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The implementation of research security policies in Germany: exploring policy narratives across governance levels

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ABSTRACT

For decades, European Union (EU) Member States have promoted openness and collaboration in science. However, amidst a changing geopolitical world order, they increasingly view international research collaborations as a possible gateway for foreign interference. As a result, several Member States have tightened international research collaborations through "research security" measures like visa restrictions for foreign researchers. So far, the implementation of these measures remains under-researched. We address this blind spot by using the narrative policy framework as a theoretical lens to investigate how the implementation of research security policies is narrated across the micro- (individual), meso- (organisational) and macro- (governmental) levels in Germany. Based on a mixed-methods analysis, we show that there are currently few linkages between policy narratives across governance levels. This narrative inconsistency creates uncertainties for micro-level actors that are tasked with policy implementation, thus endangering policy effectiveness. Conceptually, our study introduces critical nuances that help refine our understanding of how policy narratives evolve. Specifically, it demonstrates that rather than being implemented in a linear way from design to execution, research security narratives are created in a space of narrative autonomy in terms of sentiments, terminology and suggestions for implementation.

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Research security; narrative policy framework; Germany; policy implementation; science diplomacy; China

1. Introduction

For decades, governments have stressed the benefits of openness and collaboration in science, including higher citation impact (Leydesdorff *et al.* 2019), accelerated innovation (Wagner and Jonkers 2017), soft power projection and greater visibility in the global market for academic prestige (Li and Yin 2023). However, amidst growing economic,

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systemic and geopolitical competition, several advanced science nations, including European Union (EU) Member States, increasingly view international research collaborations as a possible gateway for foreign interference and knowledge leakage. As a result, they have tightened international research collaborations through security measures such as visa restrictions for foreign researchers. These measures are particularly often applied in cases where "non-like-minded" states like China are involved. Although the introduction of security measures in research collaborations is not unprecedented, governments have recently started to use new terms to describe the process, such as "research security" or "knowledge security".

In the EU, the term research security has been popularised through the 2024 Council recommendation on enhancing research security (Council of the European Union 2024). In its recommendation, the Council uses research security as an umbrella term to refer to "anticipating and managing risks" related to:

- the undesirable transfer of critical knowledge and technology that may affect the security of the EU and its Member States;
- malign influence on research that seeks to undermine academic freedom and research integrity in the EU;
- ethical or integrity violations that lead to knowledge and technologies being used to suppress, infringe on or undermine EU values (Council of the European Union 2024, p. 10).

The recommendation has put research security high on the agenda of policymakers in several EU Member States. Yet, despite its policy relevance, research security remains an under-researched and under-theorised topic.

We address this blind spot by using the narrative policy framework (NPF) as a theoretical lens and by drawing on Weiss' (2020) two-step model of narrative implementation. Taking the NPF and Weiss' (2020) model as a starting point, we investigate how the implementation of research security policies is narrated in Germany across the micro- (i.e. individual), meso- (i.e. organisational) and macro- (i.e. governmental) levels. In the process, we also scrutinise what these narratives tell us about the implementation process of research security in Germany more broadly. In the context of research security, Germany is an interesting case study for three reasons. First, it is one of the EU's economic and research powerhouses. As such, it is firmly embedded in the globalised (knowledge) economy. As a result, Germany has a pronounced interest in addressing research security-related challenges that may impact its economic performance while continuing to adhere to collaboration and openness in research to strengthen its innovative power. Second, Germany's research landscape is much more differentiated than that of other EU Member States. For instance, German universities fall under the responsibility of the federal states ("Bundesländer"), whereas extra-university research organisations (EROs) have separate legal and organisational set-ups that involve the German Federal Ministry of Education and Research (BMBF).[1] While this configuration is intriguing from a research policy perspective, it also makes it challenging to generalise findings from a case study of Germany's research security approach. Third, the BMBF issued a position paper in 2024 that outlined its guiding principles on "research security in light of the *Zeitenwende* [historical turning point; own translation]" (BMBF 2024) in rather broad terms. This leaves

room for interpretation in the policy implementation process and enables us to examine how policy narratives diverge or converge across governance levels. To do so, we combine a sentiment analysis, a qualitative content analysis, and 21 semi-structured expert interviews in a mixed-methods research design.

Our study adds an in-depth, theory-guided and evidence-driven analysis of Germany's approach to research security to the thus far largely exploratory, descriptive and under-theorised scholarship on research security. At an empirical level, it demonstrates two things. First, the sentiment analysis shows that, on average and despite recent geopolitical upheavals, policy actors at the meso and macro levels still have an overwhelmingly positive view of international research collaborations, including with so-called "non-like-minded" states like China. Second, the qualitative content analysis indicates that there are several differences and only a few commonalities in how actors at the micro level, as well as actors at the meso- and macro-levels, narrate the implementation of research security. This narrative inconsistency creates uncertainties for actors at the micro-level that are tasked with the implementation of research security measures, thus endangering policy effectiveness.

Conceptually, our case study introduces critical nuances that refine our understanding of how policy narratives evolve and gain traction on the ground. Specifically, the case of research security in Germany illustrates how the policy implementation phase unfolds in a far more dynamic and iterative fashion than Weiss' (2020) two-step model suggests. Rather than a linear passage from design to execution, we observe a parallel creation of policy narratives in a space of narrative autonomy in terms of sentiments, terminology and suggestions for implementation.

The remainder of this article is structured as follows: In section two, we provide an overview of the nascent research on research security. Hereafter, in section three, we introduce the NPF as the guiding theoretical lens for our analysis. In section four, we detail the methods used, before we report our results in section five. We critically discuss our findings in section six and conclude by outlining our study's implications from a theoretical and policy perspective, as well as by highlighting the study's limitations and future avenues for research in section seven.

2. Research security as an emerging research field

Scholarship on research security has so far been limited, but is gradually expanding as mounting geopolitical tensions are leading more states to critically re-examine established political, economic and scientific interdependencies.

As a nascent research area, research security is marked by six distinct characteristics. First, it is a highly interdisciplinary research area that scholars with a background in area studies (e.g. Braun Střelcová and Zheng 2025), higher education (e.g. Sá *et al.* 2025), law (e.g. Walker-Munro 2024a) and political science (e.g. Houttekier *et al.* 2025) are contributing to. Second, as a topic that is currently of considerable policy relevance to several advanced and emerging science nations, many research security studies have an explicit or implicit ambition to inform and shape policymaking. Third, the discourse on research security is considerably shaped by think tanks (e.g. D'hooghe and Lammertink 2022, Dao *et al.* 2024), which reinforces the literature's policy-orientation. Fourth, because research security has only made it onto the policy agenda a few years ago, a large

share of the research security scholarship has so far remained exploratory and under-theorised (Walker-Munro 2024a, p. 2). Fifth, because research security is a budding research area, terminology in the field is still in flux (Walker-Munro *et al.* 2025, p. 3). For instance, while the Netherlands and Belgium use the term "knowledge security", the UK speaks of "trusted research" (James *et al.* 2025, p. 18). Finally, existing research security studies mostly use qualitative methods and rely on secondary data (e.g. Bamberger and Huang 2025, Zha and Wang 2025), such as policy documents (for an exception, see: James *et al.* 2025).

Seen from an empirical perspective, the eclectic community working on research security has produced a body of scholarship that has contributed to our understanding of national research security approaches, concrete research constellations that may raise research security concerns and challenges that affect the acceptance of research security as a public policy (Shih and Forsberg 2023, Snetselaar 2023). For instance, Szüdi and Brugner's (2024) survey of 24 Austrian researchers found that scholars largely lack an understanding of how current geopolitical developments may affect international research collaborations and struggle to evaluate the trustworthiness of their research partners. Using South Korea as a case study, Kim and Mobrand (2025) argue that emerging science nations are likely to be less concerned by the increasing securitisation[2] of national science systems, as they have always sought to align international science cooperation with national objectives, including to bolster national security and sovereignty.

