

#AVHWHATSNEXT

THE FUTURE OF SCIENCE 2035:

AN ALEXANDER VON HUMBOLDT FOUNDATION
STRATEGIC FORESIGHT REPORT



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Authors:

Moritz J. Maier, Leon Rasztar, Felix Bickert, Simone Kaiser

Specialist support and Humboldt Foundation involvement:

Johanna Seibert, Almut Caspary, Frank Albrecht

In collaboration with:

Amelie Schölzel, Naima Häringer, Olufemi Farayola, Delia Bauer

Center for Responsible Research and Innovation at
the Fraunhofer Institute for Industrial Engineering IAO

Dear readers,

International science plays a key role in meeting global challenges. Cross-border collaborations engender new insights, strengthen innovation and promote social cohesion in open democracies. At the same time, geopolitical conflicts, radical technological change and social dynamics alter the global science system at high speed. International cooperation is thus being conducted under changed general conditions whilst the freedom of research is increasingly coming under pressure worldwide – in Europe, too.

In this complex environment, the Alexander von Humboldt Foundation has been fulfilling its mission as an intermediary organisation and science diplomacy actor for more than 70 years. Via our Humboldt Network – that now embraces more than 30,000 individuals – we connect researchers worldwide and create space for open dialogue and long-term, trust-based cooperation. Moreover, since 2016, the Humboldt Foundation’s Philipp Schwartz Initiative has been sending a strong message on behalf of academic freedom.

Freedom and openness cannot be taken for granted. They have to be actively protected and reinforced institutionally – because when academic freedom is curtailed, it is not only research and innovation that are put under pressure but the very foundations of open societies. As an organisation, we therefore campaign through our strategy for a resilient science system.

This is where the Foresight Report *The Future of Science 2035* comes into play. As a learning organisation, the Humboldt Foundation is keen to continue developing its own resilience. Foresighting enables us to explore potential future scenarios and discuss our visions against the backdrop of our statutory mission and in accordance with our organisational values. The Foresight Report also invites all of us in the science system to become active participants in shaping *The Future of Science 2035*. We are looking forward to a lively debate.

In order to remain effective in the future, we are reliant on strong partnerships and ongoing dialogue with the scientific community. This analysis is also an expression of such cooperation. We are grateful to the Fraunhofer Institute for Industrial Engineering IAO for their trusting cooperation, our hosts for their valuable ideas, the Delphi experts who contributed their time and expertise, the initiators and project leaders, Dr Johanna Seibert, Frank Albrecht and Dr Almut Caspary, as well as all the colleagues involved at the Humboldt Foundation.

This report constitutes a robust basis for action. Now the real work begins: to cooperate in responding to the insights gained, to continue developing them and to put them into practice with a mind open to the future. We are looking forward to our conversations with you all!

Dr. Judith Wellen
Head of the Strategy and External Relations Department



Dear readers,

We are living in an age when the half-life of strategic certainties is noticeably declining. Things that today seem like a reliable basis for planning may need to be reassessed tomorrow due to changed general conditions globally or new expectations regarding the role of science and international cooperation.

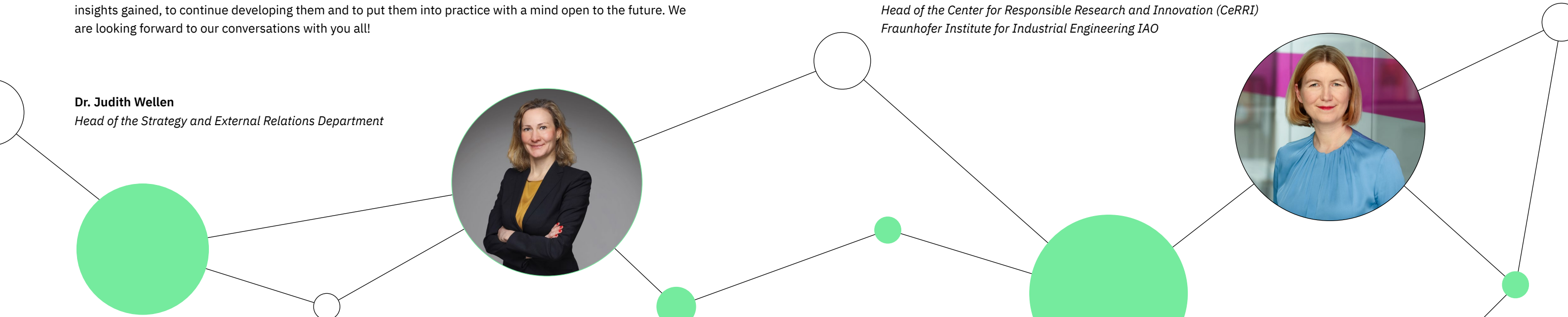
Strategic foresight is our response to this challenge. It does not guarantee predictions. What it does is somewhat different and, in our opinion, valuable: it enables organisations to systematically consider potential future scenarios, identify desirable areas of development and thus gain strategic clarity for decisions to be made today. In this way, foresight not only reinforces preparedness for what is to come but also the ability to actively shape the future in line with one’s own particular mission.

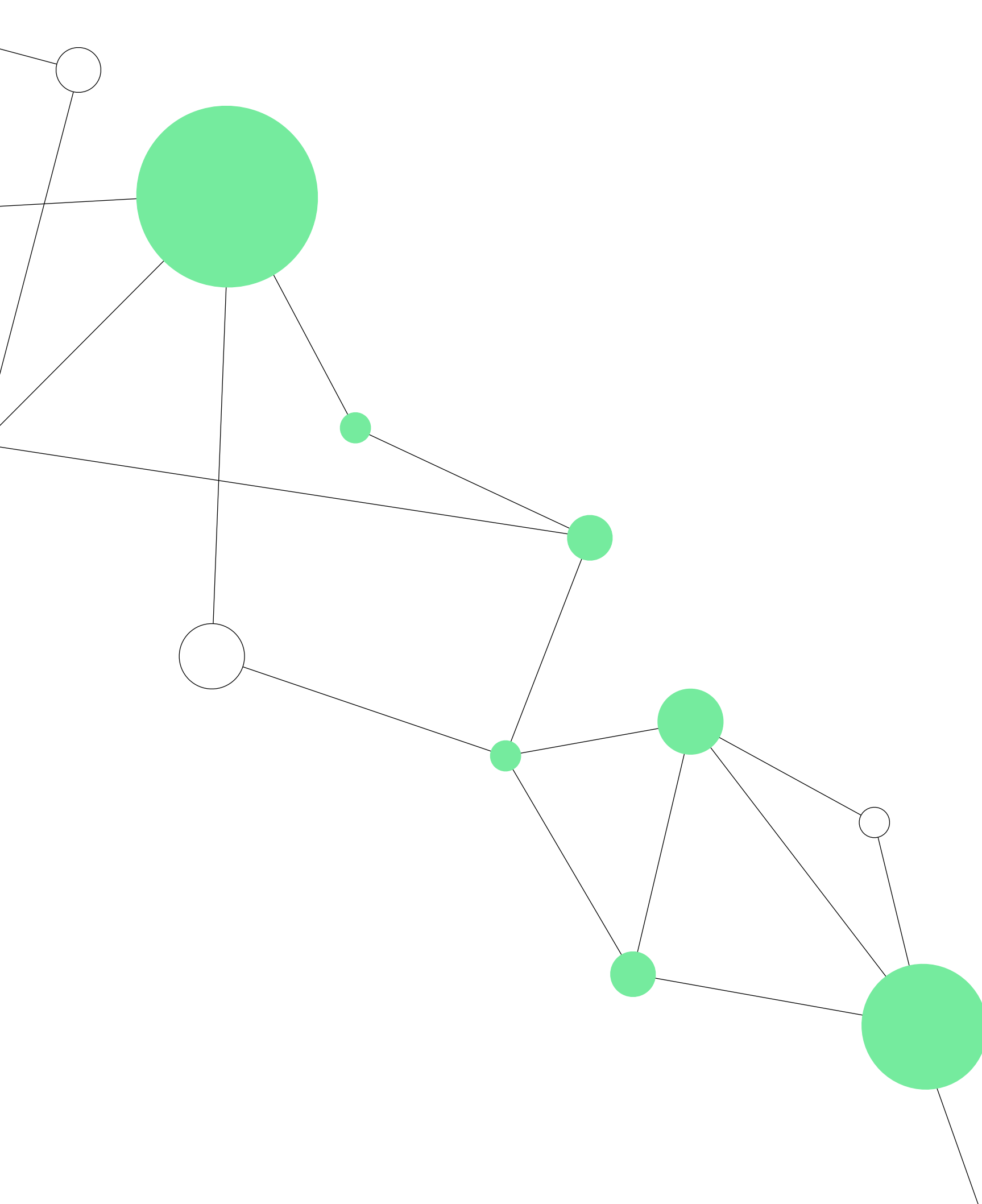
In doing so, foresight functions on several levels. It sharpens awareness for signals that often get overlooked in day-to-day operations and forces us to confront assumptions that are taken for granted. And it creates a shared understanding of potential future scenarios within an organisation, a common language for what could ensue. At a time when organisations are under pressure to act in the short term but also need to know the direction they are taking in the long term, the value of foresight lies in its ability to harness informed vigilance for strategic clarity and shaping the future.

We should like to thank the Alexander von Humboldt Foundation for the trust it placed in us and for the collegial working relationship that made this report possible. In particular, our thanks go to the project team around Dr Johanna Seibert, Dr Almut Caspary and Frank Albrecht whose expert support and critical collaboration had a significant impact on the quality of the results. Our gratitude is also due to the experts on the Delphi survey and the hosts whose contributions to the survey endowed the report with valuable perspectives from the field.

This report does not aim to be the final word on the subject, but the point of departure – an invitation to strategic dialogue and a basis for decisions that will secure the resilience of an organisation whose mission is more important than ever.

Simone Kaiser,
*Head of the Center for Responsible Research and Innovation (CeRRI)
Fraunhofer Institute for Industrial Engineering IAO*





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EXECUTIVE SUMMARY

At the heart of this foresight report are factors and developments that will influence researchers’ international cooperation and thus the work of the Alexander von Humboldt Foundation in years to come: liberal values, including academic freedom as a normative foundation, geopolitical interests as sources of conflict for open, science-driven collaborative models, shifts in the centres of power and mobility flows as strategic and operational challenges. The report combines horizon scanning, Delphi surveys, bibliometric network analysis and host interviews as well as country analyses, and condenses the findings into four future scenarios of the global science system in 2035.

THE MOST IMPORTANT POINTS:

- **GEOPOLITICS DISPLACING OPENNESS:** According to Delphi, academic isolation, instrumentalised collaborations and the securitisation of research are some of the most potent trends. Collaborations are not ceasing, they are becoming more selective, regulated and geopolitically framed.
- **AUTONOMOUS GOVERNANCE STRUCTURES WEAKENING AND SELF-CENSORSHIP:** Political appropriation of universities and measurable self-censorship are not marginal phenomena; they are systemic realities, even in democratic science nations.
- **DIGITAL POWER ASYMMETRIES:** Whoever controls AI models and research infrastructures increasingly controls scientific standards and access.
- **MOBILITY PURSUING VALUES:** A feeling of belonging, institutional protection and the normative alignment of individual convictions in a climate of academic freedom at the destination are becoming independent drivers of mobility.
- **A FURTHER POWER SHIFT IN KNOWLEDGE PRODUCTION:** China is developing into the strongest location for scientific publications and is increasingly turning into the hub of a growing Asian research network. Consequently, the Euro-Atlantic structure of the global science system is no longer the only determining factor – with the growing influence of a sinocentric science sphere it is encountering a strong competitor which is increasingly setting its own standards, networks and priorities.

¹ In the context of foresight, a trend refers to a directional change in a relevant field that can be observed empirically over an extended period and the trajectory of which is considered sufficiently stable that it can be projected into the future with reasonable plausibility. Trends differ from weak signals in that they already have a visible evidence base and from megatrends in that they are narrower in scope and less enduring.

FOUR SCENARIOS FOR THE INTERNATIONAL SCIENCE SYSTEM IN 2035

SCENARIO 1: VALUES – A COMPETITIVE ADVANTAGE

Strategic mode: positioning and expansion

In a world in which academic freedom is coming under pressure in many places, Germany is still a location where academic freedom exists. Researchers from politically fragile systems choose Germany due to its normative dependability and digital security. Liberal values and academic freedom have become a measurable locational advantage.

STRATEGIC IMPLICATIONS: Specifically focus funding instruments and external positioning on the pull factor of value orientation and academic freedom; create safeguarding instruments for researchers at risk that can be implemented at short notice. Utilise the alumni network as a reputation multiplier. Specifically communicate the German value profile in expanding Asian science regions. AI governance as an independent reputational building block. Co-financing models for programme scaling. Systematic knowledge transfer to society and the political sphere to anchor the value proposition.

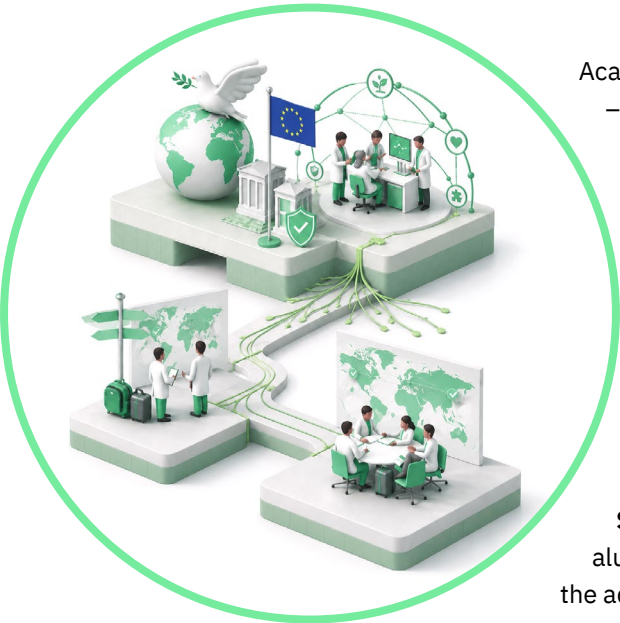


SCENARIO 2: JOINT INTERNATIONAL RESPONSIBILITY

Strategic mode: participation and bridge-building

Academic freedom has been actively secured worldwide – science diplomacy is the order of the day; international networks are the infrastructure of transnational solidarity. Alongside the transatlantic hub, an Asian science cluster is gaining traction; the transnational area of freedom must build bridges to these expanding knowledge regions. Regions with poor structural networks, such as Sub-Saharan Africa, require special integration. The Humboldt Foundation does not pursue a distinct national path but is the co-creator of a transnational area of freedom.

STRATEGIC IMPLICATIONS: Institutionalise the alumni network as a global forum for open discourse on the advancement and sharing of knowledge under liberal



conditions; also as an early-warning system, solidarity structure and bridge over geopolitical ruptures. Involve the Humboldt Foundation in policy processes to enshrine academic freedom as an internationally protected right. Targeted bridge-building to the Asian science cluster, and specific networking and funding models for regions with poor structural networks. Multi-lingual public outreach as a contribution to the global discourse on values. European co-financing and multi-year funding agreements to secure global agenda-setting power.

SCENARIO 3: REGULATED SCIENCE

Strategic mode: defence and coherence



Germany itself is under regulatory pressure: compliance consolidation, political agenda-setting and creeping self-censorship have narrowed the scope for action – without academic freedom actually being formally breached. AI systems have become the tool for the covert control of research content. Self-imposed restrictions on collaboration add to an ongoing process of relative marginalisation in the global knowledge network. The Humboldt Foundation is forced to defend its own independence from the political system that finances it.

STRATEGIC IMPLICATIONS: Boost the arm’s-length status to be able to justify independence in case of conflict. Strategic coalitions with European and international funding organisations as well as private organisations and foundations. Targeted lobbying to preserve scope and value codex. Secure AI resilience in the Foundation’s own selection and evaluation procedures. Systematic documentation of the costs of regulatory constraints for evidence-based negotiations with the political sphere and funders. Financial diversification as an existential guarantee of independence. Social visibility as a factor in protecting the institution.

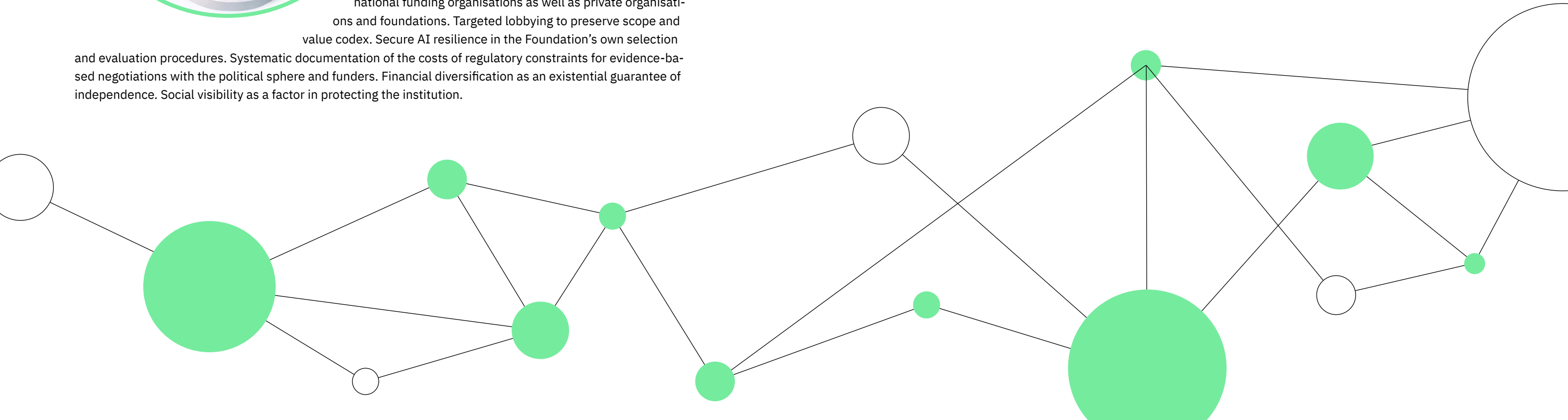
SCENARIO 4: GEOPOLITICAL FRAGMENTATION

Strategic mode: Navigation and adaptation

The global science system has fractured along geopolitical lines: mobility is becoming a sorting tool; collaborations are framed in the context of security policy. AI infrastructures are a means of exerting geopolitical pressure – those who lose access fall behind in scientific output and quality. The Asian science cluster around China is increasingly setting its own normative standards. Structurally marginalised regions – especially Sub-Saharan Africa – are in danger of being caught in the crossfire between emerging blocs. Political persecution, disruption due to war and regulatory constraints are qualitatively different types of crisis situation that require different responses.



STRATEGIC IMPLICATIONS: Embed foresight as a core institutional process – including observing AI access dynamics and their geopolitical instrumentalisation; differentiate safeguarding programmes according to the type of crisis with specific funding tools for researchers from regions with poor structural networks. Robust utilisation of the alumni network as a strategic early warning system and tool to bridge geopolitical ruptures. Address AI sovereignty as an expanded dimension of academic freedom. Build a diversified financial crisis fund to support politically independent safeguarding decisions. Differentiated communication architecture as an infrastructure for guidance and protection. Systematic policy advice during times of crisis.



INTRODUCTION

2.1 FORESIGHT – A STRATEGY DEVELOPMENT METHOD

Strategy development in times of complexity and uncertainty

Today, organisations are faced with simultaneously occurring global challenges which increasingly undermine the viability of traditional strategic planning tools. Geopolitical fragmentation, accelerated digital transformation, climate change and erosion processes in the normative foundation of the international science system are creating an environment that is shaped by volatility, uncertainty, complexity and ambiguity – or, for short, a VUCA environment (Bennett & Lemoine, 2014). In this context, linear prognoses and extrapolations based on historical data soon become unreliable as they systematically underestimate the non-linear dynamics and emergent interactions of systemic trends (Fergnani, 2022). Just how urgent this problem is can be demonstrated empirically: according to the 28th Annual Global CEO Survey by PwC (2025), 42 percent of the CEOs surveyed doubted the long-term viability of their organisations if they maintained their current course.

In the case of the Alexander von Humboldt Foundation, this challenge is particularly acute. Established by the Federal Republic of Germany as a non-profit organisation to promote international research cooperation and with a global alumni network of more than 30,000 Humboldtians, the Humboldt Foundation operates at the intersection of academia, diplomacy and international politics. Under these conditions, the ability to position itself in an anticipatory, strategic way is not merely an optimisation

option but a prerequisite for organisational resilience and the ability to act.

At the heart of this anticipatory positioning lies a question that pervades the Foundation’s entire business model: Under what conditions will a commitment to liberal values in social and scientific systems worldwide, as well as the academic freedom associated with it, persist as the normative foundation for international research cooperation and as an operational precondition for the work of the Humboldt Foundation over the next ten years? Liberal core values and the principle of academic freedom are thus not just one of the many topics in this report but the analytical focus of all methods, scenarios and strategic inferences.

What is foresight? Conceptual classification

Foresight describes a structured, method-driven process to identify, analyse and evaluate possible future developments with the aim of producing actionable knowledge for current decision-making (Miles et al., 2016; Voros, 2001). In this understanding, the underlying epistemological standpoint is crucial: foresight does not claim to make deterministic predictions but, rather, sees the future as a possibility space that encompasses various, equally plausible paths of development (Dator, 2009; Schwartz, 1991). This methodological modesty is fundamental to the approach: instead of “knowing” the future, foresight aims to reinforce organisations’ future viability by

opening up strategic opportunities before they close again.

By contrast with classic strategic planning that primarily models the future as the continuation of known trends (Mintzberg, 1994), foresight combines explorative and normative elements. Using horizon scanning, it explores the breadth of possible futures, employs scenario analysis to distil them into coherent visions of the future and thus creates a basis for testing the robustness of strategic measures against various trajectories (van der Heijden, 1996; Ringland, 2002). Foresight is thus neither purely analytical nor purely normative but a reflective process at the interface of both dimensions.

Foresight in the strategy development process: functions and added value

In the strategy development process, foresight fulfils several complementary functions (Rohrbeck & Gemünden, 2011; Heger & Rohrbeck, 2012):

- **EARLY WARNING SYSTEM AND ENVIRONMENT OBSERVATION:** Systematic horizon scanning identifies weak signals and emerging trends that are not visible using conventional analytical tools (Saritas & Smith, 2011). In the case of the Humboldt Foundation, this means identifying external changes in the international science system at an early stage – for example, geopolitical fragmentation tendencies, shifts in global research networks or new mobility restrictions for researchers.
- **REDUCING STRATEGIC DECISION-MAKING UNCERTAINTY:** Foresight does not eliminate uncertainty, but it does make it easier to handle. Scenarios serve as a cognitive tool because they make it possible to mentally run through strategic options under various future conditions, thereby helping to identify robust measures – that is, measures that are effective in several plausible scenarios (Wilkinson & Kupers, 2013; Chermack, 2011).

- **PROMOTING ORGANISATIONAL LEARNING PROCESSES:** Foresight is not only an analytical tool but also a communicative one. Foresight processes are inherently participatory – involving expert workshops and Delphi surveys – which encourages shared assessments of possible futures, external changes or internal developments, and reinforces collective strategic adaptability (Weick, 1995; Rohrbeck & Gemünden, 2011).

Foresight pursues an overarching objective: to empower organisations to remain strategically operational under conditions of structural insecurity. This is not achieved by predicting a certain future but by systematically expanding the strategic horizon of perception and reflection. Foresight thus creates the cognitive and organisational prerequisites for anticipatory rather than reactive action (Rohrbeck & Gemünden, 2011).

The added value of these methods reveals itself on several levels. On an organisation’s internal level, foresight processes promote the development of shared assessments of the future and reinforce its strategic ability to act collectively. Empirical findings show that organisations that have institutionalised foresight practices have a significantly greater ability to adapt strategies and be innovative (Rohrbeck & Kum, 2018). Moreover, participatory foresight formats serve as organisational learning spaces in which tacit knowledge is harnessed for strategic decision-making.

On an external level, foresight methods make it possible to perceive changes in the environment, be they, for example, technological, societal or geopolitical, at an early stage before they become reality. This generates a strategic time advantage and allows organisations to position themselves proactively with regard to emergent developments (Vecchiato & Roveda, 2010). In this context, Vecchiato (2012) demonstrates that the structured environment analysis used in foresight processes improves the quality of strategic decisions made under conditions of uncertainty.

Taken together, foresight reveals its intrinsic added value at the intersection of analysis, communication and decision-making: as a methodologically sound

tool for reinforcing organisational resilience and strategic forecasting.

