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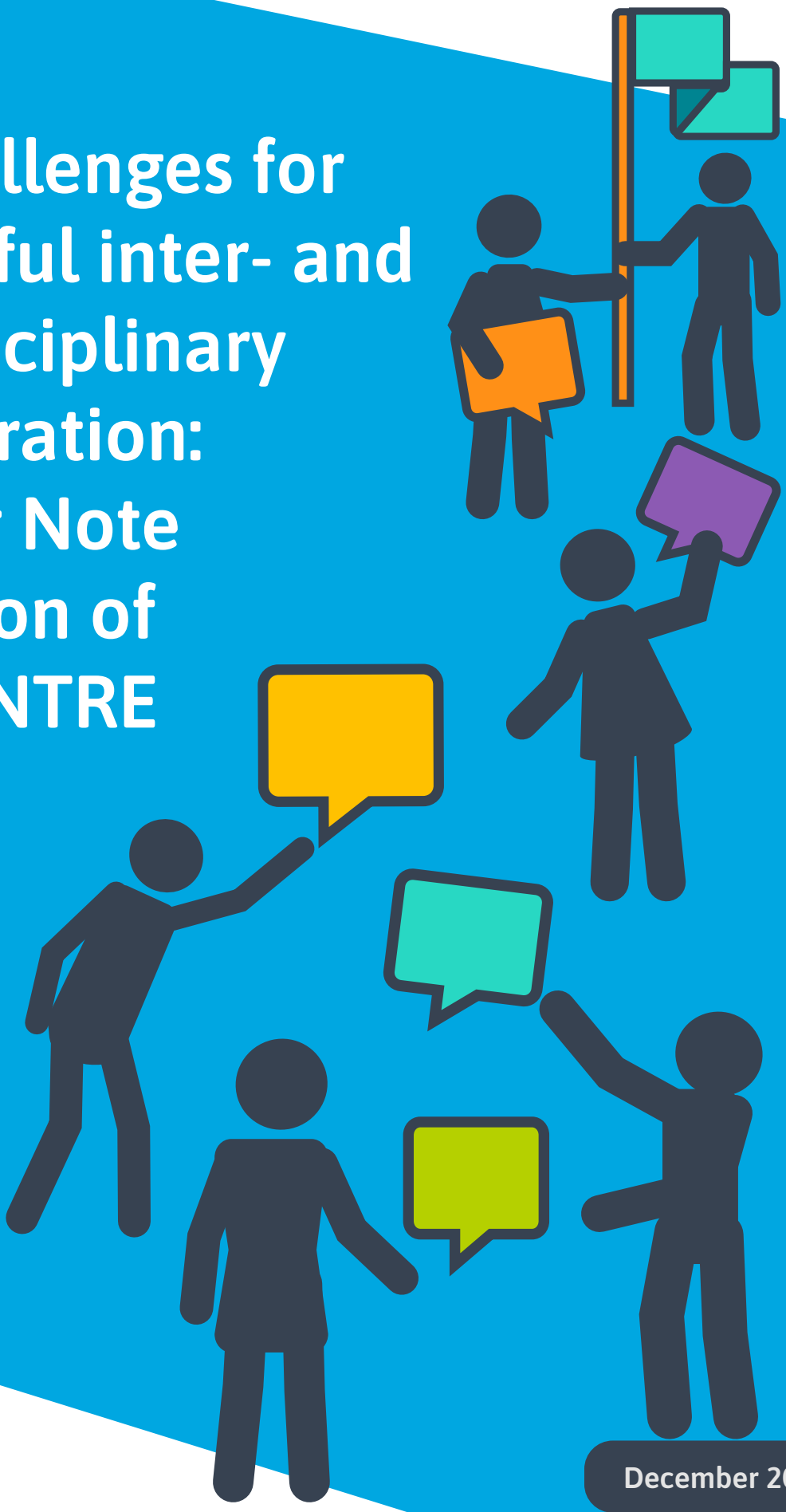
Ten challenges for successful inter- and transdisciplinary collaboration: Briefing Note collection of SSH CENTRE



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SSH CENTRE

Social Sciences & Humanities for Climate, Energy aNd Transport Research Excellence

Introduction to the Briefing Note collection

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The Briefing Note collection

This collection of briefing notes aims to provide a comprehensive overview of challenges to Social Sciences and Humanities (SSH) visibility in inter- and transdisciplinary research for climate, energy, and mobility. The collection has been created based on experiences of researchers participating in activities of SSH CENTRE. SSH CENTRE is a Horizon Europe project that aimed to develop best practices for integrating SSH into Europe's climate, energy, and mobility transition research. Through a series of collaborative *epistemic experiments*, the project explored how researchers, policymakers, and citizens can work together more effectively across disciplinary and institutional boundaries.