The growing stock of empirical studies on research security has moreover helped identify differences, commonalities and best practices across different national and regional research security initiatives and measures (e.g. Bamberger and Huang 2025, Pinna 2025, Zha and Wang 2025). For example, in their study of how universities in Sweden and Australia govern international research collaborations amidst geopolitical tensions, Shih *et al.* (2024b) find that, due to a lack of clear policy guidance from their government, Swedish universities have greater difficulties in navigating the openness-security tensions in international research collaborations than their Australian counterparts whose approach to research security has been heavily informed by the introduction of research security-related legislation and extensive due diligence protocols. Despite this strong top-down governance of research security, Walker-Munro (2024b) argues that Australia can further strengthen its research security measures by learning from Canada's interpretation of migration law to protect research from foreign interference and espionage.

Our study contributes to this growing literature on research security in three distinct ways. First, and departing from most research security studies, our analysis relies on a combination of primary and secondary data that we analyse using a mix of quantitative and qualitative methods. Second, it is the first study to investigate in-depth how Germany, a major European research powerhouse, approaches the implementation of research security policies. Finally, our study is one of the few explicitly theory-guided research security studies to date.

3. The narrative policy framework

The NPF builds on the core assumption that humans have limited cognitive capacities that require the use of heuristics to make sense of the world, including policy processes

therein (Stauffer *et al.* 2024, p. 194). The framework asserts that a story or a narrative is a particularly helpful heuristic (Stauffer *et al.* 2024, p. 194) and embraces a structuralist interpretation of narrative, arguing that "policy narratives have precise narrative [characteristics] that can be generalised across space and time to different policy contexts" (Shanahan *et al.* 2018b, p. 116).

According to the NPF, policy narratives "are strategic constructions of a policy reality promoted by policy actors that are seeking to win (or not to lose) in public policy" debates (Jones *et al.* 2014, p. 9). The framework asserts that a policy narrative consists of a narrative form and narrative content (Shanahan *et al.* 2018a, p. 335), with the latter referring to what a story is about and the former relating to a set of distinct characteristics that differentiate narratives from other non-narrative texts or communications (Shanahan *et al.* 2018a, p. 335). In its original elaboration, narrative form was seen to be composed of three key characters:

- An entity that is causing the policy problem (often dubbed "villain" but in this study referred to as the "driver")
- A "victim" who is harmed by the policy problem; and
- A "hero" who is committed to providing a solution to the policy problem.

More recent studies that employ the NPF have added the character of the "beneficiary" to the narrative form. Beneficiaries are actors that gain from a particular policy (Stauffer *et al.* 2024). In addition to these characters, the NPF argues that a setting (meaning the space within which the action of the story unfolds) and a plot (which connects the elements of a storyline) make up the narrative form (Stauffer *et al.* 2024, p. 194).

So far, the NPF has largely been used to study the agenda-setting stage of the policy process. In the few instances where studies have used the NPF to study the implementation stage of the policy process, they have focused on either the micro-, meso- or macro-level. At the micro-level, the focus is typically on the communication of individual implementers or stakeholders, whereas at the meso-level, the communication of public organisations or stakeholder groups is front and centre. Finally, at the macro- or societal level, implementation studies concentrate on the communication of large-scale institutions, such as the state or the general public more broadly (Stauffer *et al.* 2024, p. 196). Only a few studies have focused on several or all three levels of analysis simultaneously. As a result, narrative linkages across the three levels of analysis, i.e. how narratives at one level connect to or shape narratives at another level, are poorly understood (Shanahan *et al.* 2018a, p. 334).

As one of the few focusing on the policy implementation stage, Weiss (2020) argues that a policy narrative evolves in two phases (see Figure 1). During the first phase, a policy narrative is constructed by political actors, often at the governmental level, that take up ideas from existing macro or meso-level narratives, adjust them to the relevant context and then attempt to establish them (Weiss 2020, p. 109). In the second phase, the original narrative is put to a "reality check" and transformed based on the experiences of implementers on the ground (Weiss 2020, p. 109). These micro-level implementers are often referred to as street-level bureaucrats (Lipsky 1980). Taking Weiss' (2020) two-phase model as a starting point for the study of narrative linkages across

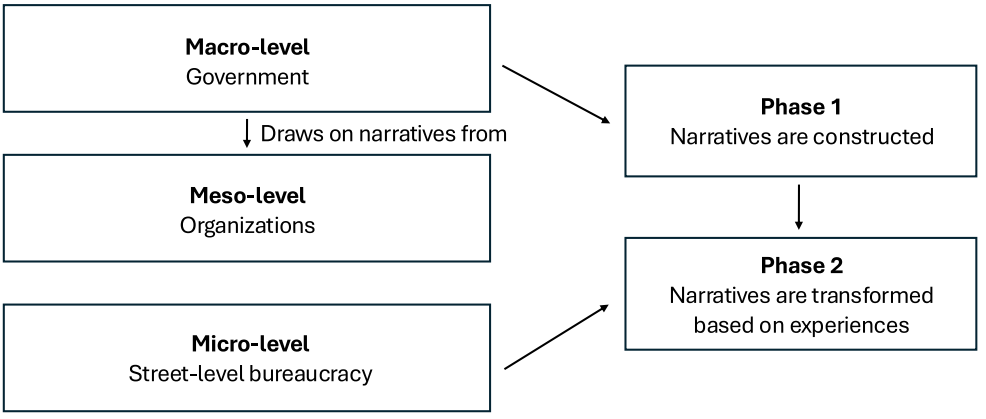

Figure 1. Ideal-typical overview of the evolution of a policy narrative during implementation; own illustration based on Weiss (2020).

governance levels, our study seeks to provide a better understanding of how the presence or absence of narrative linkages affects the implementation of policy narratives.

4. Methods and data

Our study combines a sentiment analysis, a qualitative content analysis and semi-structured expert interviews in a mixed-methods research design. Such a mix allows us to trace convergences and divergences in narratives across the micro- (individual), meso- (organisational) and macro-(governmental) levels.

Based on an unsystematic web search, we chose documents for the sentiment analysis that either relate to (research) security, international research collaboration or scientific and economic collaboration with China (see Supplementary Material). Throughout the research process, we confirmed the accuracy and comprehensiveness of our search by checking our database against all documents that our interviewees referred to during the interviews and that were mentioned in related research on Germany's research security approach (e.g. James *et al.* 2025).

We conducted a sentiment analysis for two reasons. First, it provides a contextual backdrop for our interview analysis, allowing us to situate individual responses against prevailing frames. Second, the sentiment analysis enables us to study what sentiments actors at the meso- and macro-levels associate with international research collaboration and research security, providing us with an indication of what their policy preferences are (i.e. strong negative sentiments are likely to translate into stringent and comprehensive research security policies and internal guidelines).

In this study, sentiment is defined as the positive or negative emotional tone of a given document based on the identification of sentiment words (Liu 2022). We followed the four steps defined by Wilkerson and Casas (2017) by obtaining texts, extracting data from the text corpus, quantitatively analysing the data and finally interpreting the results. First, we collected documents published by governmental organisations (e.g. BMBF), intermediaries (e.g. German Academic Exchange Service, German Rectors'

Conference) and China-centred projects (e.g. China Competence Centres, projects that receive funding for two to three years from the BMBF, are predominantly based at universities, and are meant to increase China literacy in Germany through lectures, training and exchange). Second, we proceeded to clean the data for further analysis employing the software RStudio (Version 2025.05.0 + 496). Third, we conducted a lexicon-based sentiment analysis based on the SentiWS 2.0 lexicon (Remus *et al.* 2010). This lexicon is a collection of 3.450 German sentiment words with scores ranging from 1 (max. positive) to −1 (max. negative). For each document, we computed both the average and total of all non-missing word scores. To account for diverging document lengths, we calculated the share of positive and negative sentiment words per document. Finally, we used the resulting scores to identify documents for an in-depth qualitative analysis (see below) in accordance with a "stratified purposive sampling" strategy (Teddlie and Yu 2007, p. 90).