2.2 THE REPORT’S OBJECTIVES AND RESEARCH QUESTIONS

This foresight report entitled „The Future of Science 2035“ is conceptually embedded in the Humboldt Foundation’s strategy development process for the coming strategy cycle 2028-2032. It adds a forward-looking, future-oriented dimension to the Foundation’s existing portfolio of strategic analyses, which includes a biennial risk-opportunity analysis, a post-doctoral needs assessment and a gender potential analysis. The Humboldt Foundation is therefore responding to a gap in its knowledge: Whilst retrospective and descriptive analytical tools make it possible to formulate firm statements about past and current developments, up to now, a methodologically sound basis for systematically anticipating future changes in the Foundation’s relevant political, institutional and societal environment was missing.

The report’s epistemic interest is explicitly strategic: It is not seeking to conduct academic future studies but to generate actionable knowledge that will serve as an analytical basis for the Humboldt Foundation’s decision-makers to draw conclusions in the framework of the 2028–2032 Strategy whilst providing the members of the International Advisory Board with

support and inspiration for their advisory work. This instrumentality differentiates the report from purely explorative foresight studies and places it in the category described in the literature as strategic foresight – that is, application-oriented foresight in the service of organisational strategic capability (Rohrbeck & Gemünden, 2011; Georghiou et al., 2008). The combination of analytical depth and strategic usability is thus central to the overall design of the study.

The future of liberal values and academic freedom in the global science ecosystem have emerged as the thematic focus of this prospective analysis. The liberal value system and the legal right to academic freedom are prerequisites for the Foundation’s work, a distinguishing feature of Germany as a location and an increasingly contested asset in geopolitical competition. The report therefore investigates systematically how the conditions for free science could change by 2035, both globally and in Germany – and what the concomitant strategic consequences for the Humboldt Foundation could be.

2.3 MAIN RESEARCH QUESTIONS

The research questions addressed in the report were defined and formerly adopted during the initial phase of the process in close coordination with the Humboldt Foundation’s Division 1.1 (Strategic Planning) and Division 1.4 (Philipp Schwartz Initiative [PSI] and Academic Freedom). For analytical purposes, they can be divided into four thematic clusters that address different levels of consideration and taken as a whole, cover the spectrum from the macro perspective of global trends to the micro perspective of concrete courses of action. All four clusters are aligned with an overarching research question: How are liberal values and the legal right to academic freedom evolving as systemic prerequisites for the global science ecosystem, and what does this mean for the Humboldt Foundation’s strategic capacity to act as well as its resilience? This question constitutes the content framework within which the methodologically differentiated sub-questions are addressed.

The determined focus on academic freedom as a future topic and current trend stems directly from the Humboldt Foundation’s current strategy “Resilient science for a changing world” (2024–2028) which already makes the reinforcement of academic freedom into a key objective. In view of the geopolitical climate and the continuing growth of populist tendencies that threaten academic freedom (cf. Academic Freedom Index 2025), also in democratic systems, it can be assumed that defending academic freedom will continue to be a crucial part of Humboldt Foundation activities even after the current strategy cycle. In this regard, the present foresight report provides important points of reference and an opportunity to generate ideas for further in-house analysis as well as for external communication. Academic freedom is thus not treated as just another trending topic but as a structuring cross-cutting theme that runs through all four clusters and significantly shapes the development of scenarios.

Cluster I – Identifying and weighting trends (macro level)

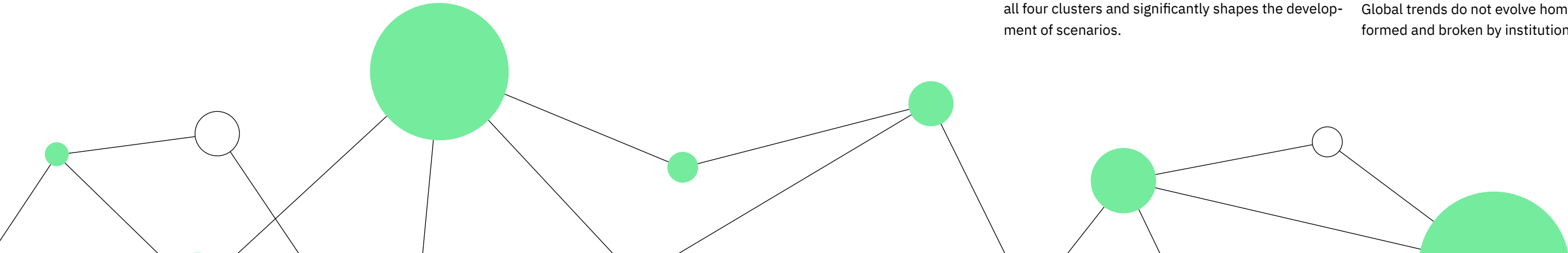
The focus of this question is which three or four future topics and which scientific, (geo-)political and social trends will have the greatest impact on the international science system in the coming decade. Academic freedom is addressed here as a distinct topic of the future and a trend with systemic implications for the global science system. The question considers the systemic dynamics of change on the macro level and forms the analytical basis for all the ensuing analyses (Voros, 2001; Saritas & Smith, 2011).

Cluster II – Organisational impact and target-group analysis (meso and micro level)

Building on trend identification, the focus is now on the meso- and micro-analytical level: How do the developments identified – particularly the developments regarding academic freedom – affect the Humboldt Foundation’s business model, its role as a player in science diplomacy and its activities in the international and German science systems? The key target groups comprise, in particular, international postdocs, universities and hosts in Germany as well as stakeholders in the political sphere, academia and society. The necessity to differentiate between target groups is based on the realisation that trends are structurally heterogeneous and can only be productively addressed on the organisational level if their target-group-specific characteristics are explicitly identified (Popper, 2008).

Cluster III – Regional differentiation of global trends

Global trends do not evolve homogenously; they are formed and broken by institutional, political and



cultural contexts that are specific to a region (Cagnin et al., 2008). This report therefore addresses the question as to which regional differentiations in the international science system should be observed, and homes in on future hubs without restricting itself entirely to so-called key countries. In doing so, it also poses the question as to how the conditions for academic freedom develop in different ways regionally and what consequences ensue from this for mobility patterns, cooperation opportunities and protection needs.

Cluster IV – Strategic inferences and robustness of measures

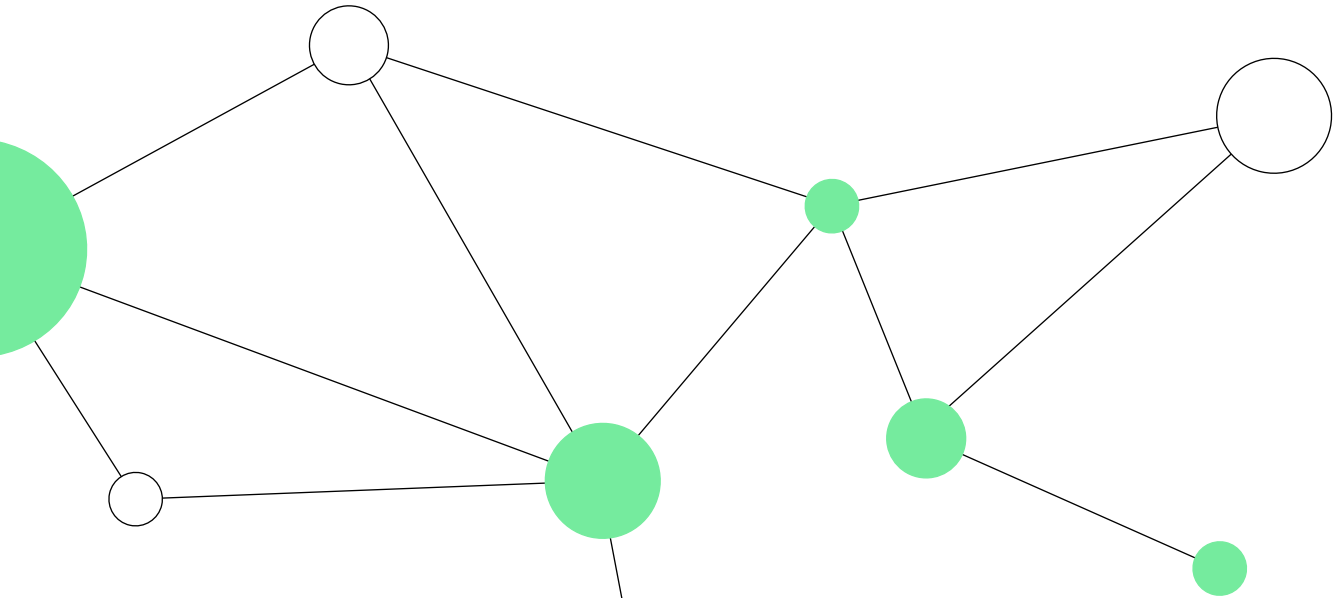
Finally, the report explores the action-related level: What opportunities and challenges arise out of the

trends identified? What options for action can be inferred? And how can the robustness of strategic measures be tested against various future scenarios? These questions correspond to the concept of robust strategies – measures that are not tailored to a single expected future path but remain effective in various plausible scenarios (Wilkinson & Kupers, 2013; van der Heijden, 1996). When focusing on academic freedom this means that the inferred measures are checked to see whether they remain strategically viable under conditions in which academic freedom is strengthened or eroded – and whether they enable the Humboldt Foundation as well as other players in the science system to continue being able to take action as a key player in this field beyond the current strategy cycle.

2.4 TIME HORIZON

This analysis covers a time horizon up to 2035, that is, a forecast period of approximately ten years. This horizon is methodologically sound: It is sufficiently broadly-based to reveal systemic trend shifts and structural discontinuities but also specific enough to ensure concrete applicability (Georghiou et al., 2008;

Voros, 2001). The results will flow directly into preparing the 2028-2032 strategy cycle which aims to secure the organisation’s future viability and will be launched at the beginning of 2027. The results thus make a timely and actionable contribution to strategic planning for a future-proof organisation.



STUDY DESIGN AND OVERVIEW OF METHODS

3.1 OVERVIEW: SCHEMATIC PROCEDURE

A core quality hallmark of the present foresight process is its systematic triangulation of complementary methods (Miles et al., 2016). The study design comprises:

-  **AI-supported horizon scanning** to identify future trends on the basis of qualitative literature searches, clustering methods and time series analysis
-  **a two-stage Delphi survey** to intersubjectively validate and weight trend projections identified by external experts (Linstone & Turoff, 1975)
-  **bibliometric network analyses** to reconstruct global research collaboration structures over time (2015–2025)
-  **country analyses with future projections** for potential science hubs, selected based on their future potential, the Humboldt Foundation’s strategic priorities as well as existing network structures, focus countries and the Foundation’s regional anchoring
-  **a quantitative survey of hosts** to establish an empirical basis for target-group-specific needs
-  scenario analysis using the **2×2 quadrant method** to develop coherent visions of the future as a basis for strategic inferences (van der Heijden, 1996)

This combination of methods ensures that the results are robust, both in terms of breadth (trend identification) and depth (scenario development). The four scenarios developed – from value-based international competitive capacity to fragmented science in complex geopolitical environments – exemplify how foresight transforms complexity into manageable, strategically actionable visions of the future.

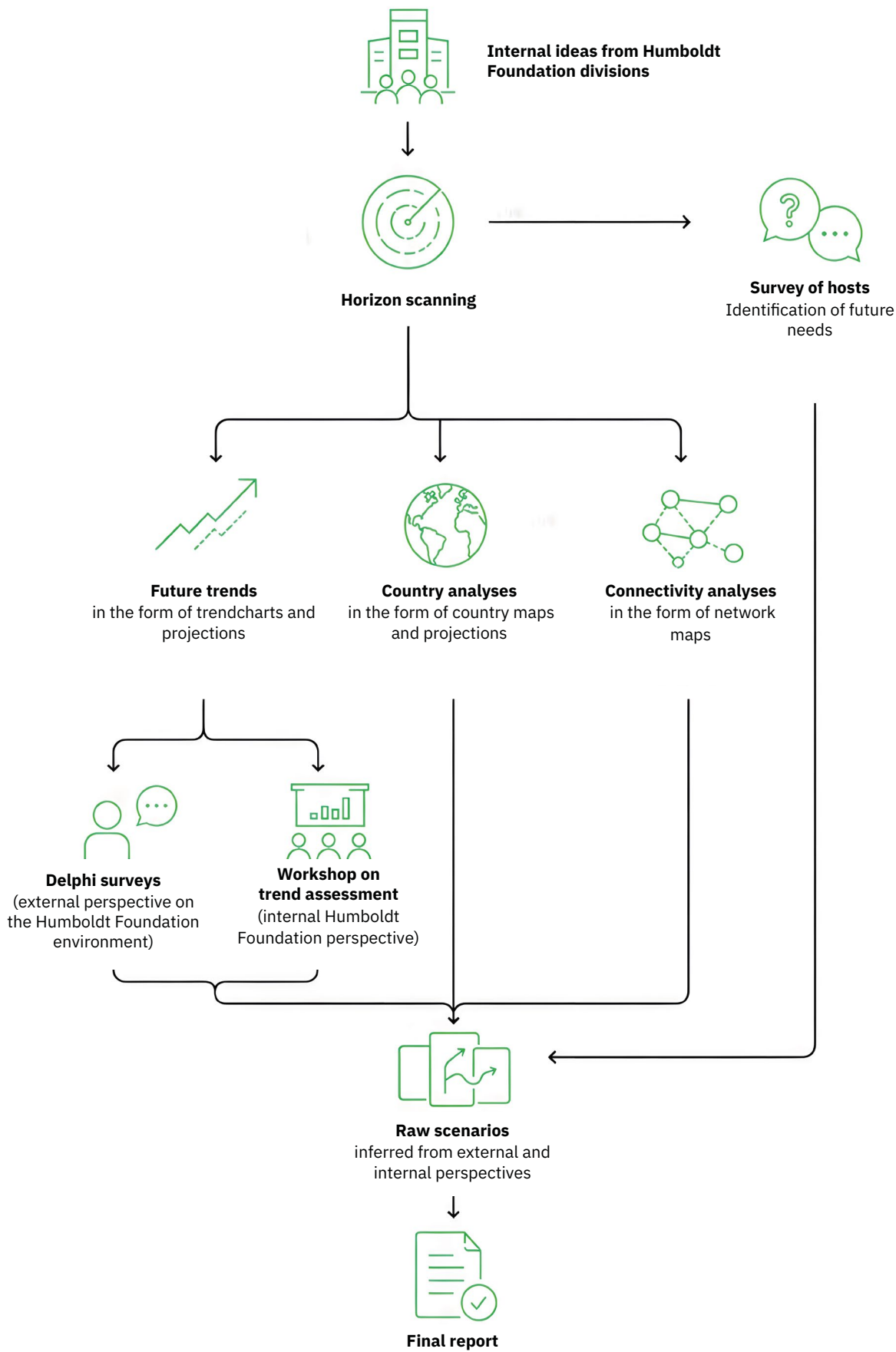


Figure 1: Overview of project's schematic procedure

3.2 PROJECT SCHEDULE AND GROUPS OF PEOPLE INVOLVED

The project can be divided into three stages: analysis of the initial situation, survey stage, followed by evaluation stage. AI-supported horizon scanning is the cornerstone of the project and should be seen as equivalent to Stage 1. The individual methods used during the various stages are described in detail in the relevant subchapters.

During this stage, AI was utilised, for example, to identify existing patterns in thematic groups, employing a human-in-the-loop approach. This approach describes a system in which humans actively intervene in automated decision-making processes at critical stages to check, correct or improve results. In this project, this meant that at every stage the IAO project team defined, thoroughly reviewed, monitored and validated the analytical methods, input data, evaluation process and results.

3.2.1 ANALYSIS OF THE INITIAL SITUATION

The objective of this stage was to understand the international science system as an environment in which the Humboldt Foundation operates. For this purpose, various scientific databases were used, such as the Web of Science and the European Union's database. They were searched for publications dealing with academic freedom, studying developments in the international science ecosystem and those that addressed knowledge flows and science-related topics generally.

The information collated in this way was used to identify trends that reflect potential future developments. This process is described in detail in the following section and the 20 trends identified are presented in the form of trendcharts. During this stage, the project team at Fraunhofer IAO took the lead. Progress reports and preliminary results were discussed during regular joint coordination meetings with the Humboldt Foundation.

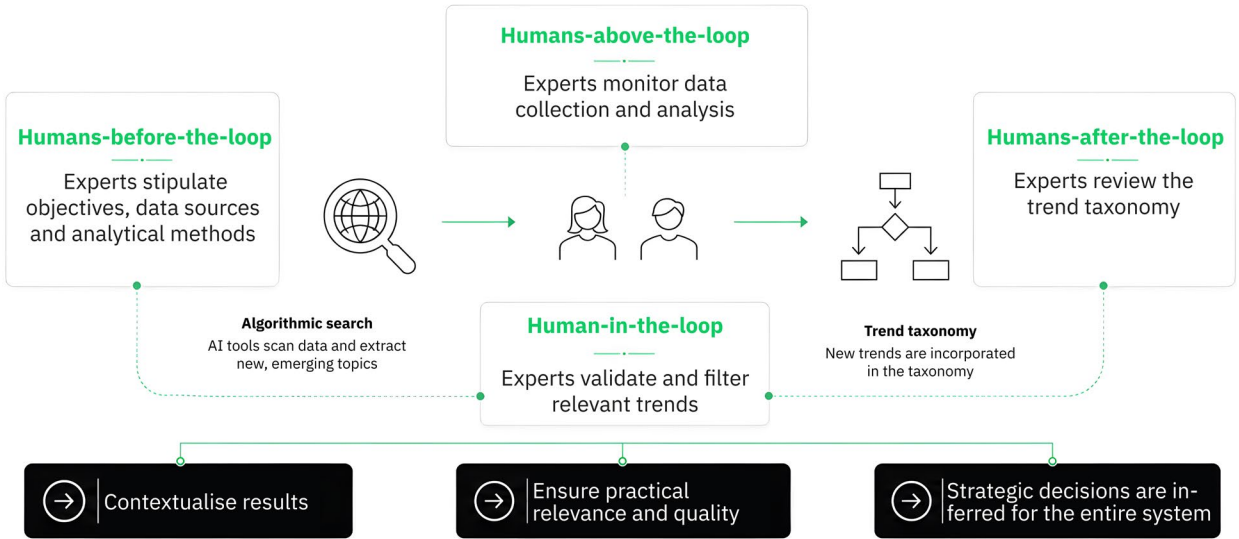


Figure 2: Human-in-the-loop approach

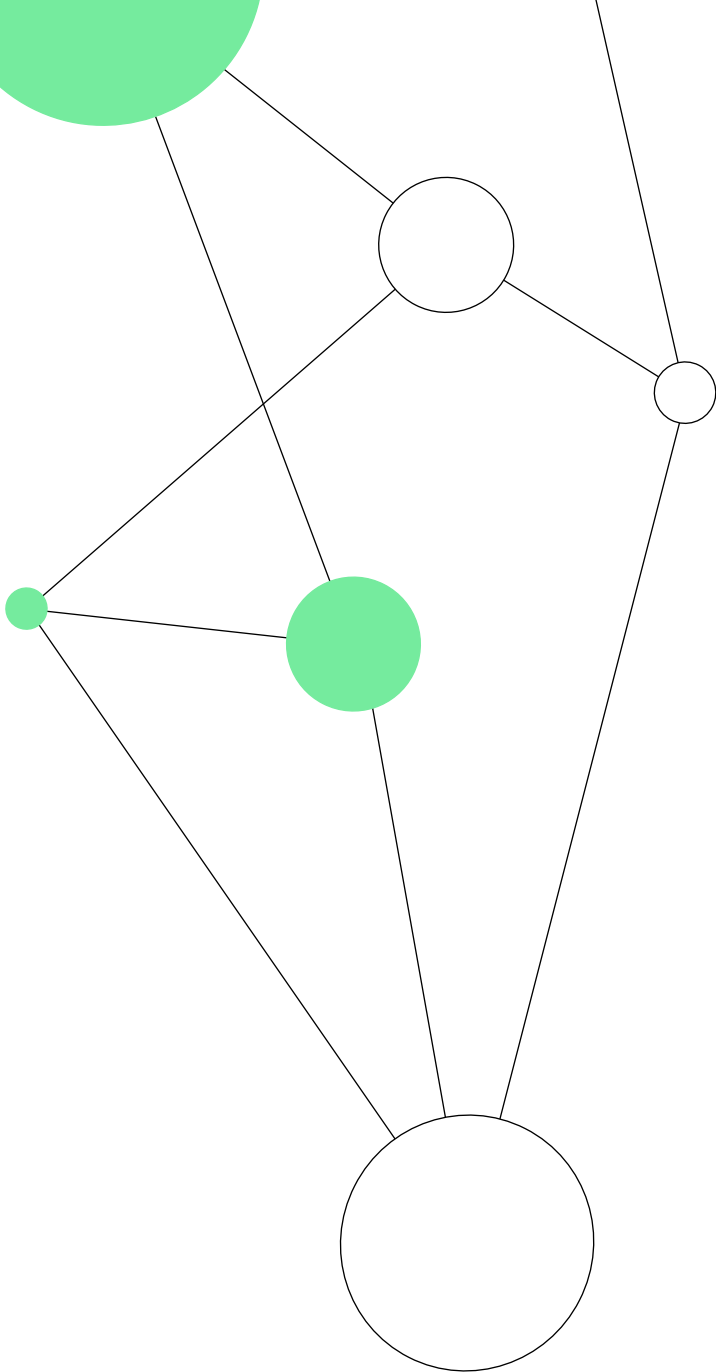
² The international science system refers to the globally connected system of communication and competition in science in which research results are produced, published and disseminated across national borders. It is not a homogenous structure but is characterised by different political systems, regional contexts and regulatory general conditions that influence opportunities for cooperation, regional thematic priorities and the degree of autonomy in academic work (Marginson, 2022).

3.2.2 SURVEY STAGE

Based on the Stage 1 results, various surveys were conducted with the aim of further validating the research results and setting them in the specific context of the Humboldt Foundation. Amongst others, this involved a Delphi survey which asked experts from the international science system for their assessments and, during several rounds of group-based discussions, reached a consensus on possible future developments. In parallel, the Stage 1 results were used to record the anticipated future needs of hosts, who form a substantial part of the Humboldt Foundation’s target group. At a subsequent trend assessment workshop, the results to date were then evaluated and discussed with the Humboldt Foundation project team with a view to the organisation’s specific context. During this stage, it was not only the project team at the Humboldt Foundation and the IAO who were involved; in addition, the Humboldt Foundation’s extensive network was tapped to recruit hosts and, in some cases, external experts affiliated with the Humboldt Foundation – including members of the International Advisory Board (IAB) – for the various formats.

3.2.3 EVALUATION STAGE

During the evaluation stage, the validated results, set in the Humboldt Foundation context, were synthesised and translated into illustrative future scenarios that convey a narrative insight into possible futures. Based on these scenarios, the IAO then identified and inferred recommendations for action and potential areas of scope with the aim of supporting the Humboldt Foundation in its strategic reflections on its organisational viability in the coming years.



CHAPTER 04

SCENARIOS

4.1 FUNDAMENTALS OF SCENARIO ANALYSIS

The future is uncertain and is influenced by a raft of interrelated factors. Especially in complex areas of action like the international science system, various stakeholders, policy frameworks, technological developments and non-linear dynamics make it difficult to make unequivocal forecasts. Scenario analysis draws on this insecurity: it does not serve to predict a specific future but to develop several plausible visions of the future. In this way, key impact factors, uncertainties and possible development paths are revealed. Scenarios thus offer a structured thinking space in which strategic options can be explored and robust courses of action developed. Appropriately, Schoemaker (1995) describes scenario planning as a tool for systematically recording a range of possible developments and supporting strategic thinking in times of uncertainty. This study employed explorative scenarios. According to Börjeson et al. (2006), “What may happen?” is the main question posed in explorative scenarios. They start with a desired target state or a probable forecast but examine potential future developments based on different assumptions. They thus focus on exploring alternative future paths. Exploratory scenarios are particularly appropriate in cases where there is high uncertainty and only limited control of external developments. They help to open up the spectrum of possible changes and focus attention on factors that could be relevant to immediate decision-making.

In this project, the four scenarios serve as an analytical and strategic tool. They offer differing perspectives on possible developments in the global science ecosystem and academic freedom. As such, they do not constitute a prognosis but an orientation frame-

work for systematic reflection on the demands that will face the Alexander von Humboldt Foundation in the future.