This collection consists of ten Briefing Notes that identify challenges that need to be overcome for SSH to effectively contribute to EU climate, energy, and mobility transitions. This introduction first provides a justification for why these Notes are needed. We then outline the Formative Accompanying Research (FAR) methodology that informed the challenges explored by the ten Briefing Notes. Following, we present an overview of their structure and contents. We conclude with an explanation of how we envision the Briefing Notes informing ongoing inter- and transdisciplinary research that supports meaningful SSH engagement. Our recommendations are targeted to researchers, project collaborators, and research managers and funders. We therefore flag that actions should be taken by all those with an interest in such work, at multiple levels of the knowledge system, and not just by SSH researchers themselves.

The need to understand challenges faced for meaningful Social Sciences and Humanities collaboration

Social Sciences and Humanities (SSH) research must play a central role in inter- and transdisciplinary research that supports Europe's transition to carbon neutrality.[1] Global challenges such as climate change do not come pre-sorted by academic field but are interdisciplinary in nature. Moreover, the origin of climate change lies in human activities and resource consumption [3]. Addressing climate change requires, alongside understanding the material, ecological, and

1 Interdisciplinary research combines methods and theories from different academic fields to tackle complex problems collaboratively. Transdisciplinary research extends this collaboration to non-academic actors [1,2]. Both approaches are understood here as always including SSH.

technological drivers, sustained attention to social, cultural, economic, and political drivers, as well as profound sociocultural and behavioural transformations, all of which fall under the expertise of SSH [4–9]. Europe's climate, energy, and mobility transitions therefore depend on SSH becoming full partners with STEM (Scientific, Technical, Engineering, and Mathematical) disciplines and societal actors.

There is increasing recognition in research and policy that despite its importance, SSH knowledge is overlooked in climate, energy, and mobility research. SSH is historically underfunded compared with STEM research, though with European-funded research this gap is decreasing [10,11]. However, meaningful collaboration must go beyond purely providing financial support. It must include understanding, reflecting, and facilitating the contribution that can be made by SSH research. For example, in many research funding calls, there is a dominance of a technocentric paradigm [6,12,13]. Within such a paradigm, SSH research is employed to facilitate pre-determined, top-down policy initiatives, with the objective of ensuring 'acceptance' among citizens or 'service the needs' of STEM projects in diffusing technology [6,13]. This role does not allow SSH to realize its potential in understanding human systems, identifying drivers of change, synthesizing diverse knowledges, and offering ethically and societally grounded solutions [6,14].

When exploring the challenges that shape SSH visibility and uptake, it is necessary to consider multiple levels of the knowledge system – individual researchers, project conditions, and the wider funding/academic system. Research into scientific processes has placed significant emphasis on the roles of individual researchers, particularly SSH researchers. Here, knowledge points to the kinds of skills and capacities that researchers seeking to do inter- and transdisciplinary research need to foster [15,16]. However, using such skills is often difficult when SSH researchers are in the minority (or are indeed alone) in a STEM-dominated collaboration. Thus, the creation of meaningful SSH collaboration relies on SSH and STEM researchers alike having the skills to collaborate together, but also on them being supported by the broader project conditions that they are operating within. In turn, such project conditions are shaped by the funding, and broader academic systems that they are being implemented within [4,17–19]. Fostering SSH visibility therefore requires a more comprehensive understanding of the challenges to collaboration, and how these are shaped by the individual researchers, project conditions and broader funding and academic requirements.