We also conducted 21 semi-structured expert interviews to examine how street-level bureaucrats narrate the implementation of research security policies. Our interview guideline was directly informed by the NPF, as it included questions that asked interviewees to reflect on whether there is anyone to blame for the increasing regulation of international research collaborations, whether anyone benefits from this development and how the implementation of research security could be facilitated (see exemplary interview guideline in Appendix). In addition, our interview guideline contained a range of questions that asked interviewees to identify the most important implementers of research security measures, discrepancies in how different actors approach research security, as well as key challenges that actors experience when trying to implement research security measures. We selected interviewees through purposeful sampling and snowballing to ensure a balanced sample (Table 1 provides a broad overview of the conducted interviews). Overall, interviewees were very responsive to our interview request, but an overwhelming majority indicated that they preferred interviews to be off the record and to stay anonymous. As a result, we did not record the interviews but instead took extensive interview notes. In almost all cases, we sent these notes to our interviewees to allow them to check interview protocols for accuracy. Whenever interviewees made changes to the interview notes, we continued working with the edited version. Finally, to analyse the interview notes, we used Deterding and Waters (2021) flexible coding approach and the qualitative data analysis software NVivo. The coding scheme that emerged after three rounds of analysis contained both deductive codes that are firmly grounded in the NPF as well as inductive codes that emerged from the material itself.

Third, we conducted an in-depth, qualitative analysis of six documents that were also included in the sentiment analysis. We did this additional qualitative analysis because, while a sentiment analysis is useful in examining the general sentiment in relation to an issue, it does not allow us to analyse themes and meanings across a corpus of documents. However, as we were interested in narrative linkages between policy narratives of street-level bureaucrats and actors at the meso and macro levels, it was key to study the documents included in the sentiment analysis in more detail. The six documents that we included in the qualitative content analysis were chosen based on their sentiment score in line with a data-driven document selection. We chose two documents that were among those with the highest share of negative sentiments, two documents that scored relatively neutral in the sentiment analysis and two other documents that exhibited a high share of positive sentiments. In addition, to make sure that we cover a range of policy narratives,

Table 1. Overview of conducted interviews.

Interviewee Code	Institution	Interview Date
INT01	University	25 October 2024
INT02	Intermediary	28 November 2024
INT03	University	11 December 2024
INT04	Think thank	13 December 2024
INT05	University	13 December 2024
INT06	Extra-university research organiation	18 December 2024
INT07	Extra-university research organisation	19 December 2024
INT08	University	20 December 2024
INT09	University	8 January 2025
INT10	European Commission	10 January 2025
INT11	Intermediary	17 January 2025
INT12	University	24 January 2025
INT13	Extra-university research organisation	24 January 2025
INT14	Extra-university research organisation	29 January 2025
INT15	Intermediary	5 February 2025
INT16	European Commission	19 February 2025
INT17	Intermediary	25 February 2025
INT18	Extra-university research organisation	26 February 2025
INT19	Extra-university research organisation	9 March 2025
INT20	Intermediary	12 March 2025
INT21	Extra-university research organisation	15 April 2025

we selected documents that were published by different actors involved in the policy debate on research security at the meso- and macro-levels. Like the interviews, we analysed these documents using flexible coding (Deterding and Waters 2021) and the qualitative data analysis software NVivo. To uncover differences and commonalities between narratives at the micro-, meso- and macro- levels, we used all NPF-related codes that had informed our interview analysis for the qualitative document analysis (see codebook in Supplementary Material). Inductive codes were added whenever information appeared in the documents that did not align with the theoretical framework, but that seemed relevant to our understanding of the policy implementation process.

5. Findings

In the following sections, we first present the results of our sentiment analysis and then outline the findings from our qualitative analysis.

5.1. Sentiment analysis

The documents included in the sentiment analysis were published between 2019 and 2025. We chose 2019 as the reference year for two reasons. First, the National Science Foundation published the first comprehensive report on research security that year, which enhanced the topic's salience on the US policy agenda. Second, it was in 2019 that the EU first referred to China as a partner, systematic rival and competitor – a policy narrative that has considerably shaped the discourse on Sino-German collaboration in scientific and economic affairs.

Figure 2 presents the count of documents included in the quantitative analysis by publication year, grouped by eight different types of actors at the meso- and macro-levels. Macro-level actors include agencies at the EU level as well as the Federal Government of Germany. China Competence Projects, EROs, political parties, intermediaries, industry

actors and universities represent meso-level actors. As is noticeable from Figure 2, the share of documents is unevenly distributed among actors and years. As a result, the trends described in the following sections need to be interpreted with caution.

Figure 2 shows that the Federal Government and intermediaries have published the highest share of documents on international research collaboration, (research) security and collaboration with China. The Federal Government published 14 out of 57 documents, while documents released by intermediaries account for 13 of the total. A peak in publication can be observed for the years 2023 and 2024. At the time of writing, the year 2025 could not be included as a complete year, which explains the low share of documents published during that year.

Table 2 presents the average positive sentiment share of all documents published by each actor group from 2019 to 2025. Documents published by China Competence Projects score the highest, while documents associated with intermediaries have, on average, the lowest positive sentiment share. We also notice that in comparison to documents published by intermediaries, publications by the Federal Government have, on average, a higher positive sentiment share.

The line graph in Figure 3 describes the average share of positive sentiment of each actor group over time. The vertical coordinate represents the average positive sentiment share of an actor group for a given year. With the text corpus being very heterogeneous and restricted to 57 documents, we did not apply statistical tests to the dataset but focused on a descriptive analysis. The figure indicates a few interesting patterns. First and foremost, it illustrates that, on average, the share of sentiment associated with international research collaboration, including with China, is remarkably positive considering that it ranges between 0.65 and 1.00. In addition, Figure 3 indicates that, on average, documents published by intermediaries scored the least positive sentiment share in 2023, followed by publications issued by EU bodies in 2022. In contrast, documents associated with China Competence Projects in 2023 and 2025 have, on average, the most positive sentiment share with no identifiable negative sentiment. Here, it is important to note that these documents are shorter and do not include as much information as

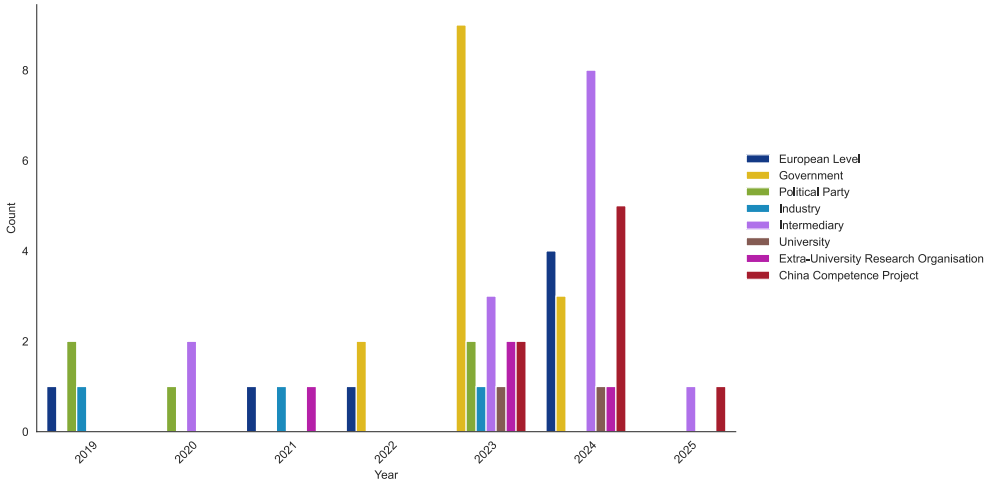

Figure 2. Analysed documents over time; $n = 57$.

Table 2. Average positive sentiment share per actor.