In scenario analysis, so-called wild cards also play an important role. They represent unlikely but potentially momentous events that can fundamentally question the core assumptions in a scenario. Wild cards thus fall outside the scope of a reliable probability analysis but remain within the realm of the conceivable. They are not forecasts in the strictest sense but can be anticipated and systematically taken into consideration. In this sense, wild cards function as an advance methodological approach to black-swan logic without negating its fundamental unpredictability (Mendonça et al., 2004; Taleb, 2008).

When working with scenarios this means that after developing plausible future scenarios, they are additionally reviewed to determine what unexpected events could undermine their core assumptions. The main question here is: What is the most crucial assumption in this scenario and what improbable but momentous event would undermine it? This is the way wild cards help to reveal blind spots and examine the robustness of strategic considerations. Their value lies less in precisely assessing the probability of something happening than in raising awareness of possible ruptures, disruption and damage potential that cannot be captured adequately by traditional forecasting and risk models. Even more unlikely events are known as black swans. According to the author, Nassim Taleb (2008), black swans have three characteristics: They are inherently unpredictable, their impact is extreme and they are rationalised

retrospectively as though they had been predictable. The crucial point is that a genuine black swan lies outside the system’s frame of reference. It arises from a blind spot, not from a known risk category.

4.2 SCENARIO FIELD AND KEY FACTORS

In addition to the various types of scenario, several methods exist that help to develop holistic scenarios from the various key factors. The quadrant or 2x2 matrix method, which is one of the most common versions of scenario analysis (Glover et al., 2016), is used as the basis for this project. Its strengths lie, amongst other things, in the fact that it helps to break down complex issues into their essential components, thereby simplifying processing (Curry & Schulz, 2009). What is important is that the quadrants act as the category for the subsequent assignment of key factors; positioning key factors along a hypothetical system of coordinates is not foreseen. No distinction is made based on gradations. Only the factors used to define the categories are relevant. For this purpose, the two factors with the greatest influence on the object under scrutiny are usually chosen (Schulhof et al., 2022). Having consulted the Humboldt Foundation project team, the factors selected were “academic freedom”, expressed as free and restricted, and “setting of the scenario”, expressed as in Germany and in the world. This decision facilitated a multifaceted differentiation of the various challenges through which the Humboldt Foundation may have to manoeuvre in the future: If, for example, academic freedom is curtailed in Germany at a

future date, the location will become less attractive globally, so the Humboldt Foundation would be faced with the challenge of fulfilling its statutory mission and providing researchers in Germany with a free research environment. On the other hand, the global science ecosystem could move further towards a lack of freedom. If Germany remains free in this scenario and thus an even more attractive location, application figures could rise further.

Once these two manifestations had been agreed, the key factors, that is, the relevant trends, were positioned in the 2x2 matrix at an internal project workshop. Together it was decided which trends should be assigned to which quadrants and why. At this stage, it was also possible to place a trend in several quadrants, which meant a trend could be assigned to more than one category. This approach prevents rigid scenarios and reflects a more realistic way of thinking about the future that questions the need for explicit affiliations.

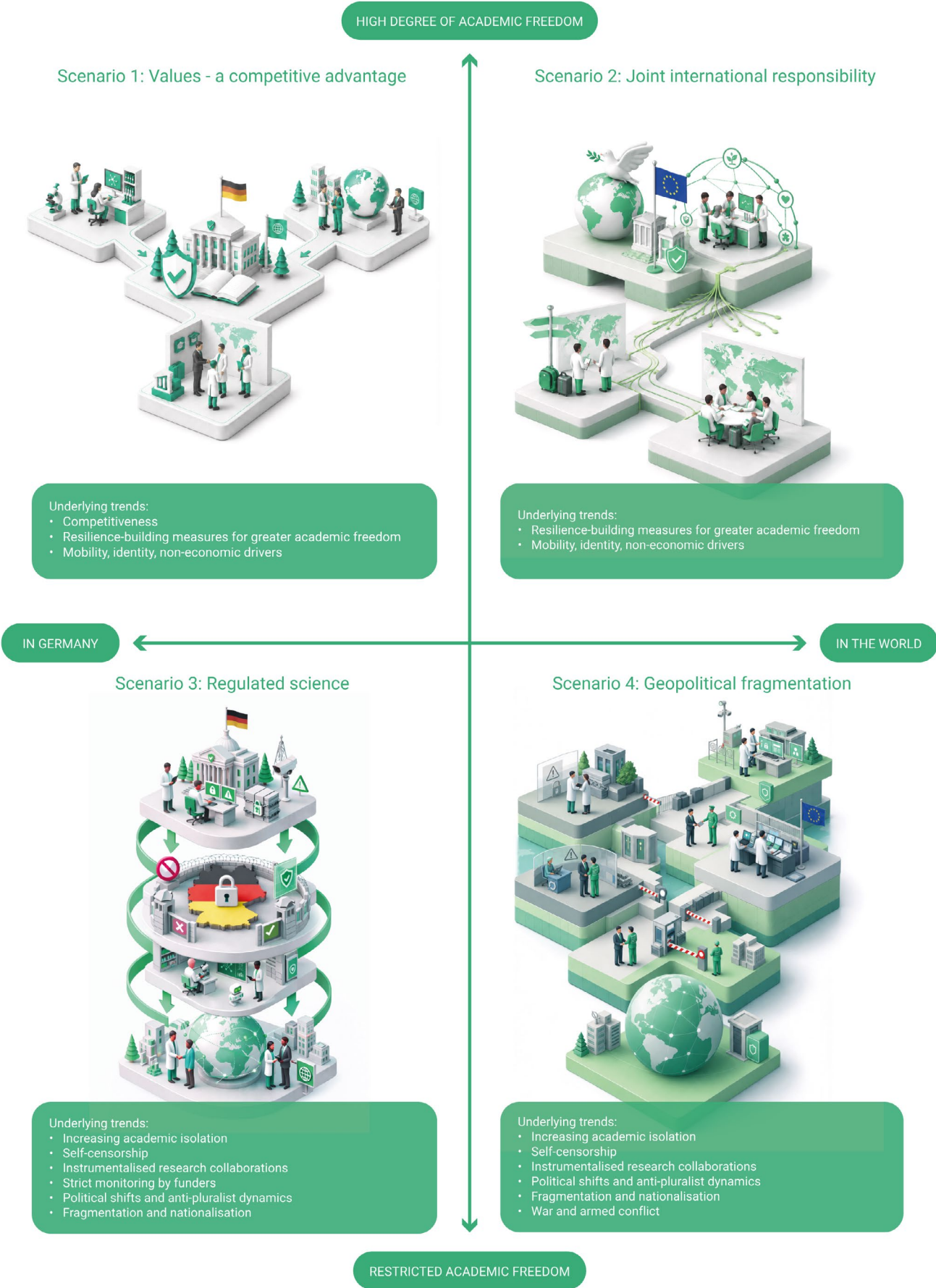


Figure 3: Overview of scenarios with respective assignment of underlying trends

4.3 DESCRIPTION OF SCENARIOS

The following presents the four scenarios identified at the trend assessment workshop. The previous horizon scanning and Delphi survey had shown that it was likely that fragmentation and a lack of freedom would continue to increase in the science ecosystem up to 2035. This underlying assumption, confirmed by experts, influences all four scenarios ensuing from the trend assessment workshop – to varying degrees in each scenario. The scenarios should not be considered in isolation but always in relation to one another. One scenario, for example, presents a state in which Germany has remained a location with a high degree of academic freedom whilst, by contrast, the international environment is becoming ever more restrictive. Another scenario explores the reverse constellation in which academic freedom is being eroded in Germany whilst in other parts of the world conditions are comparatively open. Such systematic variation means all relevant manifestations of academic freedom that are potentially at risk, as well as their strategic implications, are incorporated into the analysis. This empowers the Humboldt Foundation to be prepared for any possible scenario and introduce strategic measures at an early stage.

To achieve better comparability, a baseline scenario was drawn up in addition to the four research-based scenarios building on the Humboldt Foundation’s current strategy as well as other selected reports, such as the Academic Freedom Index 2025, the Academic Freedom Monitor 2024 and Gender Monitoring 2025. This scenario builds on current developments inferred from the various past reports. The baseline scenario continues the current status quo, as described in the various reports, and deliberately disregards new external developments. Comparing the baseline scenario with the four other scenarios highlights the changes in general conditions and their impact particularly clearly. There are especially noticeable parallels between the baseline scenario and Scenario 4. Both operate in the same problem space: political pressure, safeguarding issues, unequal degrees of freedom and collaborations under strain. However, the difference lies, above all, in dynamics. Scenario 4 describes further escalation

through to fragmentation, control and erosion. The baseline scenario, on the other hand, presents the continuation of the interim status quo: no hardening of the system but no stabilisation either. It is similar to Scenario 4 but less drastic and not so profoundly characterised by bloc formation, rigid segmentation and systemic closure. The intention in confronting challenging scenarios is in no way defeatist; rather, it seeks to facilitate strategic preparation and planning. Scenarios that anticipate unfavourable developments are precisely the ones that contain valuable ideas for proactive action: they visualise where there is room for manoeuvre, what course can be charted early on and where preventive measures can have the most leverage. Foresight does not see the future as a given, but as something that can be influenced, and it empowers organisations to remain strategically proactive even under adverse circumstances.

Each of the four scenarios is followed by a section on possible wild cards and Black Swan moments. These events are not predictions but improbable, though momentous, fractures in the core scenario assumptions. They deepen understanding of uncertainty, illustrate potential tipping points and support the strategic interpretation of the scenarios.

4.3.1 BASELINE SCENARIO: CONTINUITY ASSUMPTION

A functioning system under constant pressure: the global science ecosystem 2035

In 2035, the global science ecosystem is still internationally connected, functional and effective. Researchers publish across borders, conferences are held, international projects are still a normal component of academic work and mobility continues to be a feature of many academic careers. The structural shifts in global knowledge production continue unabated: China’s share of global scientific publications is growing rapidly whilst Germany’s and Europe’s are

dropping. The system is still functioning but constantly changing: the focus shifts and gravitational centres move but this dynamic does not lead to a global breakdown. At the same time, there are vastly differing degrees of academic freedom in the world of 2035; in many contexts it is under constant pressure. The 2024 Academic Freedom Index records 34 countries in which academic freedom has declined in comparison to 2014. These include the United States, India and the United Kingdom (Academic Freedom Index Update 2025, p. 2). Even if this trend continues in a linear fashion, the system is neither characterised by global collapse nor by comprehensive safeguards for free science but by an ongoing state of tension.

Continuity as a defining feature: between formal recognition and de facto restriction

The crucial characteristic of this image of the future is continuity. The developments already shaping the science system today continue up to 2035 without consolidating into a completely new order. In many states, academic freedom is still legally recognised and highly valued but in practice it continues to be undermined by political polarisation, anti-pluralist tendencies, security considerations, institutional control and social conflict. This sustained pressure is reflected in the continuing fragility of several strategically relevant science nations: the increasing politicisation of the science system in the United States, coupled with state budgetary cuts and growing pressure on institutional independence, has changed the basic conditions for free research even though no formal break has occurred. Already in 2024, the Academic Freedom Index recorded a decline in all five dimensions of the index in the U.S. in comparison to 2014 – particularly in “Freedom to research and teach” and “Institutional autonomy” (Academic Freedom Index Update 2025, p. 8). Even if this trend continues in a linear fashion, by 2035, the U.S. will gradually be moving towards the lower end of Status Group C (moderately restricted). With regard to the Alexander von Humboldt Foundation, in 2024, 88 fellowships and awards went to the United

States which was thus the leading country of origin (Humboldt Foundation Annual Report 2024, p. 8). In countries like Brazil, too, political polarisation and pronounced social inequalities are long-term issues which are reflected in low internationalisation quotas amongst students. In countries like Jordan, the science system operates under ongoing legal restrictions on free speech and academic freedom, which limit the scope for critical, independent research, with no end in sight to these restrictions. Against the backdrop of its location in a politically and regionally unstable region this constellation is especially significant as science systems there can be particularly impacted by external geopolitical and security dynamics. Consequently, the gap between formal recognition and the actual practice of academic freedom remains a defining feature of the global system.

Safeguarding mechanisms: widespread but not system changing

In the 2035 global science ecosystem, protecting academic freedom has therefore become a permanent task. Universities and research institutions have continued expanding their internal guidelines, procedures and responsibilities in order to be able to respond to pressure, intimidation, interventions and conflicts. Safeguarding mechanisms are more widespread than previously, but they do not alter the basic situation. They stabilise a system that remains vulnerable. So, in 2035, academic freedom is not automatically secure but institutionally monitored, administratively supported and politically defended. This institutional consolidation of safeguarding mechanisms is, however, not applied everywhere: whilst well-equipped university systems in Europe and parts of North America have been able to develop monitoring tools, escalation paths and governance structures, underfunded science systems in regions, such as Sub-Saharan Africa, which are still comparatively poorly connected and largely maintain their international ties via Europe, are in a situation in which it is more or less impossible to build effective institutional safeguards.

International mobility: possible but unevenly distributed

International mobility is a core feature of academic careers. Researchers still look for scientific quality and reputation but, at the same time, also for stability, institutional reliability and personal safety. Thus in 2035, mobility is not only the expression of open science but also a reaction to unequal conditions of freedom. It is still possible, but unevenly distributed. Regimes, administrative hurdles, geopolitical tension and divergent national frameworks continue to affect who can move freely, where mobility takes them and under what conditions international careers can be realised.

The linear projection of the Humboldt Network’s mobility data illustrates this uneven distribution. In 2024, Asia was already the largest region of origin, accounting for 701 of 1,860 applications (37.7%), followed by Europe (569, 30.6%) and North America (164, 8.8%) (Humboldt Foundation Annual Report 2024, p. 24 ff.). Between 2020 and 2024, China saw an increase in applications from 225 to 314 whilst India remained stable at a high level (214 to 259) and the United States saw a decline from 155 to 129 (Humboldt Foundation Annual Report 2024, p. 24 ff). If these trends continue at a linear rate, the proportion of applications from Asia will grow to over 45 percent by 2035 whilst the share from North America will continue to decline. This trend is also reflected in the number of active members of the Humboldt Network: of the 31,875 active members, 6,274 are in Asia, including 2,162 in China and 1,559 in India. Both countries have an AFI status of Categories D and E. By contrast, there are 16,104 network members in Europe and 5,724 in North America (Humboldt Foundation Annual Report 2024, p. 20 ff.). If the shift in origin (India growing, U.S. declining) continues at a linear rate, the proportion of the network in countries with restricted academic freedom (AFI status C-E) will shift from an estimated 20 percent to approximately 25 percent by 2035.

With reference to gender issues, there have been

some positive developments. The Humboldt Foundation’s 2025 Gender Monitoring report, for example, clearly shows that the proportion of women receiving approvals for research fellowships in 2024 reached a new high of 36.6 percent (Gender Monitoring 2025, p. 6).

However, it is important to note the uneven trends in international mobility. Data from the Humboldt Foundation’s Gender Monitoring over a 15-year period (2010-2024) reveal a steady but moderate increase in women’s participation in the international applicant pool (Gender Monitoring 2025, p. 6). But there are regional differences. Whilst the proportion of women applying from North America reached 37.8 percent, the proportion from Asia – the fastest growing region of origin – was 27.2 percent (Humboldt Foundation Annual Report 2024, p. 58). This uneven global distribution of mobility opportunities thus intersects with gender-specific barriers, the impact of which varies depending on the region of origin.

International cooperation: continuing but ambivalent

International cooperation continues, although it remains ambivalent. In 2035, cross-border cooperation is still considered scientifically necessary but is more often organised with reservations. Safeguarding issues, regulatory demands, debates about influence and political conflicts continue to affect partnerships, data access and institutional decisions. It is not that huge numbers of collaborations come to an end as a result, but they are often more carefully structured, more closely monitored and more thoroughly safeguarded. An example of this ambivalence is the relationship with China which accounts for a dominant share of global publications and acts as a leading hub in the global co-authorship network. In the AFI, China remains firmly in Status Group E (completely restricted) – with no recognisable tendency to change (Academic Freedom Index Update 2025, p. 11). At the same time, China was the Hum-

boldt Foundation’s second-most important country of origin in 2024, with 82 fellowships and awards granted, although the number of Humboldt Research Fellowships granted showed a slight downward trend (from 80 in 2020 to 73 in 2024, Humboldt Foundation Annual Report 2024, p. 26). Based on a linear projection, the number of Chinese Humboldt Fellowships will decline to about 50-60 per year by 2035, whilst with 2,162 active Humboldt Fellows, China will continue to play a key role as a country of origin for the network overall (Humboldt Foundation Annual Report 2024, p. 23). China is described as a partner, competitor and systemic rival all at once. This three-part constellation is typical for the cooperative regime in the baseline scenario: cooperation that is too valuable to discard but too complex to continue unrestrictedly. Openness is still a systemic value but is consistently combined with caution. India, which with 60 fellowships and awards granted in 2024, is the third-most important country of origin (Humboldt Foundation Annual Report 2024, p. 8), remains in the AFI’s Status Group D (severely restricted), with a decline over the preceding decade (Academic Freedom Index Update 2025, p. 11). Based on a linear projection, India will be approaching the threshold for Status Group E by 2035. The geographical distribution of Humboldt Foundation funding will thus continue to shift in favour of countries where academic freedom is substantially restricted – creating growing tension between the Foundation’s commitment to excellence and the conditions of academic freedom in its most important partner countries.

Scientific practice under selective pressure

In academia, pressure is still uneven but always palpable. Research fields associated with conflict, in particular, continue to be the focus of public debate, political criticism and digital attacks. In 2035, researchers in these fields discover that academic expertise can generate great relevance, great visibility and great vulnerability all at the same time. Academic freedom is therefore not only a legal or institutional issue but also a question of actual and individual

opportunities for expression under conditions of visibility, polarisation and public mistrust. This does not lead to direct censorship everywhere but often to more careful communication and a heightened sensibility for potential consequences of conflict. In 2024, the AFI reported a decline in the “Freedom of academic and cultural expression” category for the United States and attributes this, amongst other things, to government influence on U.S. universities (Academic Freedom Index Update 2025, p. 9). This trend shows how societal polarisation affects the conditions under which science can be expressed – a pattern that, if extrapolated linearly, is spreading to other countries.

Academic freedom beyond the state-university relationship

Moreover, academic freedom is not only dependent on the relationship between universities and the state. Leadership structures, management practices, reliance on third-party funding and external expectations also mould the scope of action in research and teaching. Increasingly, this involves algorithmic systems and AI-supported infrastructures that shape academic work. The structural impact of artificial intelligence often emerges without clear accountability or transparency. New dependencies arise which do not involve the state but, increasingly, private-sector stakeholders who can influence institutional autonomy and the diversity of scientific perspectives. In 2035, it has been recognised that academic freedom cannot be safeguarded solely by abstract basic rights, but requires robust rules, transparent procedures and institutional cultures that can deal with competing demands. These include, for example, managing AI systems by developing governance structures. This insight has gained acceptance, though it has not resolved all tensions.

Systemic response: scrutiny, coordination and limited countermeasures

The global science ecosystem continues to respond to this situation with scrutiny, coordination and limited countermeasures. Monitoring, political attention, guiding principles, support options and international exchange formats are still important. They prevent deterioration in specific areas, enhance visibility and bolster vulnerable parts of the system. Structurally, poorly connected regions in the global research ecosystem are particularly dependent on these systemic response mechanisms: Sub-Saharan Africa still relies on international aid which is neither consistent nor on an adequate scale. Much the same is true of structurally underfunded science systems in parts of Latin America and the Middle East where legal restrictions and institutional fragility permanently limit researchers’ scope of action. But they do not lead to globally uniform or consistently robust safeguarding for academic freedom by 2035. The result is a system that is open enough to function globally but fragile enough to need permanent safeguards.

Compromised continuity: the global science ecosystem as a system under constant strain

In 2035, the continuity of the global science ecosystem has been compromised. Academic freedom remains a globally recognised guiding principle but not a globally reliable state. International science is still possible, productive and visible but it is conducted under continual tension that does not escalate but neither does it disappear. Structurally, this system is shaped by persistent asymmetry: on the one hand, a growing Asian knowledge cluster focusing on China as an independent hub and closely integrating countries like South Korea, India, Japan, Singapore and Saudi Arabia; on the other, a European-North American core that is losing its relative share of publications but continues to play a defining role as a normative framework for academic freedom and institutional governance. In this constellation of ongoing tension, it is not dramatic ruptures that place a lasting strain on the system but rather the cumulative effects of small processes of erosion – declining publication rates, less openness to collaboration, growing self-censorship and unequal safeguarding capacities. The defining factor is, therefore, neither a breakthrough to comprehensive freedom nor a transition to systematic closure, but the consolidation of a situation in which open science continues to exist whilst simultaneously being subject to constant scrutiny, pressure to justify itself and the need for safeguarding.

4.3.2 SCENARIO 1: VALUES – A COMPETITIVE ADVANTAGE



Figure 4: Scenario 1 – Values – a competitive advantage

Fundamental academic freedom

In 2035, academic freedom is part of the system’s operational architecture in Germany. Universities and research institutions have explicit safeguarding protocols, escalation paths, monitoring tools and legally robust governance in place to recognise and avert

pressure on research topics, interventions in teaching and restrictions on institutional autonomy at an early stage. Researchers in Germany and the world know that anyone working in Germany can pursue free, safeguarded, collaborative research. Reliability has become a strategic competitive advantage.

Global competition: performance orientation versus reliability

Because the global science system is increasingly shaped by comparisons, rankings, visibility and the concentration of resources, Germany’s standing in this competitive situation is changing. The shift is taking place against the backdrop of a profound re-distribution of global knowledge production: China’s proportion of global scientific publications has increased hugely, and Asian research networks are playing a central role. This structural finding underlines the urgency of adopting a compelling strategy. Many countries are increasingly optimising their science systems in line with measurability and short-term visible performance. International cooperation is still important but is often treated as a means of enhancing performance and raising the institution’s profile. The logic of this is that researchers become mobile capacities who strengthen locations, and talent streams themselves become an indicator of performance. In this environment, Germany adopts a different strategy: not by becoming anti-competition but by expanding its understanding of competition. Excellence is not played off against freedom but rather built on freedom. Germany’s appeal derives from combining academic performance with normative credibility and digital security in data infrastructure and, prospectively, AI. Positioning itself in this way is not without consequences in the global science ecosystem.

This scenario draws on key observations that are already emerging internally at the Humboldt Foundation: a survey of departmental heads emphasised the necessity for a German-European scientific safe haven model and the growing significance of structures to safeguard against repression. In Chapter 6.3 (Attachment A), additional information on the internal survey can be found. Moreover, a clear shift in applicant flows has been observed within the Humboldt Foundation – particularly from India and China – as well as the growing appeal of Germany for international talent. Attention was also drawn to the structuring impact of greater politicisation of science

and the global competition in AI. The scenario distils these contemporary observations into a coherent future narrative and unfolds its impact on three levels:

Three levels of impact in the German values profile

Talent mobility: Germany – an anchor location
Firstly, the direction of academic mobility is changing. Germany attracts a disproportionate number of researchers who are not only seeking excellent research conditions but also a place where their work and they themselves are protected. This is especially obvious in the case of international talent from systems in which political polarisation, societal tension and intervention in academic freedom are increasing. Germany is becoming an anchor location for these groups: not always the biggest and fastest but one of the most reliable. Its appeal is fed by the experiences of other international researchers whose reporting on integration, recognition and safety reinforce Germany’s image. Reputation is not just a product of rankings but of experience in society.

Network of protection and trust: Germany’s new international role
Secondly, Germany is acquiring a new role in the international science ecosystem. Internationality does not merely mean co-authorships or third-party collaborations but, rather, mutual safeguarding of free science. German institutions continue to participate in programmes for researchers at risk, offer temporary shelter programmes as well as institutional sponsorship and transnational support structures. This enhances the location’s international visibility: Germany is becoming the hub of a network of protection and trust.

Shift in competitive dynamics in Europe and globally
Thirdly, the competitive dynamics in Europe and beyond are shifting. Europe can still maintain its status as a central hub in the science system, but this is no longer taken for granted. Whilst some science locations bank, above all, on leading-edge clusters,

tenure track positions and a performance-based focus, Germany can also score points with a credible values framework. In 2035, this is not a soft factor anymore but a hard locational advantage because in a situation in which scientific careers are increasingly shaped by the perception of safety, the experience of diversity and institutional autonomy, freedom, a sense of belonging and protection become productive resources. They make it more likely that talent does not just arrive, but stays, cooperates, brings along networks and enters into long-term institutional commitments. In this way, academic freedom directly reinforces competitiveness.