Formative Accompanying Research methodology

The SSH CENTRE project included a Formative Accompanying Research (FAR), the output of which is this collection of briefing notes. The intention of FAR is to learn about, with, and for, a collaboration [20]. To this end, we participated in SSH CENTRE activities, while structuring a process of reflection, evaluation, and discussion within the team (inspired by [21]). The FAR therefore served as a process of ongoing evaluation and learning to understand what works – and what does not – in fostering SSH involvement in inter- and transdisciplinary collaboration. The formative evaluation focused on three epistemic experiments that were created and run by the SSH CENTRE:

1. *Interdisciplinary Collaborations for EU Policy Recommendations:* This experiment facilitated nearly 30 new interdisciplinary collaborations between SSH and STEM researchers, aimed at generating policy-relevant insights for the European Green Deal. Each collaboration produced a chapter in one of three edited volumes on climate, energy, and mobility policy [22–24].
2. *Transdisciplinary Knowledge Brokerage Initiative:* The Knowledge Brokerage Initiative connected thirty Early Career Researchers (ECRs) from SSH backgrounds with six European municipal hubs working on sustainability transitions. After receiving online training in research-policy brokerage, the ECRs collaborated with local policymakers to co-produce actionable insights supporting decarbonisation goals [25–32].
3. *Debating Europe Citizens' Engagement:* This experiment brought together European citizens to discuss energy and climate issues. Conducted by Debating Europe, it involved focus groups on EU Missions such as Climate-Neutral and Smart Cities, Climate Adaptation, Healthy Soils, and Protecting Ocean and Waters [33].

The FAR process was designed to not only evaluate results, but also to feed insights back into the project during its implementation. The evaluation combined reflexive workshops held at four SSH CENTRE consortium meetings, as well as participant observation at a city-hub workshop, a total

of 44 semi-structured interviews with participants in the epistemic experiments, and 11 debrief interviews with SSH CENTRE partners. Full details of samples, process and interview and workshop protocols are provided on the open science platform Zenodo. Ethics approval was obtained from the Scientific and Ethics Advisory Board of the Global Change Research Institute of the Czech Academy of Sciences, CzechGlobe.

Data analysis of interview transcripts was a bottom-up and iterative process. Emerging issues were identified from interview transcripts and turned into general discussion points for project level reflection (via the aforementioned consortium reflexive workshops), which then fed back into the way that interviews were understood and analysed. The factors that emerged as shaping SSH visibility in the epistemic interventions were grouped by the FAR leads into the 10 challenges that are presented in the Briefing Notes.

Introducing the Briefing Notes

Organisation and structure

Each Briefing Note focuses on a domain where the challenges for meaningful SSH engagement become visible – some arise from structural features of the research and funding systems, others from the internal logics of inter- and transdisciplinary collaboration. The Notes are grouped into two clusters: structural challenges and practice-embedded challenges.

Structural challenges (BNs 1-5) originate in the wider organisation of research – STEM-based standards (BN1), time demands (BN2), organisational barriers (BN3), evaluation metrics (BN4), and funding calls design (BN5). The first Note (BN1) addresses the challenges rooted in lingering misunderstandings of SSH and in disciplinary hierarchies that favour STEM-based standards of evidence and impact. The second Note (BN2) reflects that the very nature of inter- and transdisciplinary research means that involving more disciplines or stakeholders increases the complexity of collaboration, which creates time demands. In the third Note (BN3), the ways in which organisational structures, especially those related to funding and career assessment within research institutions, hinder inter- and transdisciplinary research are explored. The challenge of assessing the quality and impact of research using current metrics is investigated in the fourth Briefing Note (BN4). The fifth Note (BN5) shows how funders, call designers, and reviewers act as gatekeepers, determining which knowledge is considered valuable and which collaborations and outputs receive support.

The practice-embedded challenges (BNs 6-10) stem from the inner logic of inter- and transdisciplinary collaboration – navigating terminology (BN6), research coordination and leadership (BN7), spaces for communication (BN8), reflexivity and positionality (BN9), and stakeholder engagement (BN10). These are intrinsic to collaborative research: if not addressed, they can become systemic barriers. Briefing Note six (BN6) focuses on the challenge of navigating terminology, concepts, and methods in inter- and transdisciplinary research; managing these differences is not trivial, as researchers construct and validate knowledge in relatively narrow problem spaces. Coordinating and leading inter- and transdisciplinary research teams, as Note seven (BN7) describes, requires active integration, trust building, and mediation. Furthermore, spaces for effective communication across disciplinary and stakeholder boundaries are fundamental for successful inter- and transdisciplinary research (BN8). Note nine (BN9), focusing on positionality and reflexivity, shows how addressing complex societal problems through integration of diverse forms of knowledge requires valuing them and identifying power imbalances. The final Note (BN10) emphasises that engaging stakeholders and adapting communication for diverse audiences are central to the effectiveness and impact of inter- and transdisciplinary research, particularly for addressing complex societal challenges such as climate change.