Actor group	Average positive sentiment share	Standard deviation
China Competence Project	0.879	0.106
Industry	0.818	0.047
Government	0.804	0.092
Extra-university research organisation	0.790	0.069
University	0.790	0.029
Political party	0.784	0.037
European level	0.778	0.084
Intermediary	0.765	0.100

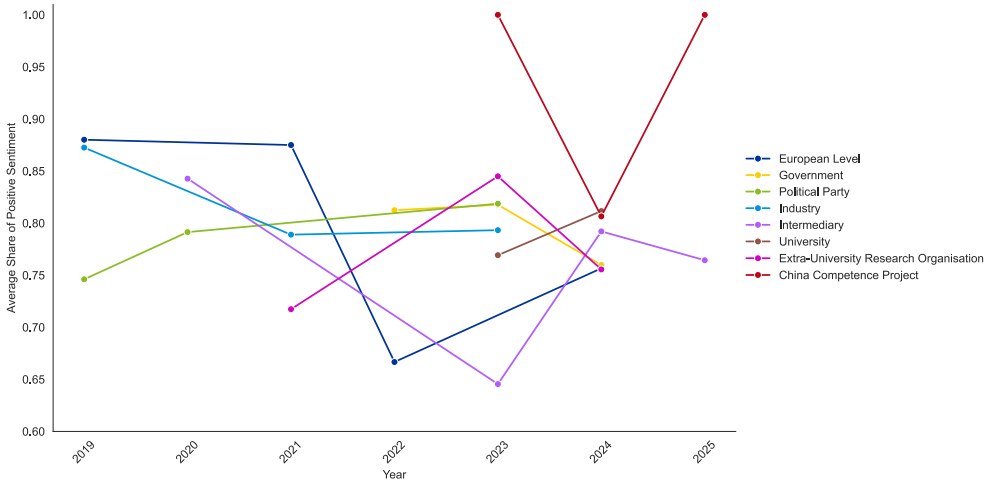

Figure 3. Average share of positive sentiment over time; $n = 57$.

some of the other publications. The most drastic drop in average sentiment can be observed for EU documents released in 2022, decreasing from 0.875 in 2021 to 0,667 in the following year.

Finally, the box plot in Figure 4 illustrates how widely sentiments vary in documents issued by a specific actor group per year, with the largest variance being detectable in intermediary documents from 2023 and Federal Government documents from 2024.

5.2. Qualitative content analysis

As described in the methods section, we selected six documents for an in-depth, qualitative content analysis, including two each from the positive, neutral and negative sentiment score strata. The selected documents include four that specifically address Sino-German (science) cooperation, while the remaining two focus on international research collaboration more broadly. Five out of the six selected documents were published before the BMBF released its position paper on research security in 2024, with the German Aerospace Centre Project Executing Agency's (DLR-PT) web-based guidance on scientific collaboration with China being the only exception.

As Table 3 illustrates, the six documents selected for the qualitative content analysis were published by meso-level (e.g. Hochschulverband [German Association of University

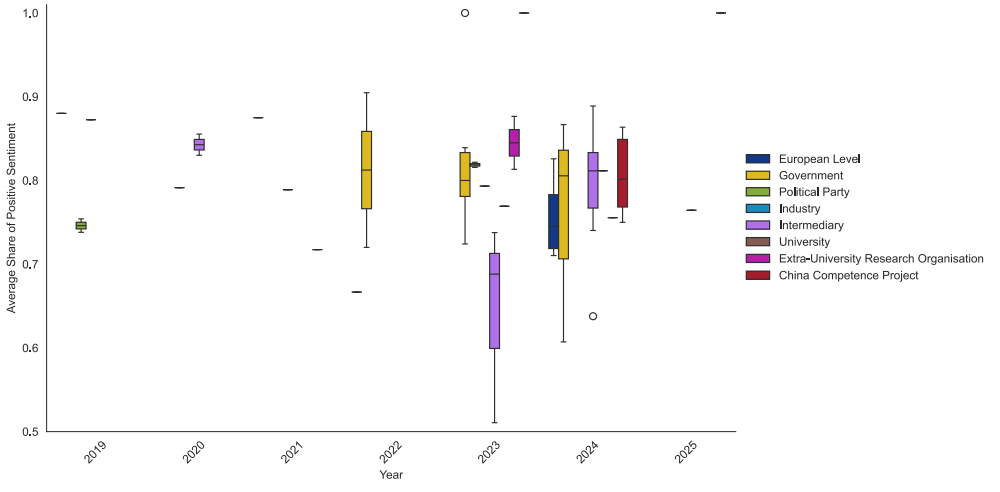

Figure 4. Sentiment variance over time; $n = 57$.

Professors and Lecturers], Universität Heidelberg [Heidelberg University]) and macro-level actors (e.g. Federal Government, Federal Foreign Office). None of these six documents makes a direct reference to the term research security. Instead, they refer to terms like "science diplomacy" (Hochschulverband 2023) or "risks" (Plé *et al.* 2024), with the former being described as a means to promote closer political cooperation through

Table 3. Documents selected for the qualitative analysis.

Actor	Year	Title
Auswärtiges Amt [Federal Foreign Office]	2023	Deutsch-chinesische Beziehungen in Forschung und Wissenschaft [Sino-German relations in research and science]
Deutsches Zentrum für Luft- und Raumfahrt Projektträger [German Aerospace Centre Project Executing Organisation; DLR-PT]	2024	Orientierung geben für die Wissenschaftskooperation mit China [Providing orientation for research collaborations with China]
Bundesregierung [Federal Government]	2023	China-Strategie der Bundesregierung [China strategy of the Federal Government]
Universität Heidelberg [Heidelberg University]	2023	Differenzierte und wissenschaftsadäquate Diskussion um Forschungskooperationen. Statement zur Zusammenarbeit mit der Volksrepublik China und dem Quantenforscher Prof. Dr. Jian-Wei Pan [A differentiated discussion on research collaboration. Public statement on the cooperation with the People's Republic of China and the quantum researcher Professor Jian-Wei Pan]
Hochschulverband [German Association of University Professors and Lecturers]	2023	"Science Diplomacy" nach der Zeitenwende. Leitlinien des Deutschen Hochschulverbandes zum Wissenschaftsaustausch mit autoritären Staaten [Science diplomacy after the "Zeitenwende". Guidelines for research collaboration with authoritarian states published by the German Association of University Professors and Lecturers]
Ple et al. (commissioned by DLR-PT)	2024	Risiken in der internationalen Forschungskooperation. Ursachen, Zusammenhänge und Wirkungen [Risks in international research collaboration. Causes, interrelationships and effects]

"scientific dialogue" and research collaboration even in times of geopolitical tensions (Hochschulverband 2023).

In the analysed documents, the policy problem and driver are generally clearly named. For instance, the German Association of University Professors and Lecturers (GAUPL) states that it is difficult to engage in science diplomacy with authoritarian states, and points out examples such as Iran, Turkey and China. According to the GAUPL, these states explicitly use the knowledge that is created in research collaborations to strengthen their military and power apparatus (Hochschulverband 2023). While the document of the GAUPL describes research collaborations with several countries as challenging, most analysed documents single out China as the main concern when it comes to safeguarding international research collaborations. China is seen to be a driver because, according to the German Foreign Office and the Federal Government, its civil–military fusion – a policy that deliberately blurs the lines between civilian and military research–enables China to employ so-called "dual use" technologies to control ethnic and political minorities as well as to strengthen its military apparatus (Auswärtiges Amt 2023, Bundesregierung 2023, Hochschulverband 2023). In line with this, the German Ambassador to China, Dr. Patricia Flor, states that:

> In China, civilian research projects, including basic research, are always considered in terms of their military applicability. Therefore, Chinese policy sets clear limits on our cooperation in this area.[3] (Auswärtiges Amt 2023)

Meso-level organisations echo these concerns. In its public statement on research collaborations with China, Heidelberg University underlines that:

> [We] view the close integration of civilian and military research ('civil–military fusion') in China with concern and pay close attention to it because of the impact it has on established collaborations. (Universität Heidelberg 2023)

Meso- and macro-level actors also see the lack of access to research data, as well as attacks on academic freedom in China and a perceived lack of reciprocity in Sino-German research collaborations as part of the policy problem. For instance, in its China strategy, the Federal Government stresses that:

> Restrictions to the freedom of science, including in transnational data flows, also impact German researchers in China. We will work to ensure greater reciprocity and improved conditions for scientific cooperation, including at the EU level. (Bundesregierung 2023, p. 29)

As this statement indicates, German researchers and, by extension, the German science system are perceived to be the victims of China's research practices at home and abroad.