Internal impact: value orientation as quality assurance

Internally, this scenario also alters the German science system itself. Value orientation acts as a form of quality assurance: institutions do not only invest in infrastructure and funding lines but also in governance, integration capacity, transparent procedures and safeguarding mechanisms. This creates a location that not only attracts leading-edge researchers but also becomes more resilient to political, societal and institutional tension. Thus, in 2035, Germany’s international competitiveness is not based on maximum acceleration but on the ability to secure trust in academic freedom, both organisationally and technologically.

Guaranteed academic freedom – a form of strategic strength

In the global science contest of 2035, Germany therefore reveals itself as a country that has learned one of the core lessons of the decade: in an environment in which freedom comes under pressure in many places and academic performance is increasingly translated into the logic of competition, guaranteed academic freedom itself turns into a form of strategic strength. Academic freedom is not merely a normative ideal but a measurable competitive factor: locations with a higher degree of institutional autonomy boast significantly higher rates of innovation

and attract top, internationally mobile researchers (Aghion et al., 2010). In 2035, Germany’s competitive advantage stems from making innovation and freedom into mutually reinforcing factors rather than conflicting goals.

Wild Card 1.1: Collapse of trust due to a data scandal

Definition: A massive data protection breach at a leading German university – such as the misappropriation of research data by an actor tolerated by the state – hits the international headlines within weeks. The safeguarding promises on which Germany’s reputation is built prove technically untenable. International researchers draw the consequences: the problem is not political freedom but, rather, digital security. The potential for damage is not just about loss of reputation but lies in the structural devaluation of the entire value argument. What was a strategic advantage, becomes a target for attack.

Derivation: This scenario builds its entire competitive advantage on two pillars: normative credibility and digital security. The text explicitly states that “Excellence with normative credibility and digital security” are its positioning characteristics. Then comes the core question: What happens when this very digital security fails? The scenario makes AI and data protection into strengths but treats them as a given.

Wild Card 1.2: Political tipping point – internal

Definition: A coalition government responding to a fast growing, anti-pluralist movement, links university funding to new “socially relevant criteria.” This is not done by decree but through budgetary decisions and new funding guidelines. The operational security protocols – which the scenario describes as stable – are ineffective because they were not designed to deal with a domestic attacker. Germany loses credibility not due to an external attack but through the gradual self-destruction of its defence system from within.

Derivation: This scenario describes security protocols and governance structures as stable and functioning. It consistently looks outward – towards international talent, global competition and other countries. In Scenario 1, internal attackers are never mentioned. The protective architecture is implicitly designed to address external threats. That is a structural gap in the scenario. So, the wild card does not derive from the text, but from what the text does not say: how resilient is the system faced with a government that changes the rules itself? Anti-pluralist tendencies are described in Scenarios 3 and 4 but incorporating this element as a wild card in Scenario 1 still makes sense because it is treated as unthinkable there.

Wild Card 1.3: A shock to global excellence from a non-European institution

Definition: A newly established, generously financed research institution – in the Gulf States or Singapore, for example – combines excellent working conditions, freedom from bureaucracy and considerably higher salaries with a carefully curated rhetoric of freedom. In a short time, it draws away a critical mass of top international researchers who had previously seen Germany as secure and attractive. The scenario had posited reliability as a unique selling point – but reliability loses its value when a competitor offers reliability plus material advantages.

Derivation: This scenario argues that Germany’s appeal is founded on reliability and freedom. It implicitly assumes that no other competitor can top this combination. The core question is: What happens when a resource-rich player, who is materially superior, adopts exactly the same rhetoric? The Gulf States and Singapore are not mentioned in the text but in the global science context they are factually relevant. The scenario posits competition essentially as competition between established systems. The wild card shatters this assumption by introducing a new player who copies and escalates the logic of the scenario.

Black Swan 1.1: The devaluation of institutions – a frame of reference

Definition: Academic reputation and trust completely detach themselves from institutional bodies. In 2035, the main benchmarks for credibility are not universities, research institutes or national systems but de-centralised, algorithmically verified reputational networks of individual researchers, much as financial trust has partially moved away from banks to crypto protocols. Germany has invested in institutions, but this investment is becoming structurally worthless, not because the institutions are getting worse but because the market for trust has shifted fundamentally.

Derivation: This scenario consistently thinks in institutional categories: universities, research institutions, governance structures, safeguarding protocols. However, it must address the following question: What is the deepest unspoken assumption underlying this scenario? The answer is that institutions remain the relevant unit of science. Historically, this assumption is not a given. Science has fundamentally changed its organisational form a number of times. A Black Swan does not shatter an assumption in a scenario but the level on which the scenario thinks. When reputation becomes portable and individual, Germany loses the operational foundation for its locational advantage although no-one has actually attacked the country directly.

Black Swan 1.2: Scientific truth – a politically irrelevant category

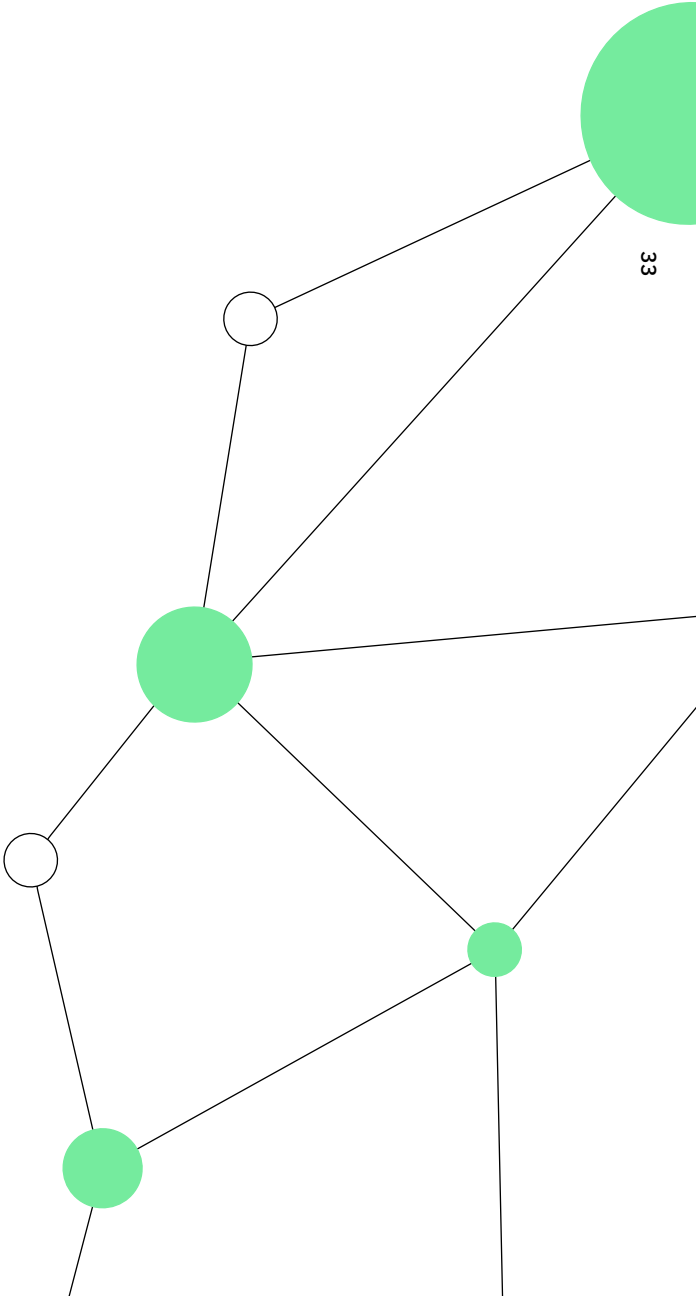
Definition: In an environment that is completely permeated by synthetic content, AI-generated findings and algorithmically curated realities, scientific trust loses its power to unite society – not because it has been disproved but because the differentiation between verified knowledge and generated content is no longer socially relevant. The strategic advantage enjoyed by academic freedom presupposes that society views science as something that is worth protecting. This is no longer the case.

Derivation: This scenario argues that academic freedom is a hard locational advantage because talent searches for it and society values it. This causality presupposes a world in which science still holds sway as an epistemic authority. The main question is: What happens when this prerequisite collapses, not due to an attack but because the ability to make distinctions has been eroded? This is a Black Swan because the scenario is not aware that this possibility is a risk category. It thinks of threats in terms of political or institutional intervention. The dissolution of the epistemic foundation of science lies outside this framework.

Black Swan 1.3: A biological or cognitive breakthrough changes who conducts science

Definition: A breakthrough in neurotechnology, brain-computer interfaces or cognitive augmentation alters who can conduct cutting-edge research under which conditions so fundamentally that previous categories of talent, mobility and institutional affiliation become obsolete. Research is no longer primarily conducted by people in institutions but by human-machine hybrids whose performance depends on access to technology, not on academic freedom in the traditional sense.

Derivation: This scenario treats science as a human endeavour that is protected or threatened by institutional frameworks. The basic assumption is that science, as a human-institutional process, is identified as the blind spot. What happens if the unity of action shifts? This is not a political or regulatory event; it is a technological one that alters the anthropological foundation of the scenario. A Black Swan of this kind is so radical precisely because it cannot be mitigated through better governance.



4.3.3 SCENARIO 2: JOINT INTERNATIONAL RESPONSIBILITY

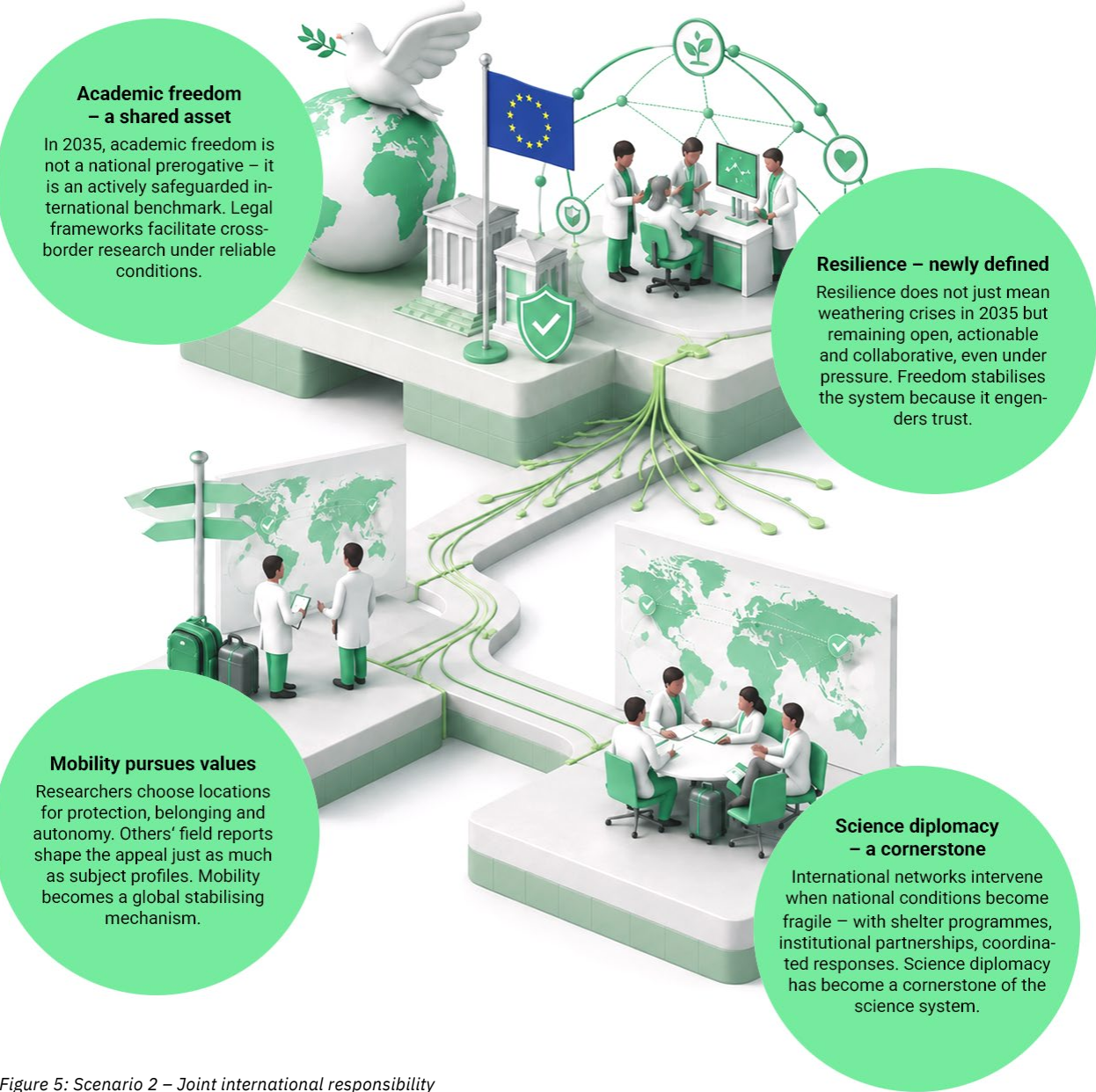


Figure 5: Scenario 2 – Joint international responsibility

Academic freedom – a globally secure systemic principle

In 2035, academic freedom has become an actively safeguarded fundamental condition in the global science ecosystem. It acts as a common benchmark for scientific cooperation, institutional governance and

international mobility. In many parts of the world, legal and organisational frameworks have been developed so that researchers can work across borders under reliable, safeguarded and calculable conditions. In this process, Europe, in particular, has distinguished itself as a stabilising force in regulatory and institutional matters: As the hub of the global publishing

network – with connections between co-authorships in the United States remaining particularly strong and ties to China having significantly strengthened – the European Research Area has sufficient structural embeddedness to make normative frameworks for cross-border scientific work operationally effective. Freedom is thus not just a normative ideal but part of the way the system itself functions.

Resilience – a systemic characteristic: a paradigm change

This development is the result of changes in the global understanding of resilience. In 2035, it is no longer primarily understood as the ability to weather crises and then return to the previous status quo. Instead, it describes how scientific systems can remain open, actionable and collaborative even when political tension, social polarisation and external shocks increase. Safeguarding academic freedom has become the key to this resilience because systems that legally anchor free research, protect it institutionally and technologically (AI, see above) and provide international feedback can respond to crises without forfeiting their openness. Value orientation and resilience are not separate entities but rather reinforce one another. Freedom stabilises the system because it fosters trust, reliability and international connectivity.

This scenario distils developments that are already being observed and processed at the Humboldt Foundation today: the increasing importance of security-related research and science diplomacy as a distinct field of action; the role of the EU as a central governance framework for cross-border science; growing operational safeguarding of academic freedom through legal and institutional mechanisms as well as diversifying global mobility and pluralising academic career paths. The scenario explores how these contemporary findings interact and shows how they could coalesce into a coherent systemic logic by 2035.

Mobility – a normatively shaped process

In this scenario, international academic mobility has acquired a new quality. It is no longer primarily seen as an individual career step or a reaction to economic incentives but as a socially and normatively shaped process. Researchers are increasingly choosing their paths along places and institutions that credibly guarantee protection, recognition, belonging and scientific autonomy. Mobile researchers want to know in which contexts academic work is compatible with personal integrity, diversity and social recognition. Other international researchers' experiences play a major role: reports about integration, safety, everyday life and institutional support shape the appeal of scientific spaces just as much as subject profiles and funding conditions.

Transnational consolidation: mobility – a global stabilisation mechanism

In 2035, this form of mobility has become a key mechanism in global stabilisation. Researchers move between institutions which share similar basic principles and thus help to consolidate a transnational area of academic freedom. This movement occurs along a network whose structural gravitational centres have shifted: in addition to the transatlantic hub comprising Europe and the United States, an Asian cluster – headed by China and increasingly embedded with India, South Korea, Japan, Singapore and Saudi Arabia – is acquiring a distinct scientific sphere and gaining traction. The free transnational science area must therefore consolidate, not only within existing axes but by building bridges to these growing science regions in order to anchor resilience globally and not just in the West. Exchange, temporary visits, joint qualification pathways and transnational careers reinforce a global network of relations that is robust in times of crisis. When individual systems come under pressure, international networks intervene faster and in a more coordinated fashion than a decade earlier. Mobility not only serves to acquire knowledge but also to guarantee scientific continuity. It becomes a practical tool for maintaining and

disseminating freedom. This function is of particular and immediate significance where national research infrastructure has remained structurally weak: despite growing collaborative activity in the global network, Sub-Saharan Africa is still comparatively poorly connected. For researchers from this region, international mobility is not one of several career options but often the only structurally secure access to free, well-resourced science.

Legal consolidation as an operational basis for securing freedom

A core precondition for this is to consolidate the legal protection of academic freedom. In the period up to 2035, legal frameworks that limit intervention in research and teaching more explicitly and make institutional resistance more effective are reinforced in several political arenas, especially at European level. Consequently, academic freedom is not only more firmly anchored in a moral sense but also operationally more workable. The legal basis defines responsibilities, establishes grievance procedures, makes boundary violations subject to legal action and strengthens the institutional autonomy of academic institutions. Such legalisation changes the way the system behaves. Universities and research institutions draw up safeguarding protocols, develop standardised procedures and early-warning mechanisms to proactively monitor risks to academic freedom. Conflicts not only reveal themselves when they escalate but in their insidious forms at an early stage.

Science diplomacy – a cornerstone of the global science system

At the same time, international cooperation has become more closely associated with shared responsibility. By 2035, science diplomacy has developed from a complementary field of action into a cornerstone of the global science system. Science organisations, funding institutions and political players no longer view academic freedom as a purely internal affair but as a joint international asset. International networks intervene when national frameworks

become fragile, creating support structures for researchers at risk, providing temporary shelter, fostering institutional partnerships and coordinating the response to crises. This type of cooperation does not primarily drive performance but serves to foster an open, resilient research area. It creates a global safety network that does not replace scientific autonomy but safeguards it. Precisely because the system has experienced pressure, polarisation and threat, it invests in structures that facilitate free research, even under difficult circumstances. Institutional resilience is evidenced by the fact that collaborations can withstand political tensions and that mobility channels do not dry up immediately. The system remains capable of learning because it does not leave freedom to chance.

Academic freedom – a consciously organised, shared infrastructure

For researchers, 2035 means they experience internationality differently. Cross-border scientific work is experienced as a space in which protection, professionalism and personal recognition go hand in hand. Issues of identity, diversity, affiliation and inclusion are not marginal but determine the stability of scientific cooperation. Academic freedom is neither merely constitutional rhetoric nor a routine that is taken for granted but a consciously organised, shared infrastructure. It not only facilitates good conditions for research but reinforces the resilience of the entire system.

Wild Card 2.1: Breakdown of a key collaborative agreement triggered by a geopolitical shock

Definition: Within months, a military conflict between two countries, which had previously been bridge builders in the global science system, such as the escalation of a territorial conflict in the Indo-Pacific region, tears apart collaborative structures that had taken years to build. The transnational networks on which the scenario is based prove more fragile than had been assumed: political loyalties overlay academic solidarity. Science diplomacy only works

in practice as long as the countries involved consider science to be diplomatically useful.

Derivation: This scenario describes transnational networks as being “resilient in times of crisis” and posits science diplomacy as its cornerstone. The core assumption is that academic solidarity survives political tension, an assumption that is directly confronted with the question: What event activates such strong political loyalties that academic solidarity breaks down? A military conflict is the classic stress scenario for networks based on trust. The text states that the Asian cluster and Europe should build bridges. A conflict in the Indo-Pacific region would turn this bridge into an inbuilt breaking point. The wild card is thus inherent in the geographical structure the scenario itself identifies.

Wild Card 2.2: A pandemic or an ecological disaster forces lockdown at short notice

Definition: A new, highly contagious infectious disease or an extreme climate disaster with global consequences forces governments around the world to radically restrict mobility. The transnational mobility structures that the scenario describes as a stabilising mechanism effectively collapse – not because of political will but out of necessity. The potential damage lies in its path dependency: once broken, networks do not automatically regenerate, and the gaps are filled by players who are less freedom orientated.

Derivation: This scenario expands mobility into a stabilising mechanism. Researchers move around with freedom in their luggage and consolidate networks. The implicit assumption is that mobility will remain possible. It thus requires an event that does not interrupt mobility politically but factually, that is, not by will but by necessity. Another pandemic is improbable in this case but not unthinkable; moreover, it has an historical precedent. The special feature of this wild card is the mechanism. The scenario would not fail due to malice but because of an external shock to which no-one can take moral exception.

This makes it harder to avert than a political wild card.

Wild Card 2.3: Normative division of the global science system by AI governance

Definition: The Asian science cluster enforces its own AI-supported standards for publication, peer review and research funding that are incompatible with European principles of openness and transparency. What appears to be a technical issue is actually a normative parting of the ways: two systems with different values cannot be integrated. The scenario had hoped to build bridges but when the infrastructure itself codes values, bridges are unable to generate a common language.

Derivation: The scenario explicitly refers to AI as an element of safeguarding freedom but treats it as a neutral tool. The question here is: What happens when AI itself becomes a normative actor, that is, when different AI systems embed different values in the scientific infrastructure? In this scenario, the Asian cluster is described as a growing player to whom bridges are supposed to be built. The wild card transposes the conflict to a technical level that the scenario cannot contemplate: If peer-review algorithms, funding audit systems or publication platforms are normatively incompatible, cooperation is blocked structurally, not politically. This is the kind of obstacle to which science diplomacy has no answer.

Black Swan 2.1: Resilience as self-immunisation against renewal

Definition: The global system of safeguarding academic freedom becomes so stable, so institutionally consolidated and so normatively locked in that it no longer allows any fundamentally new forms of knowledge. Resilience topples over into rigidity. Something that was built as a safeguarding mechanism puts the brakes on innovation: new methods, unconventional forms of knowledge or paradigm-changing approaches are not forbidden but systematically filtered out of the funding system because they do

not fit into the established validation structures. The system protects freedom, but only freedom on its own terms.

Derivation: In this scenario, resilience and openness are complementary. It describes resilience as the ability “to remain open, actionable and collaborative.” The question to be asked here is whether there is a point at which resilience does not protect openness but limits it. In system theory it is known that stabilisation mechanisms can produce locking-in tendencies. Systems that want to perpetuate themselves tend to reduce divergences. A Black Swan occurs when the very system that is supposed to safeguard freedom becomes a divergence itself. This is not predictable in the logic of the scenario because it has embedded resilience as exclusively positive.

Black Swan 2.2: The collapse of trust in peer review by generative AI

Definition: The quality of generative AI systems is so good that scientific reviewers can no longer systematically differentiate between AI-generated research papers and those written by humans. The global publication system, which is described as the backbone of transnational academic freedom, is losing its validating function – not because of political intervention but because of being undermined by technology. As the “key hub of the global publication network,” Europe is particularly affected because this hub suddenly stops fulfilling a reliable function.