All Briefing Notes follow a common structure. After introducing the topic and a headline message, they provide broad context on how the given challenge has been framed and addressed in existing research literature. Following, they outline the way the challenge was manifested within the epistemic experiments of the SSH CENTRE. These reflect the experiences of the participants in these interventions, and we use quotations for illustration purposes. Quoted interviewees are anonymised using coded identifiers indicating gender (M/F) and career stage (ECR = Early Career Researcher,

within six years of PhD; EXP = Expert Researcher, more than six years after PhD), followed by a random number for identification only (e.g., MECR1, FEXP2). Each Briefing Note concludes by providing a set of recommendations that combine the SSH CENTRE data with literature insights and offer practical actions that can be implemented by individual researchers, at the project level, or by the broader academic community (including funders).

How to use the Briefing Notes

We intend that each Briefing Note can act as a standalone document that is useful for anyone working with SSH in inter- and transdisciplinary collaborations. If a researcher or team is experiencing a particular challenge, then an individual Briefing Note should help to unpack that challenge, and provide tangible actions for navigating it. The references included provide a starting point for further, in-depth exploration. Throughout the Briefing Notes, we are keen to stress that such actions do not come solely from the SSH researchers themselves. By including the different levels of action recommendations (individual researcher, project, academic and funding systems), we ensure that there are clear actions for all those who seek to create meaningful collaborations that include SSH knowledge.

However, we also hope that the complete collection will serve as a constructive handbook for anyone seeking to improve the inclusion, visibility and uptake of SSH knowledge in climate, energy and mobility research. The challenges, lessons and actions presented should shape the ongoing design and implementation of inter- and transdisciplinary research in this field. In cross-referencing between the Briefing Notes, and indeed in this overarching front matter, we demonstrate that all the challenges are interlinked. They will all require attention at some point in inter- and transdisciplinary collaborations. This complete collection should therefore be useful to SSH researchers of all career stages in guiding their own practice and finding space within collaborative research; STEM researchers of all career stages in cultivating the capacities to collaborate with SSH researchers; decision-makers in research institutes in creating supportive environments for inter- and transdisciplinary collaboration; and research funders in providing the structures and framing that facilitates such research. Serving as a formative evaluation, this Briefing Note collection is also useful to members of the SSH CENTRE team in their future endeavours to facilitate such collaborations.

The Briefing Notes

Each briefing note has a title that reflects the challenge it addresses, as follows:

BN1 – Balancing SSH and STEM contributions in inter- and transdisciplinary collaboration

BN2 – Time demands in inter- and transdisciplinary collaboration

BN3 – Organisational structures as challenges to inter- and transdisciplinary collaboration

BN4 – Evaluation metrics in inter- and transdisciplinary collaboration

BN5 – Disciplinary design and evaluation standards in inter- and transdisciplinary collaboration

BN6 – Navigating terminology, concepts, and methods in inter- and transdisciplinary collaboration

BN7 – Coordination and leadership in inter- and transdisciplinary collaboration

BN8 – Spaces for communication in inter- and transdisciplinary collaboration

BN9 – Positionality and reflexivity in inter- and transdisciplinary collaboration

BN10 – Engaging stakeholders and audiences in inter- and transdisciplinary collaboration

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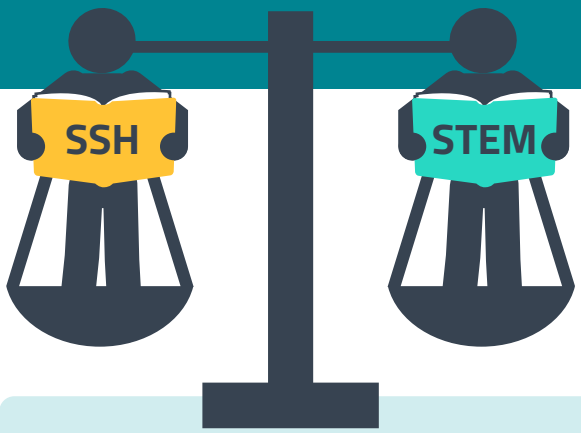
References