When it comes to finding solutions to the above-described policy problem, the analysed documents are less informative. Only a few documents suggest concrete policy solutions. Typically, policy solutions remain rather abstract, as they propose that broad measures, such as greater China literacy [Chinakompetenz], "de-risking" and the establishment of clearer collaboration rules may help address imbalances in Sino-German research collaborations. For instance, in its web-based guidance on scientific collaboration with China, the DLR-PT informs readers that it organises several events and "dialogue formats" on "China orientation" that aim to enable universities and research institutions to pursue their interests in Sino-German research collaborations (DLR-PT n.d.). The

Federal Government and the GAUPL, in turn, suggest a de-risking approach as a possible solution to current imbalances in Sino-German research collaborations – without clearly stating what such an approach would look like in practice (Bundesregierung 2023, p. 52, Hochschulverband 2023).

Across the analysed documents, the implementers who are viewed as responsible for the translation of these broad policy solutions generally remain the same. For instance, the DLR-PT seems to consider several meso- and macro-level actors, including universities, the German Rectors' Conference, the science ministries at the state level and the Alliance of German Science Organisations (the association that unites the most important research organisations in Germany, such as the Max Planck Society and the funding agency German Research Foundation) as important implementers (DLR-PT n.d.). The Federal Government largely lists the same actors as important implementers:

> We support universities and the German Rectors' Conference, EROs and the Alliance of Science Organisations in navigating collaborations with Chinese institutions. (Bundesregierung 2023)

In addition to these institutional actors, half of the documents also identify researchers as important implementers of the proposed policy solutions. For instance, the GAUPL emphasises that:

> We call upon researchers to use the advisory services of political actors and the scientific community. These services can help researchers assess whether a specific research collaboration is tenable. (Hochschulverband 2023)

5.3. Semi-structured expert interviews

The analysis of the 21 semi-structured expert interviews that we conducted with individual scientific managers and administrators based at German universities, EROs and intermediaries reveals that actors at the micro-level are generally cautious to explicitly name the policy problem. Instead, interviewees were more prone to describe the broad geopolitical context to explain why several advanced science nations, including Germany, are currently imposing restrictions on international research collaborations. Several interviewees stated that they could not identify a specific trigger (such as one or several publicised incidents of research theft) that explains why research security is currently so high on the policy agenda of German decision-makers (INT01, INT21). Rather, most interviewees believe that in Germany, research security concerns are fuelled by the intensifying economic and technological rivalry between the US and China, as well as Germany and China (INT02, INT05, INT08, INT14). Moreover, interviewees stated that several Western countries have started to re-evaluate their relationship with Beijing, including in the scientific realm, because of China's perceived support for Russia's war of aggression in Ukraine, its handling of the COVID-19 pandemic and its assertiveness on the international stage (INT05, INT09, INT15, INT19). Interviewees agreed that these recent international developments require a more strategic approach to international research collaboration. According to them, this approach should be explicitly informed by research security considerations, hence depicting a counterbalance to the bottom-up approach to research collaborations that, according to interviewees, has so far dominated in the German research ecosystem (INT19, INT20).

Not only were the interviewees hesitant or unable to clearly name the policy problem, but they were also cautious when it came to singling out a specific country as the driver. Throughout the interviews, most interviewees depicted China as always being "the elephant in the room" when it comes to research security concerns (INT06, INT17, INT20). At the same time, several interviewees mentioned that research collaborations with a range of other countries, such as the US, Iran, Russia, India and Brazil, can also be challenging from a security and ethical point of view (INT04, INT08, INT09). In addition, several interviewees highlighted that it is not only challenging for German research actors to adequately respond to China's research practices but also to address recently introduced research security policies in the US (INT02, INT18). For instance, interviewees associated with EROs mentioned that for them to be eligible for US funding and to be considered trustworthy collaboration partners, US institutions like the Department of Energy expect German research organisations to have appropriate security measures in place to ensure that research is not leaking to malign actors (INT18). Interviewees generally said that this increasingly complex situation and what they perceive to be very ambiguous guidelines from the BMBF create a great deal of uncertainty for them and the German science community (INT01, INT12, INT17). According to interviewees, this uncertainty has led some researchers to terminate existing collaborations with Chinese partners and to refrain from initiating new ones (INT07, INT17, INT20). As a result, interviewees believe that global science, in particular basic science, could potentially suffer from the increasing restrictions that are currently being imposed on international research collaborations (INT04, INT20). Some interviewees also stated that Germany's economy, science system and academic freedom may end up as victims (INT05), but very few were able to make out a clear beneficiary of the securitisation of international research collaborations. The only beneficiaries that interviewees sporadically identified were research security consultancies that have sprung up in the last few years, as well as industry actors that may benefit from increased funding for defence research (INT20, INT21).

To effectively address research security in Germany, interviewees highlighted several possible solutions. We focus on three solutions that were mentioned most often throughout the interviews. First, almost all interviewees underlined that awareness-raising among the scientific community is urgently needed to sensitise researchers to the risks that may be associated with certain types of research collaborations. Interviewees mentioned that the current level of awareness among researchers varies widely, depending on the individual's academic age, research field and experience in international research collaborations. Second, interviewees regularly stated that a central contact point for research security would help them effectively address research security concerns. According to interviewees, this contact point should ideally pool competences on the topic of research security and be able to advise street-level bureaucrats on complex issues that may arise in international research collaborations. While a majority of the interviewees were in favour of a centralised contact point, several interviewees emphasised that the contact point should be independent and managed by scientific rather than political actors (INT11, INT21). Third, interviewees noted that the current lack of resources dedicated to the topic of research security creates obstacles for street-level bureaucrats to communicate and implement relevant policies. This also explains why almost all interviewees advocated for investments to hire and train personnel on research security. In addition to a lack of resources, interviewees identified several other challenges in implementing research

security. For instance, they described that German researchers generally demonstrate disinterest and, at times, even resistance to the topic of research security. Moreover, interviewees often voiced concerns regarding the unintended consequences of research security measures. Specifically, they were worried that sweeping research security measures could lead to the discrimination and racial profiling of researchers with certain ethnic backgrounds.

When asked about the key implementers of research security measures, interviewee responses varied according to their institutional affiliation. For instance, interviewees working in university administrations generally considered the university leadership, administration and researchers to be the most important implementers of research security policies. At the same time, almost all interviewees viewed the EU as a crucial implementing actor whose task it is to ensure that there is a level playing field among Member States when it comes to research security. In other words, interviewees were concerned that EU Member States that are thoroughly implementing research security measures may have a competitive disadvantage vis-à-vis Member States that do not, as the latter can continue to receive funding from entities that the EU considers violating research security guidelines.

Finally, interviewees used a variety of terms to make sense of what they described in the interviews as a diffuse fear of international research collaborations being instrumentalised for military or political purposes. For instance, some interviewees were not fond of the term research security because – in their view – it is too often used as a battle cry (INT06). Instead, several interviewees preferred the term "Handlungssicherheit", which can be translated as "firm grounding for decision-making [own translation]" (INT09, INT19). This term was particularly popular among interviewees associated with EROs. Interestingly, two interviewees mentioned that they see a close link between research security and science diplomacy (INT01, INT11). One of the two interviewees explained that the science diplomacy concept is more mature than that of research security and has long been seen to be a means to engage with authoritarian states (INT11). As a result, actors engaged in science diplomacy activities had to grapple with issues like export controls – that are also seen to be key to research security – much earlier and can thus pass on valuable lessons. With regard to export controls, some interviewees furthermore explicitly emphasised that the concept of research security goes beyond export control regulations in that it seeks to address the "grey areas" in research collaborations (INT08, INT13).

