledge institutes in Russia and Belarus (ScienceGuide, 2022). The Austrian government "called upon the Austrian higher education institutions and research institutions to *autonomously make a differentiated assessment of their relations with the Russian Federation and to critically examine individual contacts. It is therefore up to the Austrian higher education institutions and research institutions to decide.*" (OeAD, 2022). In both countries, in practice collaboration among individuals was continued, but existing or new collaboration at the level of institutes was halted.

The G7 also responds to the changing geopolitical situation, with regard to knowledge development (Hudson, 2022). The G7 has announced three step approach. The first is developing a clear definition of what research security and integrity is. Second, a 'virtual academy' is announced, to educate researchers. And third, a toolkit is developed. These initiatives contribute potentially to all areas of knowledge security, as the definition is not clearly developed yet. Because there is no legal basis, the interventions will be overly voluntary, based on raising awareness, identifying risks, and mitigating risks with the application of the toolkit.

¹² <https://www.sanctionsmap.eu/#/main>

Finally, both Austria and the Netherlands have very similar guidelines around ethics and integrity at universities. While these guidelines are formalised nationally, they are heavily inspired and informed by international documents, such as the Magna Charta Universitatum¹³ and the work of the permanent working group of the European association of academic academies (ALLEA, 2017). Research integrity includes not only aspects of quality, but also normativity. This means that researchers are warned about collaboration with countries that do not respect human rights or that may misuse knowledge or technology as this may infringe on the integrity of the research. Therefore, maintaining research integrity strengthens all areas of knowledge security (OECD, 2022). Researchers are kept to the code of conduct for research integrity and as such, these are non-voluntary measures.

4.2 Comparison at national and organisational level

While international policy measures are adopted in both countries similarly, we see differences at the national level. First, based on this study, we observe a difference in the awareness and capacity building on knowledge security. Researchers in both countries can use the European toolkit on research security and foreign interference. However, the speed, manner, and extent to which this practical guidance is adopted in the practices of universities seems to differ. In the Netherlands, the association of universities (UNL) has developed a first toolkit or framework in the first half of 2021, which was developed in close collaboration among researchers and university staff (VSNU, 2021). This was used in a nation-wide discussion on 'knowledge security' and has led to a national guideline in January 2022 (UNL et al., 2022). Around that same time, European Union presented a 'staff working document' on Tackling foreign interference in research and innovation (European Commission. Directorate General for Research and Innovation., 2022). In Austria, an exploratory discussion on research security was initiated in 2019. However, the European working document was the formal and explicit starting point to inform the national knowledge institutes.

Furthermore, in the Netherlands several additional measures have been taken over the last two years to increase awareness and provide guidance on the topic of knowledge security.¹⁴ This first includes a continuous discussion between the ministry and the knowledge organisations. This has led to the agreement that all universities are required to explicitly organise the responsibility on the topic of 'knowledge security'. Someone in senior leadership (executive board) is responsible for knowledge security at the institution and a policy officer needs to be appointed. In Austria, no such requests or changes have been made yet. The responsibility, in Austria, strongly lies with the university professors. Making a request from the ministry to strengthen university policy on knowledge security is, according to the respondents, seen as a breach of the institutional autonomy of universities and would arguably be met with resistance.

A second additional measure taken in the Netherlands is a national contact point on knowledge security.¹⁵ It is open to all researchers and research performing organisations for questions about

¹³ <http://www.magna-charta.org/>

¹⁴ This is in line with the recently set up Research security portal of the OECD, where the number of measures taken by the Netherlands is higher than those taken by Austria. <https://stip.oecd.org/stip/research-security-portal> (viewed August '22).