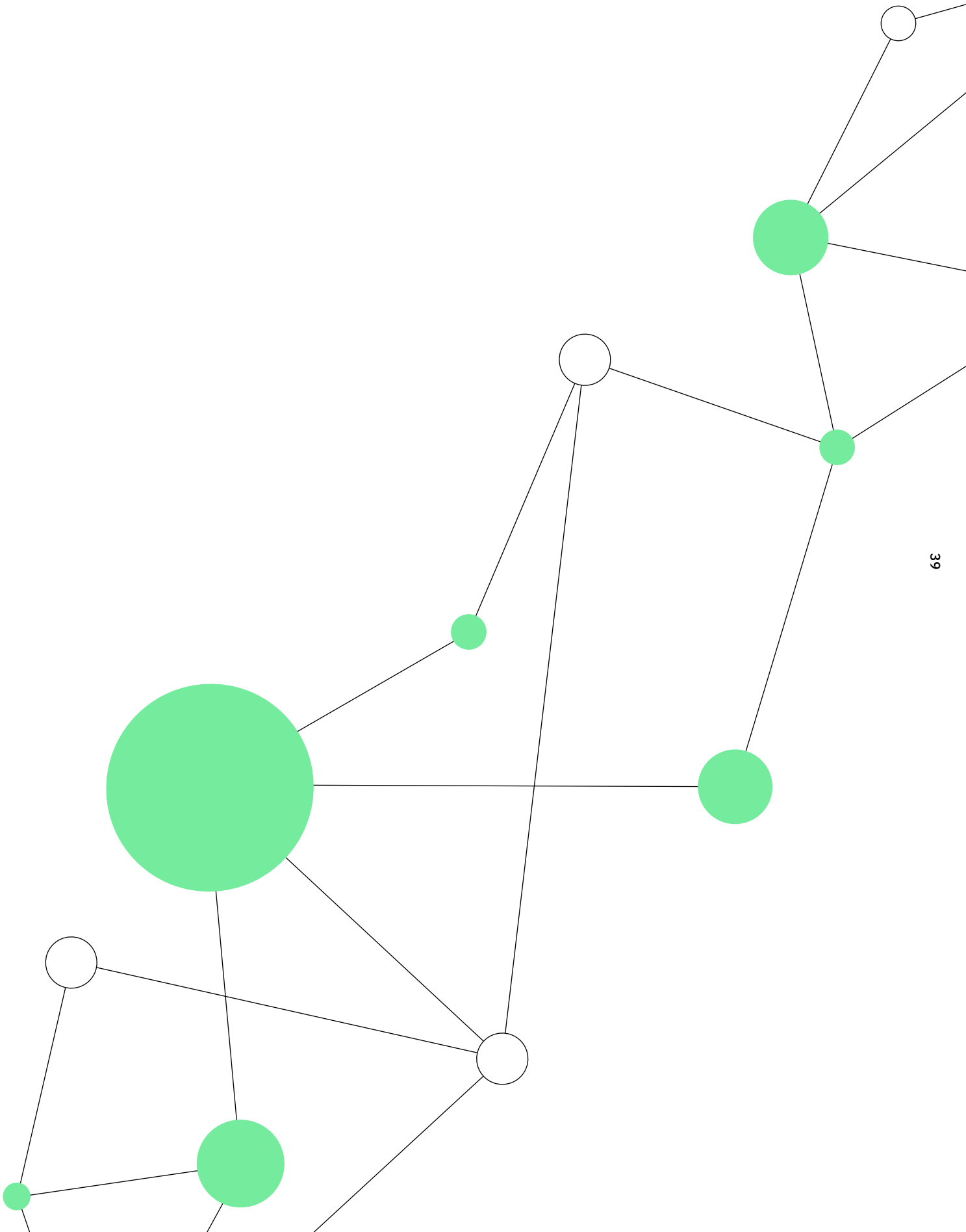
Derivation: This scenario describes Europe as structurally influential due to its position in the publication network, a strength built on the presupposition that the publication system acts as a validation authority. An event was sought that erodes this functionality

from within, not by external censorship but by undermining the basic preconditions technologically. This is a Black Swan because the scenario treats AI as a tool for safeguarding freedom, not as the potential destroyer of the epistemic infrastructure on which the entire system is built.

Black Swan 2.3: A new form of knowledge marginalises western science categories

Definition: The Asian science cluster is not only producing a greater quantity of output but also developing an epistemologically different form of knowledge production, for example by integrating practical knowledge, collective forms of understanding and AI-assisted methods that make Western concepts of single authorship, objectivity and peer review appear culturally specific. What was previously considered to be a universal standard is becoming a regional paradigm. Global academic freedom is implicitly western in this scenario and, as such, is visible and vulnerable.

Derivation: This scenario speaks of “shared fundamental principles” in the transnational science area. It works on the assumption that such shared principles exist and that they converge sufficiently. This assumption was questioned epistemologically: What happens when the fundamental principles themselves are not shared, not because they are rejected politically but because of genuine epistemological differences? This is a Black Swan because the scenario thinks in terms of diversity as an asset but does not recognise the possibility of incommensurability, that is, a genuine incompatibility between models of knowledge.



4.3.4 SCENARIO 3: REGULATED SCIENCE



Figure 6: Scenario 3 – Regulated science

**Formal continuation, factual restriction:
Germany 2035**

In 2035, Germany is still a powerful science location but the conditions for academic work have changed fundamentally. Formally, academic freedom still exists but, in practice, is interpreted more narrowly, more strictly monitored and increasingly limited by political, regulatory and security-related constraints. Research is still being conducted, universities and non-university institutions are still visible, but their operational freedom is significantly reduced in comparison with a decade earlier.

Erosion of governance – a structural starting point

The starting point of this development is not a single law or a singular event but a series of shifts in governance, funding and political framing. In Germany, university and research policy is increasingly linked to questions of regulation, security, sovereignty and loyalty. Where regulation had seemed to be, above all, a means of quality assurance or administration, it is now a tool for framing content. Responsibilities are being relocated, control rights extended, funding decisions more closely coupled with political priorities. Academic autonomy still exists but is variable: it is no longer a basic stable assumption but is ever more dependent on the political climate, the thematic field and on institutional risk assessment.

The shifts described in this scenario link up with developments already observed at the Humboldt Foundation today: a gradual erosion of governance and an expansion of control mechanisms in research funding; the growing politicisation of science and its increasing alignment with security and regulatory logics; the growing importance of security-relevant research as a basic condition for international collaborations as well as a strongly growing demand for funding programmes – particularly from India and China – that are already bound by increasing structural selectivity. The scenario distils these tendencies into a coherent development rationale and asks what

the systemic consequences will be if they continue unabated.

Doing research under pressure to comply

This development is particularly obvious in everyday research. In Germany in 2035, applications, project structures and collaborative formats are designed so they can be checked, corrected and broken off at any time. Funding logic demands more comprehensive disclosure, additional proofs, new compliance chapters and interim evaluations as well as auditability during the entire period. Funding thus not only finances research but increasingly pre-structures it. Universities and research institutions respond with internal approval chains, preliminary reviews and additional documentation obligations. There is noticeably more administrative red tape, project timings are re-scheduled and scientific creativity is more often linked to the question of whether a proposal is stable in regulatory terms and inconspicuous politically. As a result, research is less geared to acquiring knowledge and more towards fitting into existing funding schemes, security logics and reporting obligations.

**Indirect control and self-censorship as a form of
silent adaptation**

In Germany, this leads to new forms of indirect control. Science is not banned as such but steered in certain directions by priorities, monitoring mechanisms and expectation management. Some thematic areas grow because they are seen as politically compatible or relevant to security policy; others lose ground because they are considered controversial, difficult to control or sensitive in terms of reputation. Especially in sensitive areas, this leads to a gradual change in scientific practice. Researchers are careful about the way they formulate questions, frame findings more defensively and avoid constellations which could attract closer scrutiny. Self-censorship is not the exception but has become an act of silent adaptation within the system. It derives less from an explicit ban than from anticipated pressure, uncertainty about what can be said and the knowledge that financing,

visibility and institutional support are dependent on compliance with what is expected.

AI control of knowledge production

In a restrictive German science system AI systems acquire a new function: they are no longer there to increase efficiency but to silently control research content. Algorithms configured or adapted by the state can pre-filter funding applications, analyse publication patterns and systematically disadvantage politically undesirable research fields without conducting explicit censorship. In this context, AI algorithms can be used not only for identification purposes but potentially to manipulate and monitor scientific output as well. Artificial intelligence becomes a control tool: researchers are faced with opaque systems whose criteria and decisions are more or less incontestable.

Selective internationality and structural marginalisation

Germany’s international role has also changed. International mobility is still possible but has become significantly more selective. Visits, recruitment and collaborations are subject to strict rules, preliminary reviews and security-related criteria. The international cooperation undertaken by German institutions and political players is no longer primarily organised on subject lines but increasingly with regard to compatibility, regulatory harmlessness and strategic fit. In some fields, partnerships are conducted less widely, access is more tightly restricted, and cooperation is organised in a more fragmented manner. Integrated research relationships turn into interface collaborations that can be controlled legally and administratively. This restricts Germany’s international exchange although it does not break off altogether. In 2035, Germany is not isolated but more selective, careful and to some extent harder to integrate. The structural consequences of this selectivity weigh less heavily because they take place at a time when Germany’s position in the global knowledge network is under pressure anyway: its share of publications is

falling whilst the Asian science cluster around China is continually gaining influence and making ever better and closer connections. Structurally, every self-imposed restriction on openness for cooperation adds up to an ongoing process of relative marginalisation.

Consequences for the science location: functioning, but constricted

All this has noticeable consequences for the German science location. On the one hand, the system expands its own infrastructure and tries to compensate for lost openness with national capacities. On the other, the quality of academic exchange suffers because friction, criticism, circulating knowledge and informal international networking have weakened. Career paths are becoming more local, collaborative opportunities narrower and certain research issues riskier. The location still continues to function but loses the very flexibility and intellectual openness that had previously distinguished it.

Charged social debate and erosion of reliability

This situation is compounded by an alteration in the embedding of science in Germany. Political polarisation and anti-pluralist tendencies have found their way into universities and research institutions. Diversity, inclusion and institutional self-governance can no longer be taken for granted as aspects of academic professionalism but are more politically charged. Public debates on science are shifting, and political intervention is easier to legitimise. German research institutions thus become more involved in internal political disputes. International partners observe this development carefully; Germany’s appeal for emerging science nations like Indonesia falls sharply. This changed perception of Germany is not a symptom of a spectacular fracture but of the gradual erosion of reliability with regard to academic freedom. The result is that Germany in 2035 appears to be a science location in which high-level research is still possible but under narrower conditions than previously. Academic freedom still exists but it is

administratively consolidated, politically framed and much more restricted on a day-to-day basis.

Wild Card 3.1: A whistleblower scandal rocks trust in governance structures

Definition: An internationally visible case of politically motivated interference in research results, documented and published by a group of internal whistleblowers, triggers a debate the system can no longer control. What is described in the scenario as a creeping phenomenon that is hard to pin down suddenly becomes visible and nameable. Paradoxically, the potential damage lies in the disclosure itself; international partners start to withdraw because the scandal confirms what many were already thinking. Gradual erosion topples over into an acute crisis of trust.

Derivation: This scenario describes the restrictions as creeping, diffuse and hard to pin down. The text explicitly emphasises that interventions are “often indirect” and that self-censorship is “not a result of an overt prohibition.” The scenario’s logic thrives on a system that is semitransparent: nobody can say exactly where the boundaries lie. The core questions here are: What happens when this fuzziness is suddenly lifted, when the diffuse becomes concrete and public? A whistleblower scandal is a tool that does precisely that. It makes things visible that the system wants to keep invisible. Paradoxically – and that is why it is a good wild card – the disclosure does not necessarily lead solely to improvement but can accelerate a crisis of trust.

Wild Card 3.2: AI systems produce politically usable counter-expertise

Definition: State actors or those close to them use large AI systems to systematically undermine scientific consensus – for instance, on climate models, migration research or health data – by employing algorithmically generated alternative studies. This counter-expertise is not recognisable as a fake, methodologically difficult to dispute and is fed into the

public arena via policy channels. The scenario describes restriction by control – this wild card describes restriction by epistemic overload: scientific authority is not eroded because it is prohibited but because it drowns in a sea of equally plausible counter claims.

Derivation: This scenario posits restriction as reduction – less freedom, narrower corridors, more compliance. The basic assumption is that scientific authority remains stable as long as research continues to be conducted. Here, this assumption is broken: What happens when the threat is not reduction but inflation? For the first time, AI facilitates the industrial production of statements that appear to be scientific. The scope of genuine science is not altered by prohibitions but by the loss of distinguishability. The wild card takes a different AI trajectory from the scenario: there, AI is a tool for controlling researchers, here, it is a production instrument that attacks scientific credibility itself. This is qualitatively different damage from that foreseen in the scenario.

Wild Card 3.3: Emigration of a critical mass and irreversible loss of expertise

Definition: In a narrow time frame, triggered by a particularly restrictive law or a series of public interventions, an above average proportion of researchers in key disciplines leave Germany. This departure exceeds a critical threshold above which institutional structures cannot be regenerated: junior researchers are absent, networks dissolve, expertise cannot be brought back. The scenario describes a functioning, if restricted location. But systems can topple under pressure when loss of expertise is not linear but works like a cascade effect.

Derivation: This scenario concludes with the finding that Germany is “functioning but narrowed” which implies stability at a low level. This assumption was therefore questioned: Systems do not only shrink linearly, they also topple. System theory uses the term tipping point, a threshold beyond which damage generates more damage. The wild card derives from the question: What event would trigger such a tipping

point in this scenario? The answer is the emigration of a critical mass because the scenario itself describes career paths as becoming “more local,” so the system is no longer replenished by junior researchers from outside. If experienced researchers emigrate at the same time, a structural gap emerges that cannot be repaired.

Black Swan 3.1: Regulation unintentionally produces a creative counterculture with a global impact

Definition: Pressure to comply and administrative consolidation in Germany drive a generation of younger researchers to consciously adopt counter models: informal collectives, non-institutional forms of research, international networks outside of established structures. This counterculture unexpectedly develops its own scientific productivity which attracts global attention and, paradoxically, makes Germany appear to be a source of important innovation, precisely because resistance to regulation unleashes creative energy. The regulated system loses control not because of the rebellion but because it becomes irrelevant in comparison with what is happening elsewhere.

Derivation: This scenario posits regulation as a dampening mechanism: it restricts, slows down, narrows. The effect is clearly negative and linear. Consequently, the question was posed as to whether there were historic patterns in which regulation produced the opposite of what was intended. And the answer is yes: prohibition, censorship and political repression have repeatedly brought forth creative counter movements that were more productive than the regulated mainstream system. This is a Black Swan because the scenario only foresees an impact in one direction and does not recognise the productive power of resistance as a category.

Black Swan 3.2: An external player takes over the financing of basic research in Germany

Definition: In the light of the declining quality of state research and growing bureaucracy, private,

international or philanthropic actors, such as big enterprises, state funds and global foundations start massively funding basic research in Germany. They are not patrons but have their own agendas, intervention rights and exploitation interests. The regulated system that wanted to extend state control loses its control to non-state players who are not democratically accountable.

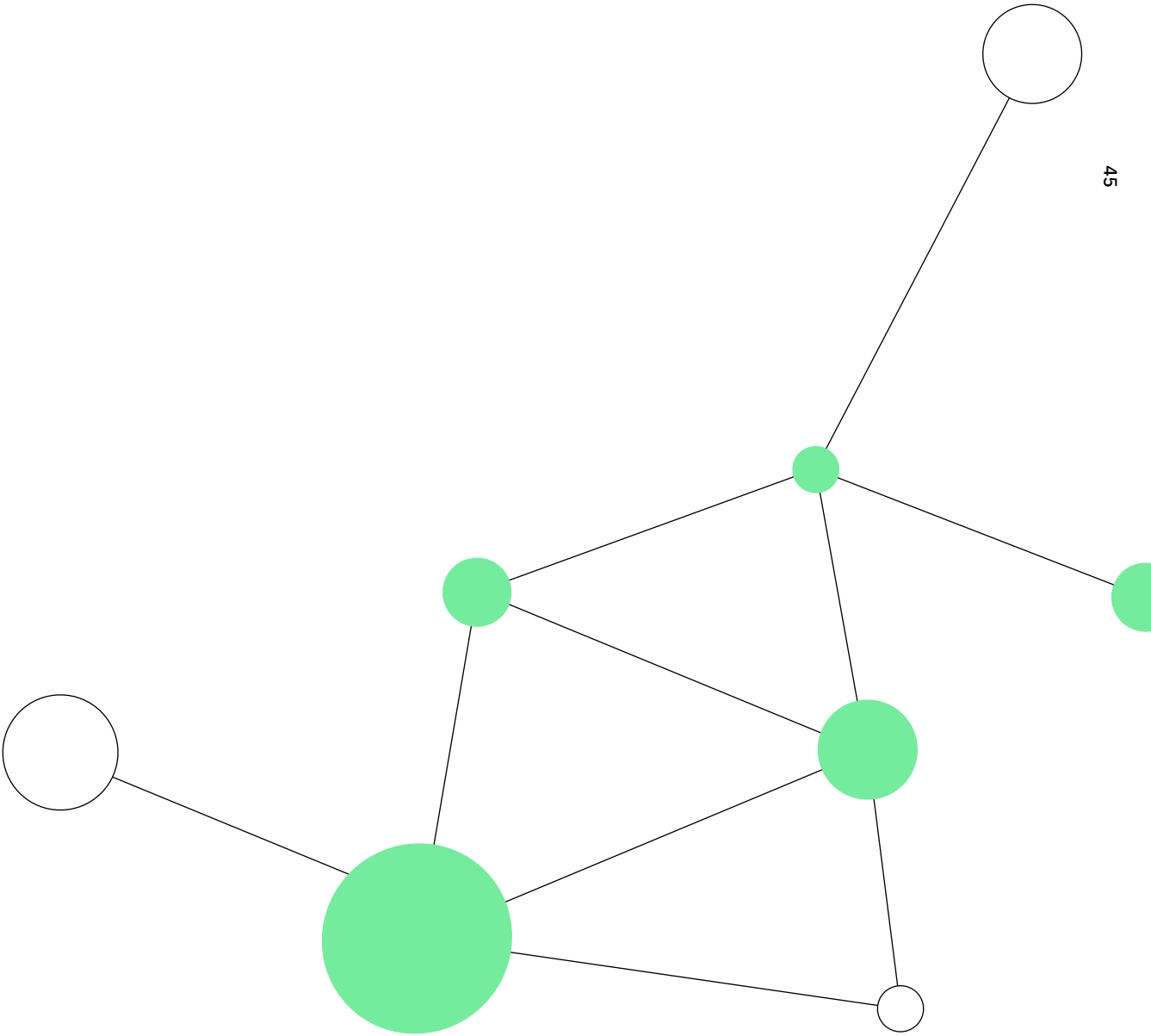
Derivation: This scenario posits regulation as a state phenomenon. The state intervenes, limits, controls. The assumption is that the state will remain the dominant external power in science. What happens when the state weakens science so much that a vacuum is created that is filled by non-state actors? This is a Black Swan because the scenario does not foresee a third actor between the state and science. It thinks in binary terms: the state regulates, science responds. The possibility that private power could replace state power in controlling science lies outside the frame of reference.

Black Swan 3.3: Scientific knowledge is legally declared a commodity

Definition: In the course of AI regulation and debates about data sovereignty a legal development is triggered in Germany and Europe that places scientific insights, methods and datasets under new property regimes. Something that is not directly intended as restricting academic freedom actually commercialises it: knowledge that was previously a common good becomes tradeable, subject to licensing and strategically exploitable. As a norm, open science collapses, not because it has been attacked but because of the unintended side effect of a regulatory framework that was built for another purpose.

Derivation: This scenario describes regulation as the control of research content; what may be investigated, what must be declared. It does not consider the property structure of knowledge as a potential subject for regulation. A form of regulation was therefore sought that the scenario would not contemplate because it hailed from a different political field, namely,

AI law and the data economy. The Black Swan arises from the collision of two uncoordinated regulatory logics that affect the same sphere and thereby destroy something that no-one intended to destroy.



4.3.5 SCENARIO 4: GEOPOLITICAL FRAGMENTATION

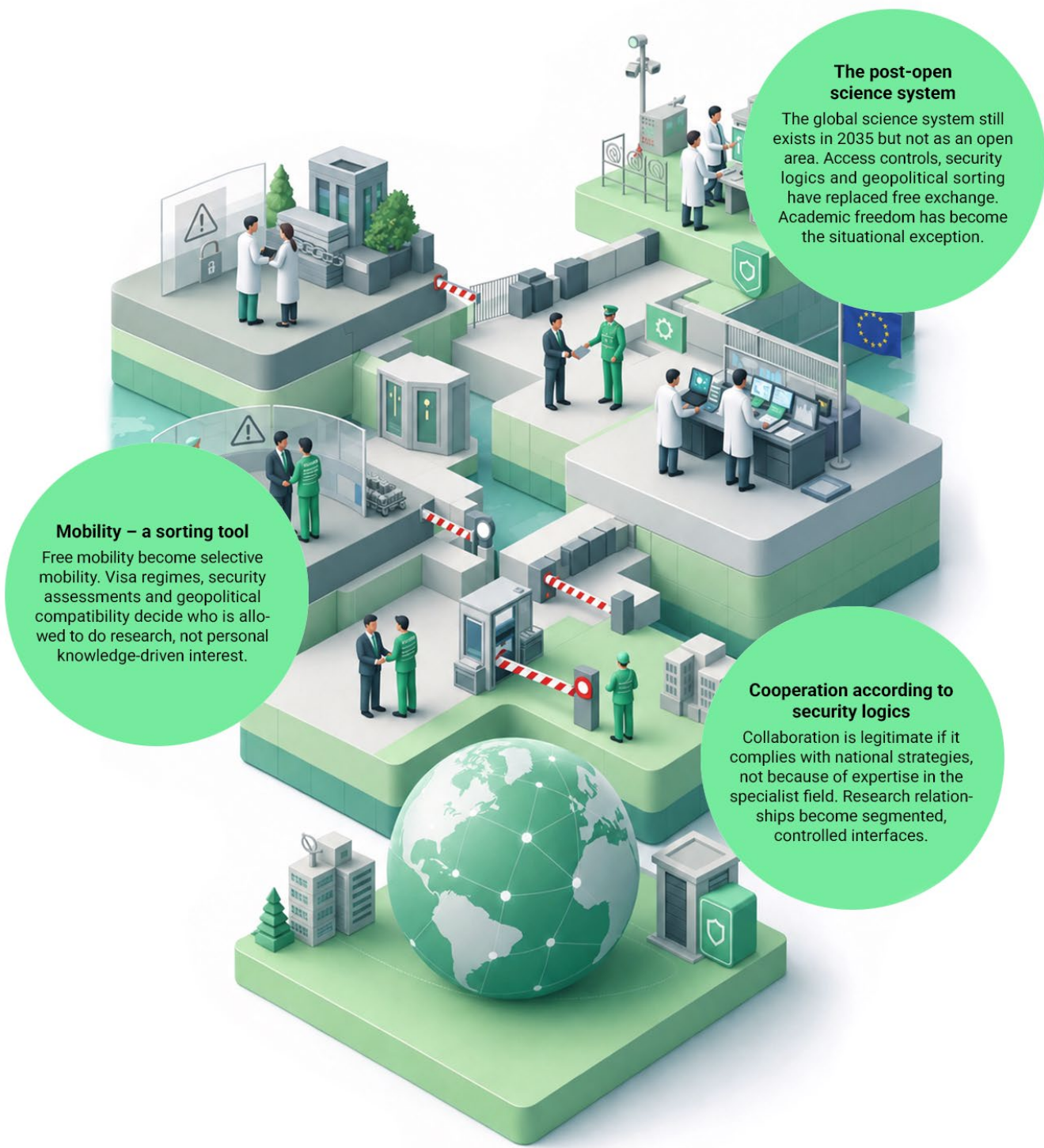


Figure 7: Scenario 4 – Geopolitical fragmentation

Science in controlled corridors: the global system in 2035

In 2035, there is still a global science system, but it no longer functions as an open area for free circulation. Instead of exchange and openness, the focus is on access controls, security logics and geopolitical sorting. Science passes along corridors that are politically defined, administratively monitored and institutionally filtered. Academic freedom in 2035 is no longer a stable fundamental condition, but a precarious, situationally negotiated exception. The Asian science cluster around China is the player with the greatest output. This concentration not only marks a quantitative shift but also a normative one: Whoever has the most shares in global science production increasingly shapes the science system’s standards, AI systems, languages and priorities.

Systemic thinning out: reduced freedom without explicit prohibitions

In many countries and institutions research fields are not explicitly prohibited but gradually hedged in. Governments, funding bodies, monitoring structures and institutional leadership are shifting the framework conditions so that the limits of what can be said, researched and collaborated on are becoming narrower. The result is not that academic freedom is being dramatically curtailed everywhere but it is being systemically eroded. Intervention is often indirect: new stipulations, loyalty expectations, language regulations, security inspections, altered funding logics, available AI systems and administrative caveats. Researchers respond by behaving with ever greater caution in order to avoid restrictions or reprisals. The resulting self-censorship narrows the corridor even more. Not officially, but unofficially. What emerges is not a unified, closed system but a fragmented science ecosystem in which the scope for freedom is unequally distributed, contingent on policy and revocable at any time.

The dynamics of this scenario are already being noted by the Humboldt Foundation (cf. survey of

departmental heads) today: AI competition between geopolitical blocs, and traditional science centres’ loss of importance as structuring forces; increasing permeation of international collaborations by security logics and their transformation into controlled interface formats; growing repression of many science systems as well as a redistribution of global application and mobility flows, particularly in favour of India and China, that can already be seen clearly today. The scenario asks what form the global science system would take if these tendencies mutually reinforced one another and no effective counter-mechanism were available.

Selective mobility – a geopolitical sorting tool

In this scenario, international mobility has lost its open character. It is still globally visible but increasingly impacted by crises, war, national restrictions, visa regimes, institutional clearance and geopolitical compatibility scrutiny. It is not primarily the researchers themselves who decide where they want to work, teach or cooperate. Their paths are determined by a labyrinth of administrative hurdles, security assessments and political considerations. Free mobility turns into selective mobility. Some groups have privileged access, others are excluded, redirected or forced to be immobile. Visits, recruitment, project participation and exchange formats depend on whether people, topics and institutions match the strategic interests of a political or institutional bloc. This development is particularly serious for researchers from countries with a structurally weak national science infrastructure, such as certain countries in Sub-Saharan Africa, which are still comparatively under-represented in the global co-authorship network and largely dependent on Europe for their scientific integration. For researchers from these regions, selective mobility does not mean they have fewer options but often excludes them from the global science system altogether. Mobility thus stops being an expression of academic openness and becomes a tool for geopolitical sorting.