6. Discussion

Overall, our comprehensive case study of Germany's approach to research security demonstrates two things. First, the exploratory sentiment analysis shows that policy actors at the meso- and macro-levels still view international research collaborations, including with so-called "non-like-minded" states like China, overwhelmingly positive. This also applies to the Federal Government, which – coupled with Germany's decentralised and complex research system (James *et al.* 2025) – helps explain the BMBF's preference for a less stringent policy response to research security concerns and the general nature of its position paper. Second, the qualitative content analysis and interview analysis indicate that there are few, and rather broad, narrative linkages across the micro-,

meso- and macro-levels (see Table 4). Specifically, there are two points at which the narratives of actors at the micro-level, as well as actors at the meso- and macro-levels resemble one another. First, across governance levels, actors seem to roughly agree on what individuals and organisations play a key role in implementing research security measures in Germany. In the interviews and the six analysed documents, actors repeatedly listed universities, (the Alliance of) research organisations, the German Rectors' Conference and researchers as key implementers. The only group that was not mentioned as an important implementer in the six documents chosen for the qualitative content analysis was intermediaries like the German Academic Exchange Service. This is likely because documents issued by this group were underrepresented in our sample for the qualitative content analysis. In fact, our interview findings indicate that actors tend to see their own organisation as a key implementer of research security. Since the implementation of research security measures will likely have to be accompanied by a new funding stream from the German government, it makes sense that interviewees try to position their own organisation as a central implementer, as this may increase its chances of benefiting from new research security funds.

Another point of convergence between policy narratives across the different governance levels was that actors agreed that a more strategic approach to international research collaboration is required in Germany. One interviewee explicitly said that, in comparison to other countries, Germany has so far had a very naive approach to international research collaboration, where considerations as to whether a cooperation is secure and beneficial for the attainment of German interests are regularly sidelined. The content analysis equally indicates that meso- and macro-level actors like the GAUPL and the Federal Government increasingly emphasise that the changing global economic and geopolitical situation requires German research actors to pursue a more strategic approach to international research collaboration. This approach includes a thorough analysis of the potential risks and benefits that a collaboration may imply for German interests and values.

At the same time, our analysis demonstrates that there are several important differences in how actors at the micro-level, as opposed to actors at the meso- and macro-levels, narrate the implementation of research security. These differences relate to three specific points: first, the policy problem, second, the terminology used and third, the suggested policy solutions.

Concerning the naming of the policy problem, our findings indicate that actors at the meso-and macro-levels are more outspoken when it comes to stating what the policy problem is and who is creating it. As position and policy papers have the explicit purpose to communicate an actor's policy preference on a given issue, it is unsurprising

Table 4. Similarities and differences in narratives across governance levels.

Similarities	Micro-level	Meso- and macro-levels
	Key implementing actors	
	Promotion of a more strategic approach to international research collaboration	
Differences		
		Naming of the policy problem
		Language used
		Concreteness of policy solutions

that the language of meso- and macro-level actors is rather straightforward when it comes to outlining the policy problem and driver. Micro-level actors, in contrast, seem to be more hesitant to clearly identify the policy problem and the driver. Most interviewees said that research security measures were not introduced as a direct response to several highly publicised instances of research theft or misappropriation in one or several German research institutions. Instead, they view the introduction of security measures in the research sphere as a response to a diffuse fear that has gripped Germany's research ecosystem. Only a few interviewees (less than five) named a specific country as being responsible for the increasing restrictions in international research collaboration. The few interviewees who named specific countries as being responsible said that the research security measures implemented in the US, as well as China's perceived civil–military fusion and research practices, were driving the policy problem. Given that interviewees also stated that they were particularly concerned that research security measures may lead to discrimination and facilitate racial profiling, it is rather intuitive that they were hesitant to point to one or several specific countries as the driver.

It is also striking that actors at the micro-level use a different and more nuanced language when they refer to the imposition of increasing restrictions on research collaborations than actors at the meso- and macro-levels. The latter did not use the term research security in any of the documents that we analysed qualitatively. Instead, meso- and macro-level actors employed the term science diplomacy or, more broadly, risks in international research collaboration. There are two reasons why the term research security does not feature in the documents that we investigated. First, the documents appeared before 2024 when the Council of the EU and the BMBF introduced and popularised the term research security at the EU and national level. Second, as mentioned in section 2, there are, thus far, no agreed-upon definitions of key terms and concepts in the research security sphere. This may also explain why individual implementers that we interviewed used a plethora of terms to describe the current changes in the global science system. Interviewees associated with EROs typically used the term "Handlungssicherheit" [firm ground for decision-making]. This term has gained traction in the context of EROs because the latter have led several BMBF-funded projects on the topic. Other actors preferred to frame research security issues in terms of "research integrity," science diplomacy or "responsible internationalisation". This latter term was coined in the Nordic context and is generally defined as "the aspects that partners in a research project need to jointly consider in order to responsibly develop their research relationship" (Shih 2024). From a NPF perspective, this terminology-related diversity can be plausibly explained by the institutional and cultural backgrounds that the different actors in the field are embedded in (Shanahan *et al.* 2018a). As each actor on the macro- and meso-level is answering to a (slightly) different set of stakeholders (e.g. different scientific communities, regional vs. global connections, state-level authorities, etc.), the observed diversity reflects each actor's strategic deployment of culturally resonant building blocks to maximise persuasive impact on this group. Traditionally, actors in the field exercise a high degree of autonomy in shaping their narratives, operating without strict, top-down guidance from macro-level authorities. Hence, it is also important to consider predispositions of their respective audiences (e.g. preference for open science vs. national security concerns) and the positioning of peer organisations, whose coalition commitments and competing storylines may shape each actor's narrative preferences.

Finally, there are also differences in how concrete the policy solutions are that actors at the micro level, as opposed to actors at the meso- and macro-levels suggest. As described in section 5.3, individual implementers have relatively specific ideas and proposals as to how research security can be strengthened in Germany. Most commonly, interviewees recommend increasing the awareness of research security among researchers through workshops and targeted communication campaigns, as well as by requiring training on research security when hiring new researchers. They also see the creation of a national contact point for research security (similar to the one that already exists in the Netherlands) favourably. Actors at the macro-level, in contrast, promote only a few and rather abstract solutions to the policy problem, such as establishing clearer rules for cooperation (Hochschulverband 2023) or diversifying research partners (Bundesregierung 2023). This variation in how concrete policy solutions are is intuitive when we consider that micro-level actors are confronted with the implementation challenges on a daily basis, while macro-level actors lack this street-level knowledge. At the same time, opportunities for micro-level implementers to influence narratives on higher levels remain scarce as there are no institutionalised "upstream" channels and street-level actors are fully occupied with day-to-day business.

Overall, our results thus show that, currently, the differences in implementation narratives across governance levels outweigh the similarities. This lack of narrative linkages may explain why most of our interviewees described Germany's current approach to research security as haphazard and muddled.

7. Conclusion

Our study's findings have concrete implications for theory and policymaking**.** We first address the former and then turn to the latter.

7.1. Theoretical implications

This section draws out the theoretical implications of our findings for the NPF. While our empirical analysis aligns with several foundational propositions of the NPF, it also reveals mechanisms that call for refinement, particularly regarding how narratives evolve and interact during policy implementation in fields characterised by high institutional autonomy.