1. Sorman AH. SSH-STEM networks: Bridging divides between social and technical. Cambridge: SSH CENTRE; 2023.
2. d'Andrea L, Feudo F. Responsible Research & Innovation: The developing role of interdisciplinarity. Cambridge: SSH CENTRE; 2023.
3. Goldberg MH, Gustafson A, van der Linden S. Leveraging Social Science to Generate Lasting Engagement with Climate Change Solutions. One Earth. 2020 Sept 18;3(3):314–24.
4. Lyall C, Bruce A, Marsden W, Meagher L. The role of funding agencies in creating interdisciplinary knowledge. Sci Public Policy. 2013 Feb 1;40(1):62–71.
5. Tobi H, Kampen JK. Research design: the methodology for interdisciplinary research framework. Qual Quant. 2018 May 1;52(3):1209–25.
6. Sonetti G, Arrobbio O, Lombardi P, Lami IM, Monaci S. "'Only Social Scientists Laughed'": Reflections on Social Sciences and Humanities Integration in European Energy Projects. Energy Res Soc Sci. 2020 Mar;61:101342.
7. Cole M. The case for the "climate humanities": toward a transdisciplinary, equity-focused paradigm shift within climate scholarship. Sustain Sci. 2023 Nov;18(6):2795–801.
8. Välikangas A. The Limited Role of Social Sciences and Humanities in Interdisciplinary Funding: What are Its Effects? Soc Epistemol. 2024 Mar 3;38(2):152–72.
9. Elixhauser S, Boni Z, Gregorič Bon N, Kanjir U, Meyer A, Muttenzer F, et al. Interdisciplinary, but how? Anthropological Perspectives from Collaborative Research on Climate and Environmental Change. Environ Sci Policy. 2024;151:103586-.
10. Overland I, Sovacool BK. The misallocation of climate research funding. Energy Res Soc Sci. 2020 Apr 1;62:101349.
11. Directorate-General for Research and Innovation (European Commission). Integration of social sciences and humanities in Horizon Europe: first monitoring report on SSH flagged projects funded under Pillar II of Horizon Europe : 2021 2023 [Internet]. Publications Office of the European Union; 2025 [cited 2025 Nov 12]. Available from: https://data.europa.eu/doi/10.2777/6733555
12. Dudman K, de Wit S. An IPCC that listens: introducing reciprocity to climate change communication. Clim Change. 2021 Sept 7;168(1):2.
13. Foulds C, Royston S, Berker T, Nakopoulou E, Bharucha ZP, Robison R, et al. An agenda for future Social Sciences and Humanities research on energy efficiency: 100 priority research questions. Humanit Soc Sci Commun. 2022 June 30;9(1):1–18.
14. Hamborg S, Meya JN, Eisenack K, Raabe T. Rethinking resilience: A cross-epistemic resilience framework for interdisciplinary energy research. Energy Res Soc Sci. 2020 Jan;59:101285.