Cooperation – a controlled interface

This shift changes the structure of international cooperation. In 2035, collaboration is still possible but is organised on a basis of complementing specialisation or a shared interest in gaining knowledge increasingly seldom. Rather, it is considered legitimate if it is compatible with national strategies, security priorities or regulatory stipulations. Collaborations are not terminated across the board; instead, they are segmented, pre-screened and strategically decoupled. Work packages are divided up, access rights limited, data spaces sealed off and the circle of partners scaled down. In some research fields, exchange is still relatively open, in others, the entry threshold is raised or they become exclusion zones. Scientific cooperation is thus transformed from a shared knowledge process into an arrangement of controlled interfaces. The global science system is not shut down completely, but it disintegrates into sub-spaces with varyingly porous borders.

AI infrastructure as leverage

In a fragmented world order, AI models and research infrastructure become key forms of geopolitical leverage. Countries that resist the interests of other countries with leading AI providers risk losing access to the relevant AI platforms, training data and model architectures. As modern science is increasingly built on these systems, from literature searches to data evaluation, a structural dependency develops which can be instrumentalised for political purposes. Access is subject to conditions, and scientific cooperation adheres to geopolitical rather than epistemic logics. Those who do not have access to leading language models cannot publish at the same standard and the same speed and thus drop back in terms of scientific output and quality.

Science as a security issue: the normative recoding of the system

The change is particularly far-reaching in places where science is no longer evaluated for its use, but

its risk. In 2035, international cooperation is increasingly framed as a security issue. Political interests, ideological differences and debates about sovereignty intervene directly in patterns of collaboration. Certain topics, technologies, methods or groups of people are flagged as sensitive, risky or dangerous. Scientific activities are thus translated into control categories. Research is no longer primarily a space for open knowledge production but for potential leverage for influence, dependency or threat. Framing security in this way shifts the system’s assessment criteria: the focus is no longer on the academic relevance of a partnership but rather on its political harmlessness. This drastically reduces predictability and dependability. Even long-term collaborations can topple when debates, priorities or geopolitical constellations change.

Self-censorship – a silent systemic infrastructure

This development is accompanied by a cultural change in science itself. The most momentous change is probably not an explicit prohibition but the erosion of what can be said. Researchers conform to an environment in which the selection of topics, choice of words, participation and publishing strategies are under anticipatory pressure. In 2035, self-censorship has become a silent infrastructure within the system. Projects are more carefully formulated, controversial issues avoided and findings framed more defensively. Even where scope still formally exists, mistrust, intransparency and monitoring dilute communication. This not only alters the content of science but also its methods, routines and language. The system learns to manage risk not with openness but by prevention and reducing points of attack. At the same time, anti-pluralist developments in various countries undermine science locations’ institutional autonomy.

Block formation and system fragmentation: post-open, not post-international

As a result, by 2035, the global science ecosystem is not enclosed but fragmented. It is composed of

spaces that are separate from one another, which have differing interpretations of academic freedom that are not linked to one another or only via narrow, controlled passages. National and regional blocks expand their own infrastructure, AI systems, standards and funding lines to reduce dependencies and safeguard sovereignty. China is at the forefront of driving this development: By actively integrating an Asian science cluster which closely connects South Korea, India, Japan, Singapore and Saudi Arabia, a sub-space is created that is globally formative in terms of publication volume, infrastructure and strategic direction whilst setting autonomous normative standards and increasingly producing its own governance logics. The United States and Europe, whose share of publications has dropped noticeably, observe this process from a structurally weakened position. This can lead to efficient local structures, but it weakens the quality of the overall system because the more exchange, criticism, comparison and open circulation are limited, the more science loses the density out of which progress in knowledge is typically generated. The drop in scientific output is not immediately obvious everywhere, but its breadth, depth and correction capability declines. In this scenario, the global science ecosystem is not post-international, but post-open: it remains sporadically connected without actually being free.

Wild Card 4.1: Technological breakthrough outside the controlled corridors

Definition: A pathbreaking discovery – in basic research, medicine or climate technology – is not made in the dominant Asian cluster or in Europe but in a small, previously marginalised research context which had not been monitored so closely precisely because of its outsider status. This breakthrough demonstrates publicly and irrefutably just what destroys the fragmented system: that progress in knowledge thrives on openness and unpredictability. The damage potential for the existing system lies in the fact that a wild card like this rocks the legitimacy of the control logic but does not necessarily lead to

a return because power interests are now too deeply embedded.

Derivation: This scenario describes a system that forces knowledge production into controlled corridors. The implicit assumption is that whoever controls infrastructure, controls output. An event was sought that breaks with this causality, that is, a breakthrough which shows that the acquisition of knowledge cannot be controlled. In the history of science, there are enough examples of marginality as a source of innovation: many significant discoveries derive from contexts on the periphery. The wild card imports this pattern into the scenario and asks what happens to the legitimacy of the control system when it is demonstrated publicly that control hinders innovation. The damage potential is not the breakthrough itself but its symbolic effect.

Wild Card 4.2: Global cyber-attack on scientific infrastructure

Definition: A coordinated, state supported attack on digital infrastructure at several leading research institutions paralyzes data access, publication systems and funding databases. In a system already characterised by mistrust and control logics this attack does not engender solidarity but leads to greater isolation: every bloc seals off its systems yet more. The scenario describes a system that is already post-open – this shock is followed by the threat of a transition to post-cooperative. Science as a joint project finally becomes an empty claim with no operational basis.

Derivation: This scenario describes a system that is already characterised by mistrust and fragmentation. The key question is: What event, instead of resolving this mistrust, would actually amplify it? In the context of an existing geopolitically charged system, a cyber-attack on scientific infrastructure constitutes a plausible escalation level. The crucial thing about this wild card is not the attack itself but the reaction to it: In an open system, an attack like this would lead to cooperation. In a fragmented system, it leads

to greater isolation. The wild card thus utilises the scenario’s own logic, that is, existing mistrust, as an amplifier. It escalates the scenario into its own trajectory instead of breaking it from outside.

Wild Card 4.3: Emergence of a parallel global structure of free science

Definition: In reaction to the fragmented, controlled system, a transnational network of free science communication develops outside of state and institutional structures. It is operated by researchers, foundations and civil society actors, with technical support from encrypted platforms and decentralised infrastructure. What begins as an informal counter movement acquires its own academic authority. The damage potential for the existing system is ambivalent: on the one hand, academic freedom gains a new space not controlled by the state; on the other, it divides the global knowledge system into an official and an unofficial sphere whose relationship to one another remains unpredictable and which both lose their validation authority.

Derivation: This scenario describes science under total institutional control. It thinks in state and institutional categories. The decisive question is: What counter model has the scenario not foreseen? The answer lies in civil society and technically decentralised self-organisation. This possibility is therefore a wild card because the scenario structure excludes it. Control appears to be total. Historically, however, circumventive movements always emerge when institutional restrictions are severe: Samizdat literature, open access movements, informal scientific networks. The wild card transports this pattern into the future and utilises new technical opportunities such as encryption and decentralised platforms. The ambivalence – liberation on the one hand, fragmentation of validation authority on the other – makes it a genuine wild card because its consequences are open and contradictory.

Black Swan 4.1: A single technological breakthrough makes geopolitical fragmentation irrelevant

Definition: A technology, such as a form of universal real-time translation and encrypted science communication, makes it effectively impossible for researchers around the world to be isolated from one another irrespective of political hurdles. The operational foundation for fragmentation does not collapse due to political change or diplomacy but as a result of technical facts. The scenario describes a system of control and access – a Black Swan in which control is no longer enforceable.

Derivation: This scenario posits control as technically enforceable: visa regimes, institutional clearance and data access can be politically controlled. The implicit assumption is that communication remains controllable. An event was sought that breaks this assumption, not politically but technologically. The history of internet censorship shows that control and circumvention permanently compete with one another. A Black Swan occurs when circumvention leaps ahead, making control structurally superfluous. It is a Black Swan rather than a wild card because no-one in the scenario is aware of this possibility as a category. The scenario accepts fragmentation as a state and does not consider its technological annulment.

Black Swan 4.2: Science – a peace infrastructure in a global conflict

Definition: A military or economic conflict of previously inconceivable intensity paradoxically forces a return to scientific cooperation on neutral territory. Certain fields, like climate research, pandemic prevention and fundamental physics, have to be preserved as strategically indispensable collaborative areas because the conflict itself produces problems that nobody can solve alone. Cooperation, which no diplomatic initiative could have produced, is forced into being by the destructive power generated by the fragmented system itself.

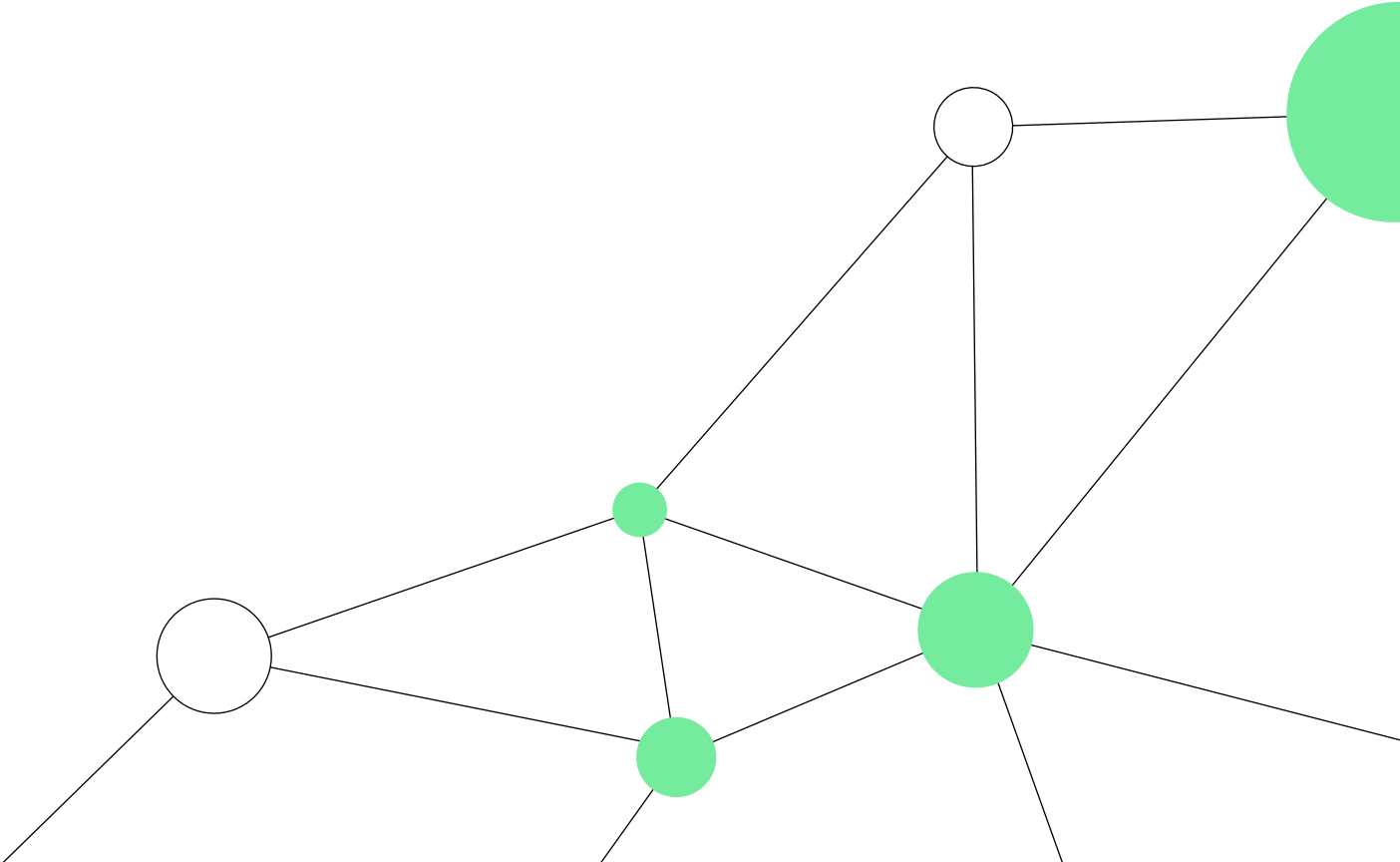
Derivation: This scenario describes a one-way street to decline: more control, more fragmentation, less openness. It has no endogenous reversal mechanism. The question posed asked whether there were historical patterns in which the degradation of the system itself produced the spark to repair it. Cooperation between the United States and the Soviet Union in certain academic fields during the Cold War is an example. This is a Black Swan because the scenario does not envisage a counterforce. It is determinedly on a decline trajectory. A Black Swan breaks this logic by forcing unforeseen cooperation from the heart of the conflict.

Black Swan 4.3: The collapse of Chinese science dominance due to internal political disruption

Definition: The Asian science cluster around China, which is described in the scenario as being the player with the greatest output and normative influence, experiences an internal political crisis, e.g., economic collapse, social agitation, a legitimisation crisis in the political system that causes deep dysfunction.

The normative influence and quantitative dominance of Chinese science break down. The geopolitical balance of the fragmented science system shifts so fast and radically that all other actors are disorientated. Neither Europe nor the United States is capable of filling the resulting vacuum because their systems are geared to a different balance.

Derivation: This scenario posits the ascendancy of the Asian science cluster and China’s dominance as a structural fact that is stable and continuing to grow. This assumption is not explicitly explained but seen as the continuation of a trend. The key question here was: What is the blind spot in this assumption? The scenario exclusively posits China as an actor outside the western system, never as a system with its own inner instability. Methodologically, this is a classic pattern that generates Black Swans: a trend is extrapolated without exploring the system that produced it. The collapse of Soviet science after 1991 is the historical precedent. No-one had predicted it because no-one thought the inner fragility of the system was real.



STRATEGIC MEASURES AND OPTIONS FOR ACTION

5.1 METHODOLOGY FOR DERIVING MEASURES

As an integral part of deriving measures, the strategic options for each scenario were systematically checked step by step. For each scenario, the following questions were discussed jointly: What opportunities arise for the organisation? What risks must be considered? And how does the relevance of the respective measure change depending on the specific future?

This structured process ensures that each measure is always considered from several perspectives. The project team contributed diverse perspectives and experience. By assessing the measures together, a

nuanced picture emerged: which measures would be robust across the various scenarios, which would only gain significance under specific conditions and where there was a need for immediate action.

The result is a jointly prepared portfolio of options for action, combined with a shared understanding of the conditions under which the measures should be prioritised.

5.2 OVERVIEW OF MEASURES

Category	S1: Values – a competitive advantage	S2: Joint international responsibility	S3: Regulated science	S4: Geopolitical fragmentation
Main challenges facing the Humboldt Foundation	Make strategic use of competitive advantage	Conduct a global dialogue on values	Defend its independence from political interference	Address different types of crisis differently
Major tool	Value-based talent recruitment and safeguarding programmes	Science diplomacy and global discussion space	Intensify arm’s-length status and alliance formation	Foresight, differentiated programmes, regional expertise

Category	S1: Values – a competitive advantage	S2: Joint international responsibility	S3: Regulated science	S4: Geopolitical fragmentation
Key principle	Reliability as a competitive advantage	Open dialogue on values, no “value colonialism”	Resilience as an organisational principle	Differentiation instead of one size fits all
Financing	Co-financing for scaling programmes	EU-/foundation funding for global reach	Diversification as a guarantor of independence	Crisis fund and international co-financing
Communication	Reputation management and branding	Contribution to multi-lingual global discourse	Visibility as a safeguarding tool	Differentiated communication architecture
Transfer to society	Impact framework and public narratives	Public engagement to reinforce resilience	Legitimacy resource against pressure to justify itself	Democratic information on fragmentation
Transfer to the political sphere	Expand public policy engagement, national and European	Continue developing EU science diplomacy and policy interface	Intensify expansion of parliamentary anchoring and lobbying	Intensify expansion of systematic policy consultancy in times of crisis
Important fields of action	Use pull factor; AF as public policy; belonging	Experience/discussion spaces; make network productive	Governance; dialogue with funders; organisational mindset	Foresight, differentiated (safeguarding) programmes, regional expertise
Strategic mode	Positioning and expansion	Active participation and bridge-building	Defence and coherency	Navigation and adaptation

5.3 MEASURES FOR EACH SCENARIO

5.3.1 SCENARIO 1: VALUES – A COMPETITIVE ADVANTAGE

Initial strategic situation

In a world in which many systems are increasingly shaped by measurability, security logics and political control, a strategic imbalance develops: Germany becomes a reliable haven for international researchers not only looking for excellent conditions but for guaranteed civil rights. For the Humboldt Foundation, this is the scenario with the greatest agenda-setting power: it can translate liberal values and legally-protected academic freedom from a normative ideal into a communicable, measurable and internationally visible locational advantage.

1. GUIDING PRINCIPLES

- **Academic freedom – a guiding principle and operational criterion:** Academic freedom should not be declaratory but must continue to be a quality criterion, anchored in funding decisions, collaborative standards and institutional procedures. Reliability is engendered by action – not by avowals. This is the only way a reputational basis can be built that acts as a driver of appeal in the scenario. In concrete terms, this requires discussion within the Foundation on how application procedures and funding decisions can be safeguarded with regard to excellence and freedom of action against improper external intervention and how the Humboldt Foundation should present this position and its operationalisation to the outside world. Areas of tension – such as those pertaining to thematically focused funding lines – demand conscious institutional positioning that neither lead to arbitrariness nor to political agenda setting.
- **Excellence, freedom, impact – a triangular synergy model:** This triangle should not be communicated and crafted as a balance between

competing claims but as a system that mutually reinforces itself. It has been empirically proven that institutional autonomy drives scientific productivity rather than slowing it down (Aghion et al., 2010). Excellence is engendered by freedom – this connection is already one of the Humboldt Foundation’s core arguments. For 2035, refining this argument lies in transferring it from the sphere of conviction into the sphere of evidence and operationalisation: firstly, by systematic, empirical proof of the connection based on its own sponsorship data (bibliometric impact analyses, career paths, networking effects); secondly, by adding the impact dimension: not merely “freedom enables excellence” but “freedom enables excellence that makes an impact on society” – a triad that resonates more effectively with policymakers and the general public than the previous two-part relationship; thirdly, by using contrasting examples: in a world in which other systems try to enforce excellence by control and thereby reach their limits, the Humboldt Foundation model is not only normative but also convincing by comparison.

- **Diversity – an epistemic and social resource:** Diversity is not merely a social requirement but a scientifically productive force: heterogeneous research groups are demonstrably more robust at solving problems and achieve more broadly-based insights (Page, 2007). With its selection and sponsorship principles, and the “Diversity for Excellence” agenda, the Humboldt Foundation has already developed a policy that addresses this connection in its programmes. Thus, in the context of Scenario 1, the main point is not to develop a fundamentally new measure but to continue developing this existing line and focusing it more sharply – especially in conjunction with the approach of individual sponsorship and showcasing diversity as an excellence factor externally.
- **Continuity in quality assurance:** Integrity, methodological care and ethical reflection are the

foundations on which the normative credibility of the German science system is based. In an environment in which, elsewhere, science is instrumentalised politically (Efimov et al., 2024), Germany’s continuous fostering of academic virtues ensures the location a visible mark of quality. For the Humboldt Foundation, this means no new measures but the continuation and showcasing of an existing strength.

- **Reliability – accumulated institutional capital:** The Humboldt Foundation needs to maintain its fundamental principles across funding phases, changes of government and institutional transformation. Only then can the social-experiential space emerge that the scenario describes as a crucial mobility driver. Reliability does not just refer to continuity on the process level – that is, consistent quality in procedures and sponsorship – but expressly on the value level, too: the Humboldt Foundation as a reliable partner with shared values that upholds its principles even when the political climate changes. The field of tension between organisational continuity and value-based reliability under altered circumstances calls for conscious institutional reflection.
- **Belonging – a productive resource:** Researchers do not just come for the research conditions – they come because of value orientation and safety, even in places shaped by AI. Studies show that a sense of belonging correlates significantly with productivity and institutional ties (Walton & Cohen, 2011). Belonging is thus not a soft factor but a measurable locational advantage. Up to now, belonging at the Humboldt Foundation has primarily been achieved via academic excellence; the network bonds through quality. In Scenario 1, the question arises as to whether and how a greater sense of belonging can be achieved through shared values: the network not just as a community of excellence but as a community of values that generates identification beyond proof of academic achievement. At the same time, this

reinforces the distinction from a logic focused solely on securing skilled human resources; it requires an internal discussion about the values – apart from excellence and academic freedom – that should be communicated to promote identification and showcased in the network.

- **Public visibility – a precondition for impact:** A competitive advantage, which is not communicated, is strategically ineffective. The Humboldt Foundation does not see public outreach as a downstream activity but as an integral part of its positioning strategy. The international research community, political decision makers and the public at large must know and understand Germany’s value profile as a science location if it is to exert its appeal.

2. FIELDS OF ACTION

Strategically align funding instruments to the pull factor “academic freedom”

The analysis of countries in the Foresight Report identifies regions in which academic freedom is coming under pressure (United States post-2025, Brazil, increasingly India). The Humboldt Foundation could create targeted sponsorship opportunities for these countries and/or especially threatened disciplines in these countries or focus more on communicating its existing programmes. This would not infringe on its openness to all countries – it is not a question of creating programmes exclusively for certain countries but of specifically showcasing existing opportunities and, potentially, introducing complementary programme lines for disciplines under particular pressure. Another point which the Foundation should discuss internally is whether, as a funding principle, academic freedom should not only cover the safeguarding of individuals but also of entire disciplines – that is, targeted sponsorship for research fields that are systematically suppressed in certain systems.

This would be a directional decision that would have to be discussed within the institution.

Structurally expand support for sponsorship-recipients and hosts

Building on experience gained in the programmes and to foster mutual learning, a tiered support format is developed that places a special focus on insights acquired from fellowships for researchers at risk. This includes, for example, legal guidance, information on escalation paths, psychosocial assistance and emergency contacts. The alumni programmes are expanded to ensure that researchers remain affiliated to their German institutions even after returning home. Hosts are provided with guidelines on how to treat researchers in safeguarding situations as well as training in good scientific practice and institutional safeguarding responsibilities. Regular, anonymised surveys on sponsorship-recipients’ and alumni’s experience of freedom, belonging and safety serve as a steering instrument and a reputational building block that can be communicated. In addition, emergency fellowship opportunities for researchers under acute threat are developed – with speedy decision-making paths in line with the Scholars at Risk Emergency Fellowship (Kinzelbach et al., 2023). Co-financing models with host universities make this tool scalable.

Make academic freedom public policy both nationally and in Europe

At EU level, ERA, Horizon Europe and the negotiations on successor programmes offer concrete anchoring points for embedding value orientation and academic freedom as funding and cooperation criteria. The Humboldt Foundation is actively involved in consultations and in developing agreed position papers in coordination with other European funding organisations. At national level, standards for institutional safeguarding protocols and escalation paths at German universities are developed in cooperation with HRK,

DFG and the science ministries – the operational infrastructure described in Scenario 1 for 2035. In this context, the Humboldt Foundation proactively contributes to parliamentary consultations, committee work and consultation processes – not only on invitation but also with its own evidence-based position papers. The aim is to establish the Humboldt Foundation as a reliable source of knowledge on science policy, mobility and academic freedom for political decision makers.

Institutionally anchor belonging and integration

Targeted training and support formats for funding cohorts take account of the fact that belonging, safety and recognition are experienced differently – by researchers from the Global South, by women, by members of persecuted minorities (cf. Blell et al., 2022). Belonging is institutionalised in funding programmes as a distinct dimension of quality and regularly measured. Through alumni mentoring programmes, former fellows’ experience can be shared and support provided in the socialisation of new cohorts. The network is addressed as a community of values that goes beyond academic excellence to drive identification – belonging evolves as a result of shared principles, not shared expertise. The external impact of this belonging approach is deliberately enhanced.