¹⁵ <https://www.rvo.nl/onderwerpen/loket-kennisveiligheid>

knowledge security. It serves as a central point of information on knowledge security from all governmental agencies. To answer the questions, several governmental organisations work together, among which the ministry of education, culture and sciences, the ministry of economic affairs and climate, the ministry of defence, the ministry of justice and safety, the ministry of foreign affairs and the national security agencies. Third, all universities currently conduct a risk analysis that is externally audited to identify possible risks of knowledge security. Most measures in the Netherlands so far can be characterised as voluntary, non-binding measures and agreements between the government and knowledge organisations. In addition to these existing measures, the Dutch government announced a binding assessment scheme for individuals from third countries that come to study or work in sensitive areas. The implementation of this measure will take some time (Minister van OCW, 2022).

In Austria, the topic of technological sovereignty has found its way to the foreground. In particular, funding organisations such as FFG have initiated calls for research and innovation strengthening technological sovereignty.¹⁶ In reality, these initiatives also contribute to research security, although under a different 'heading'.

Finally, while less transparent and therefore more difficult to pinpoint, there seems to be information exchange between research performing organisations, such as universities, and the security agencies. In both countries, the security agencies report of this in general terms in their annual reports (AIVD, 2022: 25–26; BVT, 2021: 38).

5. Discussion

Based on the results, above, this section making three overarching observations.

5.1 Overall trends in policy development

Overall, the current policy mix in the two countries consists of a common set of measures based on European policy and other types of international agreements, in combination with a new wave of measures at the national level. The common set of measures, including knowledge embargo's, dual-use and FDI legislation, has a somewhat longer tradition and consists of several legally binding measures, mainly directed at preventing undesired knowledge transfer and foreign interference. Uncoincidentally, several common EU-measures are economic measures, as the EU has a strong mandate on trade. The UN has, from a security mandate, imitated the knowledge embargos. The width and depth of these common measures is being extended in response to the international developments.

In addition, we can observe a new wave of international and national measures, such as toolkits, capacity building, and national contact points. This new wave is more directed at the public knowledge organisations in Europe. The measures are taken with caution and are often 'softer', i.e., not legally binding. This is fitting with the institutional autonomy and academic freedom in the science system, that is foundational to the academic community. Because of their newness, these recent measures have not been evaluated, and their impact is uncertain.

¹⁶ https://www.ffg.at/AS_digitaletechnologien2022

Overall, in response to heightened tensions in the world, a varied landscape of measures is being developed in Europe, driven by different organisations, countries and intergovernmental organisations, and their respective mandates. This can lead to a comprehensive, but also rather uncoordinated policy response, including risks of overregulation, unalignment, and blind spots. While there is relatively a lot of attention to raising awareness, identifying risks, and mitigating risks, we see less effort in creating save opportunities for collaborative research programmes ('greenlisting') (d'Hooghe & Lammertink, 2022).

5.2 Similarities and differences

The results show that, while there is a strong set of common measures in both countries based on international efforts, the awareness and action in the Netherlands is relatively high compared to Austria. This is most apparent in the speed at which new policy is developed. While in the Netherlands a framework and guidelines were developed before a European version existed, in Austria the European toolkit for countering foreign interference in research and innovation was the first that was available, even though some exploratory discussions about the topic in 2019 were initiated in Austria. Also, a difference in terms of capacity building could be seen. In the Netherlands all universities need to have someone responsible in senior leadership of the institution for knowledge security as well as at a more operational level. This is not formally required in Austria. Nonetheless, the increased efforts in the Netherlands so far mainly focus on non-binding and informal measures. The final responsibility in both countries for the choices with whom and how to collaborate, lies with the researchers and the research organisations. Arguably, researchers in the Netherlands have more resources available to make informed choices.

The consequences of these similarities and differences are unclear. On the one hand, the common measures may provide sufficient basis to work together at a levelled playing field in international research collaboration. The European toolbox and regulation provide the tools and resources to arrive at nuanced decisions about how to work together with non-EU-partners. On the other hand, the differences may lead to complicated situations in collaborative research projects. As the national security agencies inform researchers differently on possible undesired research collaboration, this may lead to inconsistent actions and possible waterbed effects. This means that the increased security measures in one country will lead to an increase in potentially insecure research activity in another country where the security measures are lower.