The case of research security policy in Germany demonstrates that policy implementation is not a linear, top-down translation as assumed by Weiss' (2020) model, but a dynamic and interactive process shaped by narrative autonomy (see Figure 5). For instance, in the case of research security in Germany, meso-level actors develop storylines in parallel featuring loosely coupled sentiments, terminology and implementation suggestions that are currently not fully aligned with macro-level narratives. Situated closer to the street level, these actors continuously adapt their narratives in response to feedback from practice, creating an evolving loop between macro-, meso- and micro-levels.

To conceptualise these dynamics, we develop a 2×2 matrix that illustrates possible trajectories of narrative alignment and contestation during implementation (see Table 5). The four scenarios – ranging from full narrative convergence to persistent

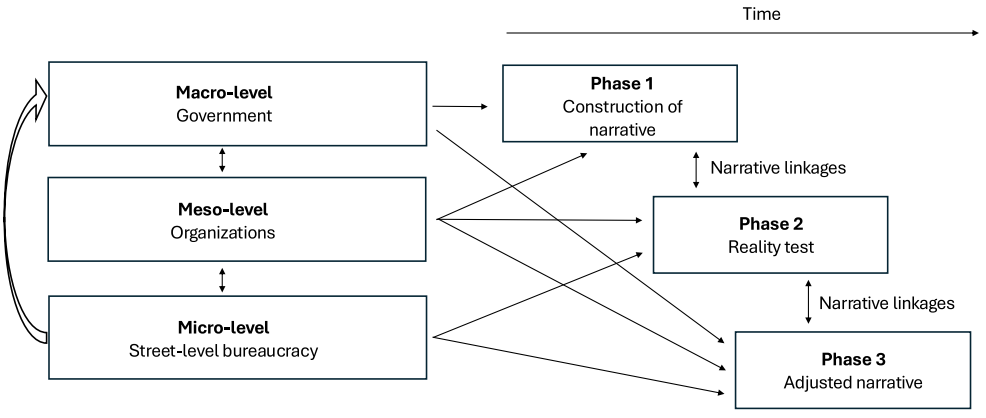

Figure 5. Refined overview of policy narrative's evolution; own illustration.

fragmentation – map how top-down and bottom-up forces interact across governance levels. Scenario A depicts unified storylines at the macro- and meso-levels that either converge or clash; Scenario B highlights bottom-up diffusion of field-internal narratives, Scenario C shows gradual adaptation to a dominant macro narrative and Scenario D reflects enduring narrative misalignment. Together, these scenarios capture the multiple pathways through which narratives can gain or lose traction during implementation.

The matrix thus provides a heuristic for analysing how narrative coherence emerges (or fails to emerge) in decentralised policy fields over time. It extends the NPF by emphasising feedback loops, narrative autonomy and the possibility of parallel rather than hierarchical narrative production in line with recent research amending the NPF (Boscarino 2025, Shanahan *et al.* 2025). In highly autonomous settings, such as research policy, alignment emerges only gradually – when consistent narrative elements outweigh differences in framing.

Finally, this conceptual extension suggests that the NPF can accommodate more dynamic, multi-actor environments than previously acknowledged. External shocks – such as geopolitical crises – can disrupt these equilibria, triggering narrative recalibration across levels. The 2×2 framework, therefore, not only refines our understanding of implementation within the NPF but it also provides a comparative lens for studying narrative evolution across countries and policy domains (Shanahan *et al.* 2018a, Shih *et al.* 2024a).

Table 5. Four scenarios of narrative trajectories in the policy process.

		Macro-level	
	Trajectory	Builds and enforces unifying narrative	Sticks to a vague narrative
Meso-level	Converges on narrative	**Scenario A** If macro- and meso- level narratives align: Consensus If macro- and meso- level narratives clash: Conflict	**Scenario B** Meso-level shapes narrative in the field
	Sticks to diverse narrative	**Scenario C** Macro-level shapes narrative in the field	**Scenario D** Continuation of status quo

7.2. Policy implications

As described in previous sections, we currently observe more narrative divergence than convergence across governance levels, indicating that macro-level actors, such as the BMBF, have failed to purport a clear narrative on international research collaboration and research security that has trickled down to the street level. This lack of narrative linkages has created a high level of uncertainty for street-level bureaucrats and the scientific community, with the former trying to reduce the level of uncertainty by proposing policy solutions that align with lived realities on the ground. Conversely, this means that to increase implementers' acceptance of and commitment to research security policies, policymakers need to craft policies that create more clarity than uncertainty. In Germany, policies are unlikely to be constructed in a strict top-down manner, considering the high level of autonomy that is characteristic of the country's research sector. Yet, given that street-level bureaucrats lack the necessary political legitimacy to implement their suggested policy solutions at a national scale, a pure bottom-up approach to the issue of research security is equally unlikely. Instead, it seems most feasible to tackle research security in a hybrid fashion, combining bottom-up with top-down approaches. It seems that at least up until the change in government in spring 2025, the BMBF was in favour of such an approach, as it had initiated a stakeholder process on the topic of research security in summer 2024. This process culminated in a conference on research security in Berlin in June 2025. It remains unclear whether the conference will be followed by additional stakeholder consultations. However, our findings and the speed at which research security measures develop globally clearly indicate that regular consultations between researchers, research administrators and policymakers are needed to craft policies that reduce uncertainty for implementers and are cognisant of the globalised nature of modern-day research.

7.3. Limitations and future research

Our study comes with one methodological limitation, as the sentiment analysis is based on a heterogeneous corpus of documents, in terms of length and type. Aware of this limitation, we purposefully combined our sentiment analysis with a qualitative content analysis and semi-structured expert interviews in a mixed-methods research design, which allows us to provide "a deeper, broader, and more illustrative description of the phenomenon" under investigation (Hurmerinta-Peltomäki and Nummela 2006, p. 452). The fact that research security is currently a moving (research) target could be interpreted as a second limitation of our study, although the timeliness of the study's topic could also be seen as one of its core strengths. In either case, and considering that there are currently new policy papers being published on the topic on a regular basis, we want to highlight that our findings need to be interpreted in light of the events that unfolded at the time when we collected our data and wrote up our findings between October 2024 and July 2025. Finally, we also want to stress that our empirical findings are difficult to generalise beyond the German case. Accordingly, additional research on research security is needed to get a better understanding of how research security is addressed by policymakers and street-level bureaucrats in other countries. At the same time, it is worth studying a single case, as it can lay the groundwork for what Yin (2018) calls analytical generalisation by refining our current conceptual understanding of policy narratives.

Looking ahead, it is likely that the policy narratives outlined in our study will rapidly evolve and possibly converge across governance levels. A seminal position paper on research security that the German Science and Humanities Council published in May 2025 seems to support this claim, as the paper proposes the establishment of a national platform for knowledge security that bears resemblance to the central contact point on research security that interviewees advocated for (Wissenschaftsrat 2025, p. 45 ff.).

Notes

1. We use the abbreviation that was common for the ministry until April 2025. Following the German federal elections in February 2025, the ministry's designation has changed to BMFTR in May 2025.
2. We use the term "securitisation" in a broad sense to describe an increase of research security measures. This broad understanding needs to be distinguished from the more elaborated and rigid concept of "securitisation" that was developed by the Copenhagen School of Security Studies.
3. German quotes were translated by the authors using DeepL.

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Research ethics statement

Ethics approval for this study was obtained from University College London (Approval No. 27597/001). Interviewees have given informed consent to participate in the research.

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Data availability statement

The data that support the sentiment analysis findings featured in this study are provided as part of the article's Supplementary Information files, as is the codebook of the qualitative content analysis. Interview data are not publicly available to maintain research participant confidentiality.

References

Auswärtiges Amt, 2023. *Deutsch-chinesische Beziehungen in Forschung und Wissenschaft* [online]. https://china.diplo.de/cn-de/aktuelles/neuigkeiten/2630262-2630262 [Accessed Access Date 2025].

Bamberger, A. and Huang, T.-Y., 2025. From irreversible openness to protectionism: geopolitics and international research cooperation in the European union. *Journal of education policy*, 40, 19–43.