Strategic communication and reputation management

In Scenario 1, the visibility of the German value proposition is a crucial mechanism of action. The Humboldt Foundation develops a data-based communication strategy which empirically showcases the connection between academic freedom and academic excellence and is tailored to diverse target groups: international researchers (decision-making basis for mobility), political decision makers (legitimation of public investment in academic freedom), the general public (understanding of the societal value of free research) and the media (narratives that

resonate). Alumni’s reports on their experiences are systematically collated and communicated internationally as authentic reputation signals – via social media, podcasts, short films and targeted media collaboration. In this way, the Humboldt Foundation positions itself as the public voice of the value of academic freedom. The precondition for this is to build internal communication capacity that goes beyond traditional public relations activities and embraces storytelling, data visualisation and international media management. This communication strategy takes explicit account of the altered geography of global knowledge: in view of the massive increase in scientific production in Asia and the growing importance of Asian research networks, the Humboldt Foundation specifically directs its communication at researchers in these burgeoning science regions – not in terms of competition logics but as the offer of a complementary locational profile that combines freedom, safety and openness.

Communicate digital security and trustworthy AI infrastructure as a feature of the value proposition

The scenario posits Germany’s appeal as partly deriving from the combination of normative credibility and digital security. The Humboldt Foundation addresses this by making the AI governance standards under which research is funded transparent in its programmes and by integrating access to trustworthy, European-regulated AI systems in its international communication as a locational advantage. Sponsorship-recipients are given guidance on secure digital research infrastructures in Germany – this becomes a stand-alone aspect of the pull factor.

Transfer of knowledge to society and the political arena

Germany’s positioning as a values-based science location, described in Scenario 1, requires active communication on the societal relevance of free science outside of the academic community. The Humboldt Foundation develops knowledge transfer formats that make research results accessible for

social debate – such as public lecture series, policy briefs, dialogue formats with citizens and targeted cooperation with science journalists. Moreover, a framework for measuring impact is developed that helps to communicate the benefits to society of Humboldt Foundation sponsorship – beyond academic metrics – including communications on democratic resilience, innovation capability and international understanding.

Broaden the financial basis for programme scaling

Growing international demand for Germany’s value portfolio demands greater financial scope for action. Co-financing models with European funding organisations and private foundations, alumni-based endowment funds and strategic partnerships make it possible to develop new programme formats and adapt the Humboldt Foundation’s capacity to the location’s growing appeal – without being dependent on increases in the federal budget or threatened by cuts. In Scenario 1, diversification does not primarily serve to defend against restrictions but to facilitate reach and programmatic innovation.

3. STRATEGIC LEVERS

- **Excellence–freedom–impact interface:** The connection between academic freedom and academic excellence is already one of the Humboldt Foundation’s core arguments – the strategic task is to underpin it empirically in order to extend the impact dimension and communicate comparatively and convincingly. Specifically: The Foundation’s own sponsorship data – bibliometric impact analyses, career paths, networking effects – are systematically evaluated so that the triad “freedom enables excellence that makes an impact on society” is supported by data. In addition, the contrast to systems that try to enforce excellence by control and thereby reach their limits is utilised – the Humboldt Foundation model thus not only becomes normative but convincing by comparison. This evidence-based

narration is tailored to specific target groups: international researchers as a basis for decision making, political decision makers as legitimisation of public investment, for the general public as a comprehensible impact narrative. By 2035, the aim is to transform the Humboldt Foundation’s existing argument from an institutional conviction to an effective, empirically robust unique selling point that can be communicated.

- **Position the Humboldt Foundation as the global reference institution for values-based promotion of research:** The Humboldt Foundation boasts a unique basis of legitimacy: more than 30,000 alumni worldwide, 63 Nobel Prize winners, seven decades of consistent funding practice. This symbolic capital is actively utilised to position the Humboldt Foundation as a model for values-based, excellence-orientated sponsorship – nationally, Europe wide and globally.
- **Activate the alumni network as a strategic multiplier:** Today already, Humboldtians are exceptionally credible multipliers, and the Humboldt Foundation uses its network for its communication. This should be refined by 2035 through three further developments: Firstly, the network evolves from a communication channel to an active, creative player – alumni are not only approached as ambassadors but are involved as co-creators of the Foundation’s positioning, for example, through alumni-led initiatives on topics like academic freedom in their own countries, through systematic inclusion in policy processes and through autonomous regional advocacy formats. Secondly, the network is used as a structured knowledge system: alumni in key positions around the world not only deliver reports on their experience but also strategically useable situational assessments – the network becomes an early-warning and advisory tool. Thirdly, reciprocity is reinforced: the Humboldt Foundation offers alumni not just a platform for visibility but concrete feedback formats – opportunities for protection in case of risk, reintegration when

careers are interrupted, thematic networks for long-term collaboration. This creates a network that not only multiplies reputation but also functions as an operational infrastructure for academic freedom.

- **Build networks of safeguarding and trust:** substantial expansion of participation in and partnerships with Scholars at Risk, CARA and ISC – operationally, financially and in communications; alliance of European funding organisations for joint positioning and co-financed safeguarding programmes. The Humboldt Foundation sees itself as a hub in a global network of safeguarding and trust.
- **Enhance science diplomacy as an institutional profile:** Academic freedom is integrated into bilateral academic dialogues and government consultations as a diplomatic topic. Humboldtians in leadership positions act as informal science diplomats.
- **Institutionalise transfer to political arena:** Regular briefing of government committees (research, foreign affairs) and systematic contributions to Federal Government reports on international science policy.
- **Recognise communication as a strategic tool:** Continued reinforcement of the Humboldt Foundation’s incisive, stand-alone branding identity in the international academic area – visible, recognisable and consistent on all channels.
- **AI governance – a reputational building block:** In this scenario, Germany positions itself by combining excellence with digital security. The Humboldt Foundation supports this positioning by being actively involved in developing standards for the responsible use of AI in science. Credible handling of AI is communicated as a stand-alone competitive advantage of the German science system.

5.3.2 SCENARIO 2: JOINT INTERNATIONAL RESPONSIBILITY

Initial strategic situation

In Scenario 2, the global science system has recognised that resilience can only be generated by shared values and structures. Here, the Humboldt Foundation does not advocate its own special national way but is a co-author of a transnational area of freedom. The primary challenge is not to ward off restrictions but to help construct global resilience – whilst maintaining sensitivity for the diversity of cultural and epistemic traditions. The leitmotiv is: offer, value orientation, don’t enforce it; make networks productive; actively shape science diplomacy, don’t just observe it.

1. GUIDING PRINCIPLES

- **Open dialogue on values instead of normative stipulation:** In a globalised science system with differing epistemic and cultural traditions, the Humboldt Foundation is not a normative exporter of western ideas about value. It creates space for conversations about values without imposing them. The dialogue itself is the medium by which resilience is reinforced – not the result. This objective is already one of the Humboldt Foundation’s guiding principles. In Scenario 2, the aim is to implement it more effectively and embed it more firmly within the institution.
- **Not values-based colonialism:** Value orientation is offered, not imposed. As an intermediary organisation, the Humboldt Foundation stands for certain basic values – academic freedom, integrity, pluralism – which it does not translate into conditions but into an invitation to reflect on them together. The authenticity of this attitude is a prerequisite for global partnership (Ruffini, 2017). But the precondition for this is that the Humboldt Foundation itself is able to openly discuss these values internally: What do academic freedom

and excellence in the Foundation’s operations actually mean? How does it want to interpret the existing legal framework in the future? These points must be so clear that everyone in the organisation can explain them – internally and to the academic community. Only on this basis can it be demonstrated credibly that values are developed through dialogue and not defined in advance. In this endeavour, the Humboldt Foundation consciously places itself in a field of tension: to preserve spaces for freedom that do not exist in other systems whilst remaining open to the question of how these spaces are shaped in other cultural contexts.

- **Diversity – the foundation for resilience:** Different thought traditions are not a threat to the coherence of the global research area, but a strength. Epistemic diversity enhances the ability to learn collectively as well as resilience to systemic crises (Page, 2007). In its programmes, the Humboldt Foundation puts this conviction into practice. Scenario 2 expands the Humboldt Foundation’s existing conversation on diversity: It is not only communicated and practised as the basis for excellence but also for resilience – whereby resilience is not understood as defensive stabilisation, but as the dynamic capability of academic systems to continuously evolve, learn and productively address complex global challenges, enabled by epistemic diversity. This expansion corresponds to the specific demands of globally shared responsibility for academic freedom.
- **Critical thinking – a core competence:** What the Humboldt Foundation promotes through its programmes is not conformity but the ability to grapple with values and academic norms in a reflective, differentiated and open manner. In its best form, critical thinking is a resilience resource – for individuals and for systems.
- **Belonging and self-definition – a resilience-strengthening resource:** In a world in which

international mobility is normatively charged and researchers increasingly choose their locations in accordance with value and identity issues (Liu et al., 2025; Gao, 2024), a sense of belonging and the opportunity to define oneself become key factors in academic performance and bonding.

- **Public discourse – a resilience practice:** In a scenario in which academic freedom is understood as a globally protected good, public outreach is not just organisational communication but a contribution to the global conversation. The Humboldt Foundation sees its communication activities as actively helping shape the public discussion spaces in which values are negotiated, defended and developed.

2. FIELDS OF ACTION

Consciously design experiential spaces for value development processes

In Scenario 2, research stays in Germany are not just a career step but normatively shaped learning experiences. The Humboldt Foundation develops flanking programmes that enable self-reflection on values in science: discussion rounds, peer exchange, mentoring formats that embed conversations on values – but does not impose them. Value development not only takes place during the stay but precisely after it, too – on the return, in long-term networking activities, in the confrontation with other systems. This field of action thus explicitly includes the post-fellowship phase. After the stay, targeted return bridges are built: alumni are supported in transferring their experiences to their institutions at home, thus helping to consolidate the transnational area of freedom. A long-term commitment to shared fundamental principles also necessitates a discussion about binding frameworks for network activities – comparable to “rules of engagement” that apply to the entire network and provide guidance without being repressive. This discussion touches on the question of how

the Humboldt Foundation deals with members of the network who actively thwart shared values – a field of tension between belonging and limitation that must be openly addressed institutionally and not only processed in the context of a response. For this, an internal Foundation discussion about existing values (excellence, academic freedom) and their concrete meaning for every single person’s actions in the organisation is a necessary prerequisite.

Establish discussion spaces for the global conversation on values

The Humboldt Foundation’s network of over 30,000 Humboldtians worldwide offers extraordinary potential for a global conversation on academic freedom, integrity and academic culture. This potential is exploited by thematic networking events, regular global symposia and digital debating platforms. A conscious effort is made to include researchers from the Global South and from non-western academic traditions – resilience evolves from polyphony, not conformity. Special emphasis is placed on building dedicated bridges to the growing Asian knowledge regions: The scenario posits that, alongside the transatlantic hub, an Asian cluster – with China, India, South Korea, Japan, Singapore and Saudi Arabia – is gaining considerable traction. The Humboldt Foundation develops discussion and cooperation formats specially to involve researchers from these regions in order to anchor resilience globally and not just in the West. This requires investment in linguistic, cultural and institutional access going beyond existing European-North American networking structures. Academic freedom is anchored in the network as a permanent topic of debate, not as a one-off programme topic.

Make the network productive as an active resource space

The alumni network is not merely fostered but actively mobilised: as a seismograph for worldwide developments in academic freedom, as the scaffold of a transnational area of trust and as the mediating authority between different traditions of

thought. Targeted partnerships between like-minded individuals and those with different – though not incompatible – values are fostered, with the aim of facilitating a productive dialogue based on mutual learning. Institutional sponsorship – German universities as an anchor for international partners in crisis situations – is systematically developed. Particular attention is paid to researchers in regions that are poorly connected, especially Sub-Saharan Africa. The scenario identifies this region as still being comparatively poorly integrated in the global knowledge network – for researchers from there, international mobility is often the only structurally secure access to free, resource-strong science. The Humboldt Foundation develops tailored networking and sponsorship formats to address this structural asymmetry: mentoring programmes with alumni in the region, institutional partnerships with African universities and targeted inclusion of Sub-Saharan researchers in the network’s value discussion on an equal footing.

Actively shape science diplomacy

The Humboldt Foundation takes on an active role in shaping international science diplomacy formats – such as the EU Science Diplomacy Alliance; in Scenario 2, science diplomacy is a foundational practice in the global system. The Foundation positions itself as an institutional driver, not an observer, not restricting its engagement to EU level but embracing bilateral scientific dialogue, multilateral forums and informal diplomatic channels. At European level, it actively helps shape the legal consolidation of protecting academic freedom: limiting intervention in research and teaching more precisely and making institutional resistance more effective. Academic freedom is not only morally anchored but operationally more manageable. In this context, thought must be given to the field of tension between the Humboldt Foundation’s arms-length status and its role in science diplomacy: a diplomat is posted by the state; in the Humboldt tradition, a researcher acts independently of the organisation. This distinction is not a weakness but a

sign of quality – but it must be explicitly communicated and safeguarded in its programmes.

Critically reflect on and re-frame role as intermediary organisation

The Humboldt Foundation operates at the interface of science, diplomacy and international politics. This intermediary role is not taken for granted but seen as a task requiring reflection. Whose interests benefit structurally from which programmes? Whose voices remain under-represented? The balance between value-orientation and genuine openness must be embedded in the institution and regularly scrutinised. In the context of Scenario 2, the Humboldt Foundation’s existing conversation on diversity is expanded: In addition to “diversity for excellence,” “diversity for resilience” becomes an autonomous programme line – the insight being that diverse perspectives not only produce better research but also more resilient systems.

Public outreach – a contribution to the global discussion on values

The Humboldt Foundation develops multilingual communication formats that build platforms for members of the network to engage in international conversations on values: podcast series with alumni from different science cultures, visual storytelling projects about the experience of freedom and lack of freedom in research, open-access publications on academic freedom as part of the Humboldt Foundation’s own knowledge production. Communication is not only directed at the academic community but intentionally at an informed public, the media and political decision makers worldwide, as well. In Scenario 2, the Humboldt Foundation sees itself as a public voice in a global conversation – not as a silent funding institution. Sponsorship recipients are encouraged and empowered to communicate their research openly. Public engagement is integrated as an autonomous dimension of quality in designing and evaluating programmes.

Knowledge transfer to society and political processes

The science diplomacy described in Scenario 2 can only be effective if it actively feeds into political processes. The Humboldt Foundation develops a systematic policy interface: regular contributions to EU consultations (ERA, Horizon Europe successor, EU Science Diplomacy Alliance), involvement in OECD reviews of academic freedom and an active role in UNESCO processes. At national level, parliamentary networks are fostered – not by lobbying in the narrow sense but by providing expertise and experiential knowledge that decision makers need for informed decisions. Transfer to society takes the form of public events at which alumni and sponsorship recipients present their research in a way people can understand and contribute to the public debate – in this way, academic freedom becomes less abstract and can be experienced by means of concrete research stories.

Secure financial basis for global engagement

The Humboldt Foundation’s ambitious role in helping to shape a transnational area of freedom requires a financial basis that goes beyond national budgetary cycles. The UCL Policy Lab Report explicitly recommends independent organisations with long-term commitments to extend multi-year funding agreements: “Multi-year funding arrangements [...] confer greater stability” (Pagel & McKee, 2025, p. 6). The Humboldt Foundation endeavours to make such agreements with the Federal Foreign Office (AA) and Federal Ministry of Research, Technology and Space (BMFTR). It also systematically taps into European co-financing models: Horizon Europe, ERA funding, ERC partnerships and EU structural funds are a starting point for science diplomacy. Private foundations with a global focus (e.g., Volkswagen Foundation, Mercator, Open Society Foundations) are also enlisted as co-funders of discussion formats, programmes and networking activities. In Scenario 2, diversification serves to facilitate reach and

agenda-setting power – it expands the institutional basis for reinforcing global resilience.

3. STRATEGIC LEVERS

- **Position the network as a global area for discussion:** The main strategic proposal in Scenario 2 is to transform the Humboldt Foundation’s network from an individual careers network into an active global discussion space for academic freedom and resilience. The operational consequences are investment in digital infrastructure, moderation capabilities and thematic networking formats.
- **Sustainably strengthen self-definition and belonging:** Programmes are designed not only to transfer knowledge but also to enable normative self-positioning. Alumni, who identify with the Humboldt Foundation’s fundamental values, become long-term pillars of the transnational area of freedom – multiplying agents of resilience.
- **Communicate diversity as a foundation for resilience based on evidence:** The Humboldt Foundation can plausibly argue that diversity does not equate to arbitrariness but epistemic strength – because its network embodies this proposition. This message is systematically utilised in policy papers, science communication and conversations with decision makers.
- **Embed academic freedom in the discourse as a shared, international, legally-protected good:** Involvement in UNESCO, ISC, LERU, IAU as a voice for academic freedom as a common good – not from a national German perspective but as a globally shared conviction that the Humboldt Foundation can credibly represent on the strength of its network.
- **Actively shape EU science diplomacy:** The Humboldt Foundation develops concrete ideas on a regulatory framework for transnational

safeguarding structures and standards of institutional cooperation – as an organisation driving European science diplomacy that cements academic freedom as a fundamental principle.

- **Build EU policy expertise:** dedicated capacity for systematically supporting European legislation and governance processes relating to academic freedom. The Humboldt Foundation becomes the recognised partner in consultations with European institutions.
- **Financial partnerships – an outcomes-based tool:** Co-financing models are not only sought for financial reasons but also for strategic ones – they create alliances and expand the institutional basis for reinforcing global resilience.
- **Build strategic bridges to the Asian science cluster:** The Humboldt Foundation recognises the structural shift in global knowledge production and actively develops collaborative formats with institutions and researchers in China, India, South Korea, Japan and other Asian partners. The aim is not only to consolidate the transnational area of freedom in the existing western axes but to enable regions with different governance traditions to experience resilience operationally – through joint programmes, open discussion spaces and partnerships based on trust.

5.3.3 SCENARIO 3: REGULATED SCIENCE

Initial strategic situation

In Scenario 3, Germany itself comes under regulatory pressure: academic freedom still formally exists but is administratively consolidated, politically framed and gradually being restricted on a day-to-day basis. Self-censorship is not imposed by overt prohibitions but by anticipated pressure and altered conditions for acceptance (Välvirronen & Saikkonen, 2021). For the Humboldt Foundation this is a

challenging, existential scenario: It must defend its independence from the political system that finances it, maintain spaces in an increasingly narrowing environment and still remain capable of acting. The key question is: How does a publicly funded intermediary organisation behave when the system around it is becoming less liberal? And the leitmotif is: defend arm’s-length, keep space open, join coalitions, diversify financial sources and leverage social embeddedness as a protective factor.

1. GUIDING PRINCIPLES

- **Consciously construe and legally secure arm’s-length principle:** The Humboldt Foundation is a non-profit foundation with considerable institutional autonomy – even though it is publicly funded. The arm’s-length principle guarantees operational independence from direct political control. In Scenario 3, this independence must be construed actively and in a way that is legally robust and visible. It is not a privilege, but a mission in the public interest (Casson, 2019). The UCL Policy Lab Report (Pagel & McKee, 2025) empirically demonstrates that 71 percent of the British public are in favour of arm’s-length bodies (ALBs) that are independent of government – a finding that suggests that in Germany, too, social support for institutional independence is a resource which can be mobilised.
- **Actively defend institutional independence from regulatory consolidation:** Regulatory pressure mounts insidiously. The Humboldt Foundation must not wait until restrictions become manifest before responding but must proactively draw boundaries – towards funders, by tapping independent financial sources, in internal processes and in public outreach. The defence of free spaces is an active institutional achievement, not a given, and it differs from the arm’s-length principle in its trajectory: Whilst the first guiding principle describes legal and structural safeguarding, this one addresses the operational

practice of proactively drawing boundaries in the face of concrete attempts to impose restrictions.

- **Resilience – an organisational principle:**
Organisational resilience means being structured in a way that makes it possible to continue operating under changed conditions – not despite change, but due to anticipatory preparation (Rohrbeck & Gemünden, 2011). This includes the ability to absorb pressure without compromising one’s own values.
- **Consciously setting openness and delight in experimentation against structural constrictions:**
Structural narrowing – the gradual narrowing of academic space by compliance, risk avoidance and administrative pressure – is the major systemic danger in Scenario 3. The Humboldt Foundation actively counters it: space for experimentation, unexpected questions and creative programme design become institutionalised, protected by governance and financing.
- **Reliability through international partnerships:**
Stable relationships with international partners who share similar values create a structural counterbalance to national restrictions. In Scenario 3, international norms and networks are not just cooperative resources but institutional safeguards.
- **Social visibility – an institutional safeguard:**
An organisation that is known, esteemed and understood by the public is harder to marginalise politically than one that works quietly. Public outreach in Scenario 3 is not an add-on but a safeguarding tool (Pagel & McKee, 2025).

2. FIELDS OF ACTION

Refine Humboldt Foundation’s governance and legal positioning

The legal implications of arm’s-length status have been legally analysed and robustly enshrined in official documents – statutes, mission, internal policies. In the event of conflict, it must be possible to legally defend the institutional principle of academic freedom. Internal governance structures are reinforced as protection against political pressure: clear responsibilities, defined escalation paths, transparent decision-making processes. A systematic analysis of the Foundation’s own sponsorship programmes to determine which spaces are endangered by regulatory consolidation is the basis for targeted safeguarding measures.

Robust exchange with funders and active lobbying

In regular exchange formats with the AA and BMFTR, the Humboldt Foundation addresses the risks of regulatory consolidation for the Foundation’s ability to function – not defensively, but as evidence-based expertise. Researchers and hosts are included in these conversations as credible voices: it is not only representatives of the organisation who speak but those affected themselves. Lobbying is still understood as a strategic tool and specifically expanded to continue developing in the same vein – position papers, parliamentary contacts, cooperation with science policy actors and participation in legislative procedures. The Humboldt Foundation views it as part of its mission to influence the general conditions under which it works. In Scenario 3, the transfer to the political arena continues to be systematised and expanded: Regular briefings for the Committee on Research, Technology, Space and Technology Assessment, targeted contact with the spokespeople for science policy, preparation of policy briefs on concrete regulatory proposals that affect academic freedom as well as active involvement in hearings and consultations are resolutely continued, consolidated and expanded. In keeping with the recom-

mendation in the UCL report (Pagel & McKee, 2025, Recommendation 7) that political leadership should publicly acknowledge the importance of independent institutions, the Humboldt Foundation actively works to establish a situation in which academic freedom is communicated as a value – and not an obstacle – in the political debate.

Financial diversification to guarantee independence

In Scenario 3, diversifying the financial basis changes from being a strategic option to an existential necessity. When national regulatory pressure increases, the Humboldt Foundation’s dependence on a single state funder is its greatest structural vulnerability. The example of British arm’s-length bodies in the UCL Policy Lab Report shows that organisations which exclusively have grant-in-aid financing are particularly vulnerable to political volatility: “Where funds are provided primarily by a sponsoring Government department, particularly as annually agreed budgets, ALBs are exposed to short-term political leverage. This makes long-term planning fragile” (Pagel & McKee, 2025, p. 6). The Humboldt Foundation therefore proactively develops alternative financing models: European funding (EU Framework Programmes, ERC Partnerships); funds from private foundations (national and international) and fundraising structures (endowment funds). The objective is not to achieve complete independence from public funding – this is still essential both in terms of legitimacy and financing – but to create complementary funding sources that preserve spaces for programmes when the political pressure on the main funder grows. Acquiring alternative sources of funding takes years – diversification must therefore begin immediately, not just when the pressure manifests itself.

Organisational development and a resilient mindset

A resilient organisational mindset is developed at all levels of the Humboldt Foundation: How does the institute cope with growing pressure to comply? How does it protect the strength of its staff’s values and

their delight in experimentation? How does it prevent administrative consolidation from undermining innovativeness? Administrative processes are designed so that they can be quickly adapted to changed general conditions without compromising institutional principles. Internal formats – innovation labs, spaces for reflection, pilot programmes – consciously counteract structural narrowing. AI is strategically employed to create resources for spaces dedicated to values and experimentation. At the same time, the Humboldt Foundation develops an active counter strategy to the AI-controlled knowledge production described in the scenario: When state-configured algorithms pre-filter funding applications, analyse publication patterns and systematically disadvantage politically undesired research fields, the Humboldt Foundation must consciously immunise its own selection and evaluation procedures against such mechanisms. In concrete terms, this means the following: transparency about the AI systems used in its own processes; peer review as a human corrective to algorithmic pre-filtering; active reflection on whether and how AI-supported pre-selection could influence the thematic openness of sponsorship as well as development of checking routines to ensure that certain research fields are not systematically disadvantaged by opaque algorithmic decisions. The Humboldt Foundation positions itself as a pioneer of transparent, values-based use of AI in research promotion and thus provides a counter model to the silent control described in the scenario.