5.3 Importance of national context

A final observation is the importance of the national context to explain the differences in terms of the awareness and (public) discussion about this knowledge security and foreign interference. In the Netherlands, the risks and threats of international collaboration are more publicly discussed than in Austria. In the Netherlands, media attention and political interest drive both policymakers and universities to come up with responses. It is difficult to fully account for this difference in awareness, but part of the explanation may lie in the academic and political differences between the two countries. Academically, the Netherlands has a higher number and share of foreign students from outside the European Union. The Dutch research institutes can thus be seen as more globally

connected than their Austrian counterparts. Politically, Austria can be characterised as a federalist state and executing its neutrality in terms of foreign affairs.¹⁷ Austria plays a role as neutral ground for a variety of international organisations. This neutrality is difficult to combine with measures of research security as these may add barriers for other countries. These academical and political factors give rise to different policy responses to the increased risks of international developments.

This importance of the national context is crucial for understanding the similarities and differences across countries. For an aligned European approach, the different national contexts need to be considered.

6. Conclusion and implications

This comparative study set out to better understand the similarities and differences in policy responses to the concern of knowledge security in two countries, to inform future policy making in the two countries and the EU.

We can conclude that currently the safety and security of knowledge development in both countries is first and foremost strengthened by export control mechanisms, international sanctions, and international agreements. Trade-related measures are taken by the European Union. Also, codes of conduct regarding research integrity and scientific freedom are internationally strongly aligned because of the international character of academia. The UN has used its global security mandate to erect two knowledge embargos.

At the same time, we see an emerging divergence between the actions taken in the Netherlands and Austria. The Netherlands has taken action to increase awareness, provide information, conduct a risk analysis, and build capacity at institutions. At the same time, these Dutch measures are, so far, by and large not binding. The differences between countries may diminish by the Mutual Learning Exercise that is being organised at the time of writing this paper.

While this study was conducted with limited time and resources, the results may inform further policymaking in several ways.

- This study shows a potential for reciprocal learning between countries. Taking the local context into account, the lessons and best practices may be shared and implemented in different countries.
- The differences between countries expose the need for capacity building at European level. While the European Union is working towards a stronger European Research Area, dealing with the risks and opportunities of international collaboration with non-European countries need to be covered. Since the research and innovation chain is, so to say, as strong as the weakest link, it is in the interest of the whole European Union to increase the knowledge security effort. While the EU does not have a strong mandate on research and higher education, through its funding programmes the EU has a way of setting standards and institutionalising practices that may strengthen knowledge security and integrity in the EU.

¹⁷ https://en.wikipedia.org/wiki/Declaration_of_Neutrality

- The study showed that most of the policy responses that were identified are focussed on raising awareness, identifying risks, and mitigating risks. Relatively little attention is paid to creating opportunities for safe collaboration. For a secure and strong research ecosystem, there is a need to creating opportunities for safe and secure research collaboration.