BMBF, 2024. *Forschungssicherheit im Lichte der Zeitenwende*. Berlin.

Boscarino, J.E., 2025. Narrative efficacy: the empowering feedback effects of policy storytelling. *Review of policy research*, Online first.

Braun Střelcová, A. and Zheng, G, 2025. Turning changes into chances in international academic collaboration: a case study of a joint sino-German college in Shanghai. *Higher education*, Online first, 1–20.

Bundesregierung, 2023. *China-Strategie der Bundesregierung*. Berlin: Auswärtiges Amt.

Council of the European Union, 2024. *Council recommendation on enhancing research security*. Brussels.

D'hooghe, I. and Lammertink, J., 2022. *How national governments and research institutions safeguard knowledge development in science and technology*. Leiden.

Dao, T.K., *et al*., 2024. *Responsible collaboration through appropriate research security*. Houston: Rice University's Baker Institute for Public Policy.

Deterding, N.M. and Waters, M.C., 2021. Flexible coding of in-depth interviews: a twenty-first-century approach. *Sociological methods & research*, 50, 708–739.

Dlr-Pt, n.d. *Orientierung geben für die Wissenschaftskooperation mit China* [online]. Available from: https://projekttraeger.dlr.de/de/referenzen/orientierung-geben-fuer-die-wissenschaftskooperation-mit-china#:~:text=Unter%20dem%20Überbegriff%20„China%2DOrientierung,in%20der%20Wissenschaft%20zu%20fördern. [Accessed Access Date 2025].

Hochschulverband, 2023. *"Science Diplomacy" nach der Zeitenwende. Leitlinien des Deutschen Hochschulverbandes zum Wissenschaftsaustausch mit autoritären Staaten*. Berlin.

Houttekier, N., Van Hoeymissen, S., and Du Bois, C., 2025. Sino-Belgian research collaborations and Chinese military power. *European security*, 34, 250–272.

Hurmerinta-Peltomäki, L. and Nummela, N., 2006. Mixed methods in international business research: a value-added perspective. *Management international review*, 46, 439–459.

James, A., Flanagan, K., Naisbitt, A. & Rigby, J., 2025. *European research security: threat perspectives and the responses of policy makers and research performing organisations.* Manchester: Manchester Institute of Innovation Research.

Jones, M.D., Mcbeth, M.K., and Shanahan, E.A., 2014. Introducing the narrative policy framework. *In*: M.D. Jones, M.K. Mcbeth, and E.A. Shanahan, eds. *The science of stories: applications of the narrative policy framework in public policy analysis*. New York: Palgrave Macmillan, 1–25.

Kim, H. and Mobrand, E., 2025. International science as national project: lessons from South Korea for the future of international research collaboration. *Studies in higher education*, 1–13, Online first.

Leydesdorff, L., Bornmann, L., and Wagner, C.S., 2019. The relative influences of government funding and international collaboration on citation impact. *Journal of the association for information science and technology*, 70, 198–201.

Li, H. and Yin, Z., 2023. Influence of publication on university ranking: citation, collaboration, and level of interdisciplinary research. *Journal of librarianship and information science*, 55, 828–835.

Lipsky, M., 1980. *Street-level bureaucracy: dilemmas of the individual in public service*. New York: Russell Sage Foundation.

Liu, B., 2022. *Sentiment analysis and opinion mining*. Cham: Springer Nature.

Pinna, C., 2025. Navigating knowledge and research security in EU-China relations: the case of Hungary, Italy and The Netherlands. *Journal of studies in international education*, 29, 319–343.

Plé, A., Kunkis, M., and Droste-Franke, B., 2024. *Risiken in der internationalen Forschungskooperation. Ursachen, Zusammenhänge und Wirkungen*. Bonn: DLR Projektträger.
Remus, R., Quasthoff, U. and Heyer, G., 2010. SentiWS – a publicly available German-language resource for sentiment analysis. *Proceedings of the seventh international conference on language resources and evaluation (LREC'10)*. Valetta, Malta: European Language Resources Association.
Sá, C., Pashayeva, A., and Weidenslaufer, C., 2025. Canada's leap forward in research security. *Minerva*, 1–20. Online first.
Shanahan, E.A., *et al.*, 2025. Narrative power in the narrative policy framework. *Policy studies journal*, 1–16. Online first.
Shanahan, E.A., Jones, M.D., and Mcbeth, M.K., 2018a. How to conduct a narrative policy framework study. *The social science journal*, 55, 332–345.
Shanahan, E.A., *et al.*, 2018b. The narrative policy framework. *In*: C.M. Weible and P.A. Sabatier, eds. *Theories of the policy process*. New York: Routledge, 115–142.
Shih, T., 2024. The role of research funders in providing directions for managing responsible internationalization and research security. *Technological forecasting and social change*, 201, 123253.
Shih, T., Chubb, A., and Cooney-O'donoghue, D., 2024a. Processing the geopolitics of global science: emerging national-level advisory structures. *Journal of studies in international education*, 39, 300–318.
Shih, T., Chubb, A., and Cooney-O'donoghue, D., 2024b. Scientific collaboration amid geopolitical tensions: A comparison of Sweden and Australia. *Higher education*, 87, 1339–1356.
Shih, T., and Forsberg, E., 2023. Origins, motives, and challenges in western–Chinese research collaborations amid recent geopolitical tensions: findings from Swedish–Chinese research collaborations. *Higher education*, 85, 651–667.
Snetselaar, D., 2023. Dreams lab: assembling knowledge security in Sino-Dutch research collaborations. *European security*, 32, 233–251.
Stauffer, B., Kuenzler, J., and Jones, M.D., 2024. Narrative policy framework and policy implementation. *In*: F. Sager, C. Mavrot, and L.R. Keiser, eds. *Handbook of public policy implementation*. Cheltenham: Edward Elgar Publishing, 193–203.
Szüdi, G. and Brugner, P., 2024. *Knowledge and perception of research security – the case of research cooperation between Austria and China*. Vienna: Reconnect Project.
Teddlie, C. and Yu, F., 2007. Mixed methods sampling: a typology with examples. *Journal of mixed methods research*, 1, 77–100.
Universität Heidelberg, 2023. Differenzierte und wissenschaftsadäquate Diskussion um Forschungskooperationen. Statement zur Zusammenarbeit mit der Volksrepublik China und dem Quantenforscher Prof. Dr. Jian-Wei Pan [online]. Available from: https://www.uni-heidelberg.de/de/newsroom/differenzierte-und-wissenschaftsadaequate-diskussion-um-forschungskooperationen [Accessed Access Date 2025].
Wagner, C.S. and Jonkers, K., 2017. Open countries have strong science. *Nature*, 550, 32–33.
Walker-Munro, B., 2024a. National security, foreign investment & research security: the current state of art. *Griffith law review*, 33, 167–188.
Walker-Munro, B., 2024b. Risks of espionage in our universities?: lessons on research security from 'Li v Canada'. *The Adelaide law review*, 45, 635–661.
Walker-Munro, B., Ferrill, J., and Tiwari, M., 2025. Sensitive research & anti-money laundering: A possible marriage of convenience? *Current issues in criminal justice*, 37, 308–333.
Weiss, J., 2020. The evolution of reform narratives: a narrative policy framework analysis of German NPM reforms. *Critical Policy Studies*, 14, 106–123.
Wilkerson, J. and Casas, A., 2017. Large-scale computerized text analysis in political science: opportunities and challenges. *Annual review of political science*, 20, 529–544.
Wissenschaftsrat, 2025. *Wissenschaft und Sicherheit in Zeiten weltpolitischer Umbrüche*. Köln: Wissenschaftsrat.
Yin, R.K., 2018. *Case study research and applications*. 6th ed. Los Angeles: SAGE Publishing.
Zha, Q. and Wang, Y.X., 2025. North America and European union policy changes towards higher education relations with China: a comparative study. *Journal of studies in international education*, 29, 344–367.