International networks and strategic alliances – a counterweight

In Scenario 3, national and international funding organisations, often also arm’s-length bodies which share similar values and institutional autonomy, are of particular strategic value. By systematic mapping, the Humboldt Foundation identifies the partners who are relevant to building a structural counterweight to national regulatory pressure – including funding organisations, academies and academic foundations in Europe and beyond. The Humboldt Foundation fosters these relationships intensively and develops joint funding alliances and co-financing models that are

more resilient to national restrictions. International norms – ERA principles, UNESCO recommendations on academic freedom – become the frame of reference in conversations with national funders.

Actively counter structural marginalisation

The scenario describes how Germany’s self-imposed collaborative restrictions combine with a process of relative marginalisation which is already underway: the share of national publications drops whilst the Asian science cluster gains influence. The Humboldt Foundation responds to this dynamic by deliberately keeping collaborative channels open and strengthening them where political pressure leads to narrowing. It invests in maintaining international partnerships even when the national environment flags them up as “risky” – provided that they are scientifically productive and compatible with their values. Moreover, the Humboldt Foundation documents and communicates the costs of regulatory narrowing: Which collaborations have failed to come about? Which talents have decided against Germany? Which research fields are leeching quality due to the lack of exchange? This evidence is used as an argument in conversations with funders and fed into the political debate. In particular, the drop in Germany’s appeal for up-and-coming science nations described in the scenario is seen as an early-warning signal and addressed by tailored outreach measures – towards countries like Indonesia, Colombia, Nigeria and Vietnam.

Identify spaces and keep them open in the Foundation’s own programmes

The Humboldt Foundation sends dedicated signals to topic areas that are subject to regulatory pressure: We welcome and protect the freedom of research. This can be achieved through thematic priorities, special programmes and calls, or agenda setting in communications. The Foundation prevents self-censorship – the system’s silent act of conformity (Välvirronen & Saikkonen, 2021) – from seeping into its own funding processes. This field of action functions as a conscious counterweight to political agenda setting: the

Humboldt Foundation sets its own thematic accents instead of being driven by external prioritisation.

Communication – a protective tool and societal anchoring

In an environment of increasing regulation and creeping delegitimisation of academic freedom, public outreach becomes a protective tool. The Humboldt Foundation invests in its visibility and anchorage in society – not for self-presentation but because an organisation that is known, esteemed and understood by the public is harder to marginalise than one that works silently. In concrete terms: Develop an open communication strategy that showcases the Humboldt Foundation’s social function – for citizens, the media and political actors alike. Utilise the alumni network as a multiplier in public debates on academic freedom; regular media work on issues of academic freedom, providing concrete cases and data.

Knowledge transfer to society – a legitimacy resource

The more science is subjected to political pressure to justify itself, the more important it becomes to be able to showcase the societal value of free research and make it accessible. The Humboldt Foundation develops formats for the transfer of knowledge to the public that reach beyond the academic community: science and society dialogues, collaborations with science museums and educational institutions and public lecture series involving sponsorship-recipients presenting socially relevant research topics. These formats serve two purposes: they convey concrete research findings to an interested public and, at the same time, demonstrate why free research has a societal value that exceeds its immediate use. In Scenario 3, in which the political legitimacy of science is increasingly linked to measurability and short-term benefits, this evidence serves as a protective institutional argument.

3. STRATEGIC LEVERS

- **Actively shape regulation instead of just implementing it:** The Humboldt Foundation is involved in the relevant governance processes – nationally and at European level – present, influential and capable of arguing its case. This means involvement in committees, its own policy papers, collaboration with scientific associations and university rectors. Shaping instead of implementing.
- **Build coalitions – a structural counterbalance to regulatory pressure:** Alliances with national and European funding organisations, university associations and scientific academies that stand together to defend the institutional autonomy of the science system. Collective action increases the ability to assert oneself and spreads political risk.
- **Organisational resilience for capacity to act in the long term:** Internal structures and management culture are systematically geared towards resilience: clarity about values, adaptability, readiness to learn, mature handling of AI and willingness to experiment are institutionally embedded – not as soft skills but as structural preconditions for the Humboldt Foundation to continue functioning under difficult conditions.
- **Actively navigate and communicate the balance between accountability and freedom:** The Humboldt Foundation must consciously shape and publicly communicate the balance between legitimate accountability and institutional freedom. This balance is not a given, but an institutional achievement that must be showcased – to funders, partners and the scientific community.
- **Political interest group:** Active lobbying of political decision makers builds on existing activities and is specifically expanded – via position papers,

parliamentary contacts and involvement in legislative procedures.

- **Leverage parliamentary embeddedness:** The Humboldt Foundation strives for institutional integration in parliamentary consultation processes – comparable with the function recommended for ALBs in the UCL report as “direct reporting to Parliament” (Pagel & McKee, 2025, Recommendation 4). Regular reporting to the research committee, invitations to expert hearings as experts and provision of evaluations.
- **Public visibility – an insurance policy:** An organisation that is well-known and esteemed in society is not so easy to marginalise. In Scenario 3, communications are not an add-on but a protective mechanism.
- **Diversification – a strategic priority:** Acquiring alternative sources of finance is vested in the Foundation’s management as a strategic field of action. It is not delegated to the operational level but is a board-level topic with its own timetable and measurable goals.
- **Safeguard AI resilience in internal procedures:** The Humboldt Foundation ensures that opaque algorithmic control does not make its selection, evaluation and sponsorship processes susceptible to the “silent steering” described in the scenario. Peer review, ultimate human decision-making and transparency about the use of AI in its own processes are anchored in institutional principles.
- **Reveal the costs of narrowing:** The Humboldt Foundation systematically collects data on the consequences of regulatory consolidation for Germany’s international competitiveness as a science location and uses them for its evidence-based argumentation in political communications – with funders, parliamentary committees and the general public.

5.3.4 SCENARIO 4: GEOPOLITICAL FRAGMENTATION

Initial strategic situation

In Scenario 4, the global science system is fragmenting along geopolitical lines into sub-regions with varying degrees of border permeability. Mobility is selective, collaborations are framed in terms of security policy, self-censorship becomes a silent systemic infrastructure (Clark et al., 2025). The Humboldt Foundation functions in an environment of maximum uncertainty: the previous business model based on global sponsorship open to all disciplines and regions is being questioned. The safeguarding needs of individuals and subjects grow dramatically and become qualitatively more differentiated. The core principle is strategic differentiation: the Humboldt Foundation must learn to address different types of crisis in different ways, act proactively using foresight tools and credibly assert its value-orientation in a fragmented environment. The leitmotiv is navigation instead of response, differentiation instead of uniformity, communication instead of silence.

1. GUIDING PRINCIPLES

- **Actively and explicitly defend academic freedom:** In Scenario 4, the Humboldt Foundation cannot rely on academic freedom being perceived as a normative given – neither globally, nor in the German context. Here, too, it is increasingly coming under pressure. The liberal principles must be explicitly embedded in statutes, mindset and programmes and unambiguously presented both internally and externally. People who know the Humboldt Foundation must know what it stands for.
- **Constructively balance openness and security:** In Scenario 4, tension between the principle of open, non-discriminatory sponsorship and the realities of geopolitical security logics is unavoidable. Neither naïve openness nor reflexive closure

are appropriate answers – what is required is informed, differentiated positioning that is regularly reviewed.

- **Differentiation instead of one size fits all:** Political persecution, armed conflicts, regulatory narrowing and geopolitical fragmentation are different phenomena that require specific tools. Blanket responses reduce effectiveness and normative credibility. The Humboldt Foundation develops a differentiated toolbox that meets the requirements of a fragmented system.
- **Structurally link responsivity and resilience:** The Humboldt Foundation must be able to respond to crises at short notice (responsivity) whilst maintaining sustainable structures and values (resilience). This field of tension – accelerated by the unpredictability described in Scenario 4 – must be actively managed by the institution and supported by the staff.
- **Trust – a strategic resource in a fragmented world:** In a fragmented, suspicious science system, the trust the Humboldt Foundation’s network has built over decades is a particularly valuable strategic resource. It facilitates communication and cooperation across geopolitical fractures and must be consciously fostered and utilised. In this scenario, the Humboldt Network is a “network of trust” that must continue to be developed, imbued with life and targeted effectively – as an infrastructure for situation monitoring, safeguarding and building bridges across system boundaries.
- **Visibility – a protective infrastructure:** In a fragmented world, visibility is a protective factor. Researchers who know that the Humboldt Foundation exists and can be reached have an option. Thus, communication becomes a protective infrastructure – not only for the Humboldt Foundation itself but also for researchers worldwide seeking orientation and shelter.

2. FIELDS OF ACTION

Embed country- and region-specific foresight as well as early-warning systems as standard institutional tools

Regular structured foresight analyses – particularly country-specific and thematic risk analyses for the Humboldt Foundation’s strategically relevant regions – become institutional routine. This includes explicit foresighting on regional mobility developments in partnership with international mobility organisations (British Council, Campus France, DAAD). Regarding strategically relevant regions – Middle East, Sub-Saharan Africa, Southern and Southeast Asia, Latin America, Eastern Europe – greater regional expertise is acquired both internally and through external consultations. Local alumni networks are systematically activated as early-warning seismographs. Anyone registering what is changing where should be able to contribute this information in a structured manner. Endangered disciplines and topics are identified in order to develop tailored sponsorship measures before the fields collapse. In this context, a fundamental question poses itself: Is it not an aspect of open-theme sponsorship to specifically support research areas that are systematically threatened and structurally disadvantaged – as a form of compensation? If certain disciplines in entire regions can no longer be pursued freely, the safeguarding mission expands from the individual to the field. The Humboldt Foundation discusses how open-theme research can be reinforced as a principle precisely by making threatened disciplines visible and promoting them. Foresighting explicitly embraces the monitoring of developments in AI infrastructures and their geopolitical instrumentalisation. The scenario describes how removing access to AI platforms, training data and model architectures is used as geopolitical leverage – with immediate consequences for whole locations’ ability to publish and produce scientific quality. The Humboldt Foundation integrates the monitoring of such “AI access dynamics” into its regular risk analyses: Which regions and research fields are particularly affected by AI dependency? Where is

sponsorship-recipients’ academic work structurally endangered by the loss of AI access?

Build and differentiate safeguarding programmes, both in terms of quality and quantity

In Scenario 4, it is indispensable to fundamentally differentiate the safeguarding programmes according to type of crisis: Researchers who are at risk for political reasons (focus: academic freedom and individual safeguarding) have different needs from those who are affected by armed conflict (focus: humanitarian support, institutional reconstruction, return perspectives). These two strands are programmatically separated and individually expanded, a refocusing which necessitates an internal discussion within the Foundation on how the Philipp Schwartz Initiative must be expanded and potentially supplemented. It is also necessary to elucidate how national programmes behave in relation to the nascent EU-wide protective infrastructure: the consensus within the Foundation that a national programme makes sense even if there are European opportunities – because Germany itself adopts a protective function as a location, which is politically and institutionally valuable at national level – should be explicitly substantiated and advocated. In terms of quantity: In a world of growing geopolitical tension and armed conflict safeguarding needs also grow. The Humboldt Foundation invests in capacity now that will be needed in 2035. It institutionalises fast-track processes for researchers at risk – speedy decisions, flexible sponsorship structures, institutional networking with host universities. Special attention is paid to the situation of researchers from Sub-Saharan Africa, described in the scenario, for whom selective mobility not only means losing an option but often being excluded from the global science system completely. The Humboldt Foundation develops specific funding tools for this group which go beyond traditional individual safeguarding: institutional collaborative corridors that keep functioning even under fragmented conditions; long-term qualification paths that are not dependent on short-term geopolitical constellations and

targeted integration in networks to overcome structural isolation.

Reinforce governance and institutional framework conditions for crisis mobility

Greater use of institutional support from the Federal Foreign Office: visas, safe mobility, diplomatic protection for sponsorship-recipients in difficult situations. The Humboldt Foundation develops clear institutional protocols for dealing with risk situations – from risk identification to protective response. The fundamental question as to whether sponsorship that is open to all disciplines and regions remains structurally feasible in the world of 2035 must be discussed openly and honestly: What adaptations are necessary? What boundaries cannot be crossed? In Scenario 4, political transfer goes beyond lobbying – in times of crisis, it becomes systematic policy advice. The Humboldt Foundation positions itself as an institutional source of knowledge for the Federal Foreign Office, the BMFTR and the Bundestag on issues relating to international scientific mobility under geopolitical pressure. In concrete terms: development of situational report formats that can be accessed quickly and utilised politically (crisis briefings); construction of an advisory network of alumni in key positions worldwide; proactive provision of scenarios and options for action to political decision-makers before crises escalate. The Humboldt Foundation thus moves from being a body implementing political directives to a strategic consultant – a shift in role in Scenario 4 that is imperative and in the interests of both sides.

Regional networks and international partnerships – crisis tools

In Scenario 4, the Humboldt Foundation’s alumni network is one of the most valuable institutional channels for monitoring the situation, protecting researchers in crisis situations and fostering connections across geopolitical fractures. Systematic mechanisms are developed to aggregate and utilise this knowledge. Through systematic mapping, the

Humboldt Foundation identifies its existing and potential collaborative partners for coordinated crisis response and joint foresighting – including organisations like Scholars at Risk, CARA, UNESCO and ISC. Targeted investment in fostering collaborations across geopolitical boundaries – even when they are politically controversial or laborious. Mapping is not an isolated act but understood as an ongoing process to regularly update the dynamic partner landscape.

Investigate and present self-censorship as a systemic risk

The Humboldt Foundation’s network of trust – built on long-term, personal relationships – offers unique opportunities to record self-censorship dynamics that remain hidden in formal surveys. Anonymised survey formats, confidential conversations and the alumni network are used as a source of information. Clark et al. (2025) show that self-censorship in academic contexts is measurable; Väliverronen & Saikkonen (2021) describe its subtle mechanisms. These findings are channelled into policy papers – as an evidence-based contribution to the global debate on academic freedom and as a basis for internal programme control.

Address AI sovereignty as a precondition for science’s ability to act

The scenario identifies access to AI infrastructure as a key geopolitical lever: Without access to the leading language models, the same publication standards cannot be achieved, and scientific output drops. In this context, the Humboldt Foundation develops its own strategic position:

- **Firstly:** as part of its foresighting activities, it systematically records which sponsorship recipients and alumni are affected or could be threatened by restrictions in AI access – as an element of an extended safeguarding mission.
- **Secondly:** it actively campaigns for open, non-discriminatory research AI infrastructure

at European level. Access to AI for research purposes is conceived as part of the right to academic freedom.

- **Thirdly:** it explores whether its own funding can also be used to specifically enable sponsorship-recipients in regions cut off from AI to access open AI tools and platforms – as a new form of compensation for disadvantages in a fragmented digital science landscape.
- **Fourthly:** it promotes research on European open-source alternatives and participates in consortia that develop independent AI infrastructure for science – as a way of helping to avoid one-sided dependencies.

Financial resilience for a fragmented environment

In a fragmented global science system in which geopolitical tension can also impact funding relationships, financial diversification is a prerequisite for remaining able to operate. The Humboldt Foundation must expect political constellations to influence state funders’ willingness to provide support – for instance, if safeguarding programmes for researchers from countries with which there are diplomatic tensions become politically undesirable. A diversified financial portfolio protects programme autonomy in precisely these situations. In concrete terms: build a dedicated crisis fund, fed from various sources (public, private, European) which facilitates speedy, politically independent funding decisions in crisis situations. These include international co-financing models with partners for joint safeguarding and bridging programmes as well as multi-year funding agreements with the AA that explicitly define the purpose of funding as crisis response capacity and are not bound by short-term political trends. In the British context, the UCL report (Pagel & McKee, 2025, p. 8) recommends legal safeguards which require agreement in parliament for significant cuts to core ALBs. Against the backdrop of the Bundestag’s budgetary sovereignty, which is firmly anchored in German constitutional budgetary law, and the

structural principles of budgetary law (especially the annuality principle according to Art. 110 of the Basic Law), direct transfer of this tool is not straightforward. Nevertheless, the fundamental safeguarding idea – stabilising long-term funding and safeguarding programmes from short-term budgetary fluctuations – could be implemented in Germany, for example by authorising multi-year commitments, institutional funding mechanisms or contractually secured programme agreements.

Communications – navigation in a fragmented public realm

In a fragmented world, the public is also fragmented. The Humboldt Foundation can no longer reach all relevant target groups with a single communication strategy. One option is to adopt a more differentiated communication architecture: for international researchers in crisis situations (clear, easy to find information on safeguarding programmes and funding opportunities); for political decision-makers in Germany and Europe (evidence-based situational reports on the state of academic freedom worldwide); for the general public (narratives that showcase why academic freedom is also in Germany’s national interest); for international media (positioning the Humboldt Foundation as a reference institution for questions of academic mobility). In Scenario 4, communication thus not only serves to convey information but becomes more of a navigation and orientation tool: it helps researchers worldwide to identify the Humboldt Foundation as a reliable point of contact, and it helps the German public to understand the complexity of the fragmented system.

Knowledge transfer – a democratic mission

In an environment, in which science is read as a security issue and geopolitical sorting logics shape public perception of international cooperation, the Humboldt Foundation has a special responsibility for knowledge transfer to society. It visualises what fragmentation really means: for researchers, for knowledge processes, for Germany’s ability to in-

novate. This is done by regular public reports on the state of global scientific cooperation; public events in which sponsorship recipients and alumni report on their experiences with borders, barriers to cooperation and self-censorship; targeted media work that uses concrete research biographies to make abstract geopolitical dynamics comprehensible. This transfer serves democratic information: a society that understands what is at stake can make informed political decisions.

3. STRATEGIC LEVERS

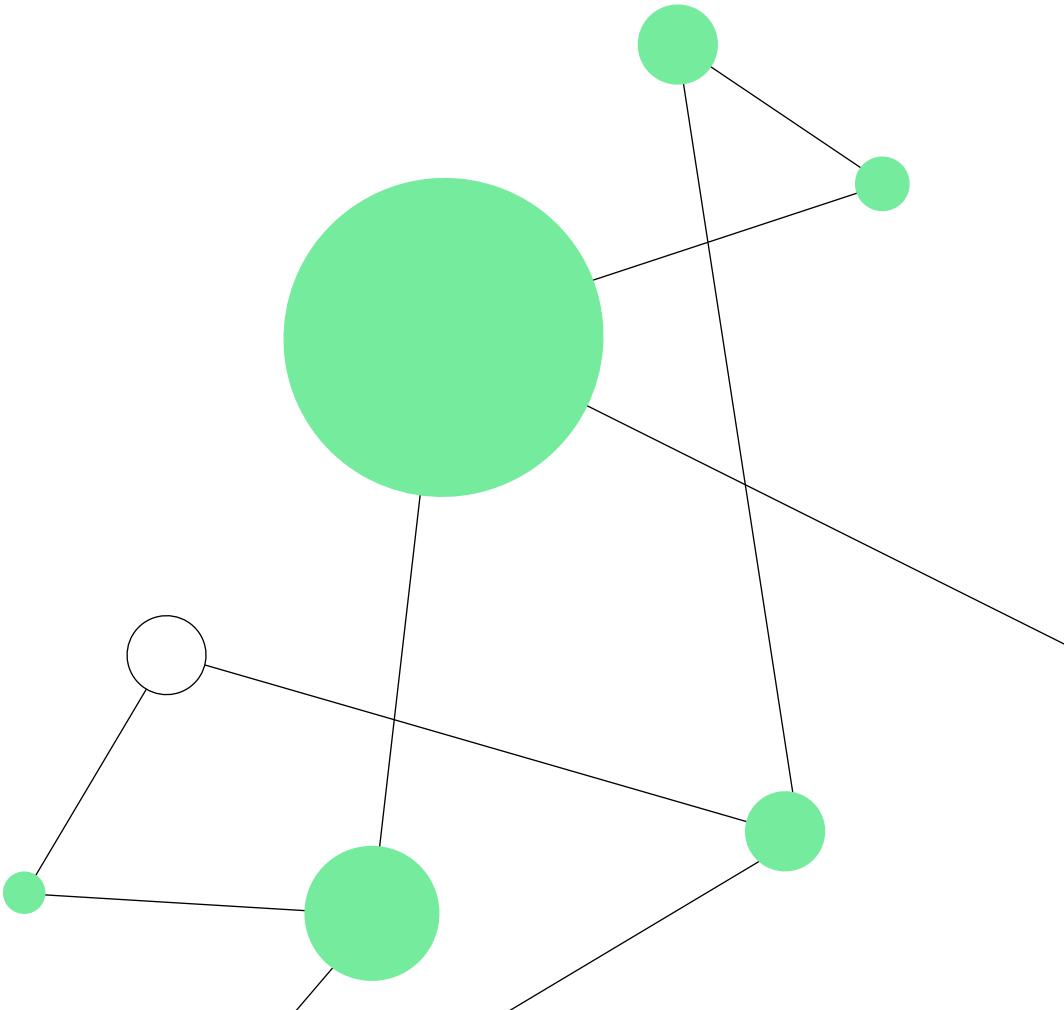
- **Early-warning systems: proactive action – an institutional self-image.** In Scenario 4, the Humboldt Foundation is a proactive, not a reactive institution. Foresight is not used for occasional analyses but is a core institutional process. Before crises hit, scenarios are played through, risks assessed and programme responses prepared. This requires institutional capacity, resources and a leadership culture that values strategic foresight.
- **Differentiated programmes:** greater effectiveness under fragmented conditions. Tailored offers for different types of crisis and countries of origin increase the impact of the Foundation’s activities – and maintain the Humboldt Foundation’s normative credibility in an environment in which one size fits all is perceived as ignorance of lived realities.
- **Strong networks:** bridging geopolitical fractures. In Scenario 4, the global alumni network and strategic partnerships are the Humboldt Foundation’s most important institutional capital. Fostering and activating them are not peripheral tasks but key strategic achievements – investment in something that can bridge geopolitical fractures.
- **Distinct value position:** orientation in a fragmented world. In a world in which values

are politically contentious and normative clarity is rare, a distinctly recognisable, coherent, defensible value position held by the Humboldt Foundation is an orientation anchor for researchers around the world. This position must be consistently implemented, visibly communicated and, if necessary, actively defended.

- **Regional expertise:** more precise decisions under uncertainty. Deep understanding of regional dynamics – political, cultural and institutional – facilitate more precise, effective decisions in a fragmented system. In this context, regional expertise is not a secondary specialisation of individual funding managers but one of the organisation’s key strategic competences. “Genuine” regional expertise is required, combined with the ability to make strategic decisions – that is, think-tank qualities: classify decisions, assess options and derive robust strategic decisions on the course to be taken. Systematic investment in this expertise is essential – in terms of personnel, structure and knowledge.
- **Crisis fund – a quickly mobilisable resource:** A financially diversified fund which facilitates safeguarding decisions without months-long approval processes. In Scenario 4, political independence in funding allocation is not just desirable but operationally necessary.
- **Political consultancy – a key institutional activity:** The Humboldt Foundation consolidates its existing policy advice and develops it into a clearly-defined key activity. On the basis of the knowledge it accumulates through its global presence, alumni network and foresight capacity, it continually and systematically scales this service and organises policy advice for decision-makers – regularly, evidence-based and proactively.
- **Communication – a global orientation service:** In a fragmented world, visibility is a protective

factor. Researchers who know that the Humboldt Foundation exists and is reachable have an option. Communication thus becomes a safeguarding infrastructure.

- **Social legitimacy as a protection:** An organisation that is perceived by society as relevant, comprehensible and valuable is difficult for politics to marginalise. Knowledge transfer and public outreach are therefore not downstream activities in Scenario 4 but strategic priorities.
- **AI access – an expanded dimension of academic freedom:** The Humboldt Foundation conceptualises access to AI research infrastructure as an element of protecting the ability to pursue science and develops tools to safeguard sponsorship-recipients from AI-related structural marginalisation – with its own resources, European alliances and the promotion of open alternatives.



APPENDIX

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Contact Address:

Dr. Johanna Seibert
Alexander von Humboldt Foundation
Strategy and External Relations Department
Deputy Head of Strategic Planning

Markgrafenstr. 37
10117 Berlin

johanna.seibert@avh.de
Tel.: +49 (0)228 833-458

www.humboldt-foundation.de

Postal Address:

Alexander von Humboldt-Stiftung
Jean-Paul-Straße 12
53173 Bonn
Germany

Tel.: +49 (0)228 833-0
Fax: +49 (0)228 833-199

E-Mail: info@avh.de
www.humboldt-foundation.de

Authors: Dr. Moritz J. Maier, Leon Rasztar, Felix Bickert, Simone Kaiser

Technical Supervision and Collaboration (Humboldt Foundation): Dr. Johanna Seibert, Dr. Almut Caspary, Frank Albrecht

With Contributions From: Amelie Schölzel, Naima Häringer, Olufemi Farayola, Delia Bauer

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