7. References

- AIVD. 2022. *Jaarverslag AIVD 2021*. Jaarverslag, Den Haag: Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, Algemene Inlichtingen- en Veiligheidsdienst.
- ALLEA. 2017. *European Code of Conduct for Research Integrity. Revised Edition*. Berlijn: ALLEA ALL European Academies.
- BMDW. 2021. *Die Rolle der Exportkontrolle für Wissenschaft und Forschung*: 22. Wien: Bundesministerium für Digitalisierung und Wirtschaftsstandort (BMDW).
- Borrell, J. 2020, December 3. Why European strategic autonomy matters. *European Union External Action*. https://www.eeas.europa.eu/eeas/why-european-strategic-autonomy-matters_en.
- BVT. 2021. *Verfassungsschutzbericht 2020*: 96. Wien: Bundesamt für Verfassungsschutz und Terrorismusbekämpfung (BVT).
- CBS. 2022, March 18. 40 procent eerstejaars universiteit is internationale student. *Centraal Bureau voor de Statistiek*. <https://www.cbs.nl/nl-nl/nieuws/2022/11/40-procent-eerstejaars-universiteit-is-internationale-student>.
- d’Hooghe, I., & Lammertink, J. 2022. *How National Governments and Research Institutions Safeguard Knowledge Development in Science and Technology*. Leiden: LeidenAsiaCentre.
- Duszynski, J., & Galvin, M. 2022. “What I’m Mostly Afraid of Is That There Will Be Two Sciences—Democratic Science and Autocratic Science.” *ISSUES in Science and Technology*, 38(4): 27–30.
- European Commission. 2020, October 9. EU foreign investment screening mechanism becomes fully operational. *European Commission*.
- European Commission. 2021a. *The Global Approach to Research and Innovation Europe’s strategy for international cooperation in a changing world*. Brussel: European Commission.
- European Commission. 2021b, March 23. Strengthening the EU’s autonomy – Commission seeks input on a new anti-coercion instrument. *European Commission - Press Release*. Brussel.
- European Commission. 2022a, June 28. EU resilience: Council presidency and European Parliament reach political agreement to strengthen the resilience of critical entities. *European Commission - Press Release*, 2. Brussel.
- European Commission. 2022b, March 4. Commission suspends cooperation with Russia on research and innovation. *European Commission - Press Release*, 2. Brussels.
- European Commission. 2023. Commission Delegated Regulation (EU) 2023/ of 21 October 2022 amending Regulation (EU) 2021/821 of the European Parliament and of the

- Council as regards the list of dual-use items. *Official Journal of the European Union*, L(9): 252.
- European Commission. Directorate General for Research and Innovation. 2022. **Tackling R&I foreign interference: Staff working document**. Luxemburg: Publications Office. <https://data.europa.eu/doi/10.2777/513746>.
- Fischer, K. 2022, April 19. Is Geopolitics Closing the Door on Open Research? *The Chronicle of Higher Education*. <https://www.chronicle.com/article/is-geopolitics-closing-the-door-on-open-research>.
- Fuest, C., Flach, L., Dorn, F., & Scheckenhofer, L. 2022. **Geopolitische Herausforderungen und ihre Folgen für das deutsche Wirtschaftsmodell**: 39. München: Vereinigung der Bayerischen Wirtschaft.
- Gaisch, M. 2016. **Internationalisation of Second-tier Higher Education Institutions A look at Universities of Applied Sciences in Austria**, 10. Presented at the Forschungsforum der Österreichischen Fachhochschulen, Wien.
- Gildea, R. J., & D'Alessandra, F. 2022, March 7. We Need International Agreement on How to Handle These Dangerous Technologies. *Slate.com*. <https://slate.com/technology/2022/03/dual-use-surveillance-technology-export-controls.html>.
- Hollanders, H., Es-Sadki, N., & Rantcheva, A. 2021. **European Innovation Scoreboard 2021**: 95. Brussel, België: European Commission.
- Hudson, R. L. 2021, July 13. Canada tightens up security rules for foreign research collaboration. *Science|Business*. <https://www.ftm.eu/articles/china-science-investigation-launch>.
- Hudson, R. L. 2022, July 7. How to keep science open – but also secure G7 nations work on an answer. *Science Business*. <https://sciencebusiness.net/news/how-keep-science-open-also-secure-g7-nations-work-answer>.
- Huotari, M., & Jean, S. 2022. **Bolstering Europe's Economic Strategy vis-à-vis China**, (72).
- Johnson, J., Adams, J., Grant, J., & Murphy, D. 2022. **Stumbling bear, soaring dragon. Russia, China and the geopolitics of global science**. Londen: The Policy Institute. King's College London, Clarivate, Harvard Kennedy School Mossavar-Rahmani Centre for Business and Government.
- Jones, B. 2017. **The new geopolitics**. Washington, DC: Brookings. <https://www.brookings.edu/blog/order-from-chaos/2017/11/28/the-new-geopolitics/>.
- Li, Y., Zhao, W., Li, D., Tao, X., Xiong, Z., et al. 2019. RETRACTED ARTICLE: EDAR, LYPLAL1, PRDM16, PAX3, DKK1, TNFSF12, CACNA2D3, and SUPT3H gene variants influence facial morphology in a Eurasian population. *Human Genetics*, 138(6): 681–689.
- MERICS. 2022, January 5. China's systemic competition and normative rivalry with the US and the EU. **MERICS Mercator Institute for China Studies**. <https://merics.org/en/chinas-systemic-competition-and-normative-rivalry-us-and-eu>.
- Minister van OCW. 2022. **Voortgang aanpak kennisveiligheid hoger onderwijs en**

wetenschap.

- Montan Universität Leoben. 2021. **Focus on Internationalisation. Report 2021**: 120. Leoben: MIRO, Montan Universität Leoben.
- OeAD. 2022, April 26. **OeAD in Solidarity with Ukraine—FAQs regarding Ukraine as well as Russia**. <https://oead.at/en/the-oead/information-about-ukraine>.
- OECD. 2022. **Integrity and security in the global research ecosystem**. Parijs: OECD Science, Technology and Industry.
- ÖWA. 2018, January 19. Secure quantum communication over 7,600 kilometers. **Austrian Academy of Sciences**. <https://www.oeaw.ac.at/en/news-1/secure-quantum-communication-over-7600-kilometers-2>.
- ScienceGuide. 2022, March 4. Nederlandse kennisinstellingen verbreken banden met Rusland na oproep van Dijkgraaf. **ScienceGuide**. <https://www.scienceguide.nl/2022/03/nederlandse-kennisinstellingen-verbreken-banden-met-rusland-na-oproep-van-dijkgraaf/>.
- Seaman, J., Ghiretti, F., Erlbacher, L., Martin, X., Otero-Iglesias, M., et al. 2022. **Dependence in Europe's relations with China: Weighing perceptions and reality**. https://www.ifri.org/sites/default/files/atoms/files/etnc_2022_report.pdf.
- The Economist. 2022, May 5. China unveils its vision of a global security order. **The Economist**. London.
- UNL, KNAW, Vereniging Hogescholen, NFU, TO2 federatie, et al. 2022, January. **National Knowledge Security Guidelines. Secure internatinoal collaboration**. Rijksoverheid.
- Upton, B. 2022, March 2. More Russian ties cut as Europe offers help to Ukraine colleagues. **Times Higher Education**. <https://www.timeshighereducation.com/news/more-russian-ties-cut-europe-offers-help-ukraine-colleagues>.
- Van den Broek, A., Braam, C., Hampsink, S., & Kommers, S. 2014. **Internationalisation at home. Gebruik en opbrengsten in het Nederlands Hoger Onderwijs**: 49. Nijmegen: ResearchNed.
- van der Wende, M., & Kirby, W. C. 2020. **China and Europe on the New Silk Road: Connecting Universities Across Eurasia**. Oxford university press.
- VSNU. 2021, February. **Framework Knowledge Security Dutch Universities**. Association of Universities The Netherlands.
- VSNU & VH. 2018. **Internationalisation. Agenda for Higher Education**: 76. Den Haag: VSNU en Vereniging Hogescholen.
- Wagner, C. S., Cao, C., Jonkers, K., Schwaag Serger, S., & Goenaga, X. 2021, April 5. What Do China's Scientific Ambitions Mean for Science—And the World? **ISSUES in Science and Technology**.
- Wee, S.-L., & Mozur, P. 2021, December 3. China Uses DNA to Map Faces, With Help From the West. **The New York Times**. New York, NY.