15. Caniglia G, Freeth R, Luederitz C, Leventon J, West SP, John B, et al. Practical wisdom and virtue ethics for knowledge co-production in sustainability science. Nat Sustain. 2023 May;6(5):493–501.
16. Augsburg T. Becoming Transdisciplinary: The Emergence of the Transdisciplinary Individual. World Futur. 2014 May 19;70(3–4):233–47.
17. Harris F, Lyon F, Sioen GB, Ebi KL. Working with the tensions of transdisciplinary research: a review and agenda for the future of knowledge co-production in the Anthropocene. Glob Sustain. 2024;7:e13.
18. Salmon RA, Priestley RK, Goven J. The reflexive scientist: an approach to transforming public engagement. J Environ Stud Sci. 2017;7(1):53–68.
19. Salmela M, Vienni-Baptista B, Cheas K. Towards the Recognition of Interdisciplinary and Transdisciplinary Researchers. Minerva [Internet]. 2025 Feb 28 [cited 2025 May 14]; Available from: https://doi.org/10.1007/s11024-025-09578-y
20. Freeth R, Vilsmaier U. Researching Collaborative Interdisciplinary Teams: Practices and Principles for Navigating Researcher Positionality. Sci Technol Stud. 2019;33(3):57–72.
21. Freeth R, Caniglia G. Learning to collaborate while collaborating: advancing interdisciplinary sustainability research. Sustain Sci. 2020 Jan 1;15(1):247–61.
22. Keserü I, Basu S, Ryghaug M, Skjølsvold TM, editors. Strengthening European Mobility Policy: Governance Recommendations from Innovative Interdisciplinary Collaborations [Internet]. Cham: Springer Nature Switzerland; 2024 [cited 2025 Jan 10]. Available from: https://link.springer.com/10.1007/978-3-031-67936-0
23. Galende Sánchez E, Sorman AH, Cabello V, Heidenreich S, Klöckner CA, editors. Strengthening European Climate Policy: Governance Recommendations from Innovative Interdisciplinary Collaborations [Internet]. Cham: Springer Nature Switzerland; 2024 [cited 2025 Jan 10]. Available from: https://link.springer.com/10.1007/978-3-031-72055-0
24. Crowther A, Foulds C, Robison R, Gladkykh G, editors. Strengthening European Energy Policy: Governance Recommendations From Innovative Interdisciplinary Collaborations [Internet]. Cham: Springer Nature Switzerland; 2024 [cited 2025 Jan 10]. Available from: https://link.springer.com/10.1007/978-3-031-66481-6
25. Heuninckx S, Khalid R, Kola-Bezka M, Quast P, Wood N. Inclusivity Framework for Energy Communities [Internet]. Cambridge: SSH CENTRE; 2024. Available from: https://doi.org/10.5281/zenodo.14763151
26. Alonso Raposo M, Carvalho J, János Lőrincz M, Lawlor E, Rossetti R. Towards Sustainable Mobility: A Roadmap for establishing a Community of Practice in Porto [Internet]. Cambridge: SSH CENTRE; 2024. Available from: https://doi.org/10.5281/zenodo.14763554
27. Cevheribucak G, Etienne E, Moreno C, Robiou du Pont Y, Tiwari A. A user guide to engage citizens in the Valencia Climate Alliance [Internet]. Cambridge: SSH CENTRE; 2024. Available from: https://doi.org/10.5281/zenodo.14763376
28. Staňková N, Novikau A, Zaphiropoulo J, Robison R, Varjú V, Caiati G. Insights from Social Sciences and Humanities: Infosheets and live challenges for Rijeka's District Heating (Croatia) [Internet]. Cambridge: Zenodo; 2024. Available from: https://doi.org/10.5281/zenodo.14763630
29. Aubois-Liogier V, Baturina D, Marcroft TP, Niessen L. Transversalité pour la circularité et la sobriété à Grenoble [Internet]. Cambridge: SSH CENTRE; 2027. Available from: https://doi.org/10.5281/zenodo.14763521
30. Aubois-Liogier V, Baturina D, Marcroft TP, Niessen L. Transversality for circularity and sufficiency in Grenoble [Internet]. Cambridge: SSH CENTRE; 2024. Available from: https://doi.org/10.5281/zenodo.14763427

31. Capaccioli A, Djukic M, Hook H, Martinez L, Tuteja K. Building capacities to implement inclusive digital mobility: A Knowledge Brokerage Initiative in Čačak [Internet]. Cambridge: SSH CENTRE; 2024. Available from: https://doi. org/10.5281/zenodo.14763576
32. Heuninckx S, Khalid R, Kola-Bezka M, Quast P, Wood N. Towards Inclusive Energy Communities in Arnhem [Internet]. Cambridge: SSH CENTRE; 2024. Available from: https://doi. org/10.5281/zenodo.14763151
33. Malaize J, Rohse M, Foulds C, Loewen B, Crowther A. Citizen-led recommendations for the Horizon Europe Missions on sustainability [Internet]. Zenodo; 2025. Available from: https://doi. org/10.5281/zenodo.14747487



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Balancing SSH and STEM contributions in inter- and transdisciplinary collaboration

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What did the SSH CENTRE project do?

SSH CENTRE (Social Sciences and Humanities for Climate, Energy aNd Transport Research Excellence) is a Horizon Europe project that focused on generating best practices for incorporating both Social Sciences and Humanities (SSH) and inter- and transdisciplinary research into the European Union's climate, energy, and mobility transition policy. The SSH CENTRE project deliberately created spaces for *epistemic experimentation* – i.e. structured collaborations that bridge different epistemic (knowledge) cultures to co-produce policy-relevant knowledge:

Interdisciplinary Collaborations for EU Policy Recommendations

The SSH CENTRE project facilitated nearly 30 novel collaborations between the SSH and STEM (Science, Technology, Engineering and Mathematics) disciplines, for strengthening European climate, energy, and mobility policy. These resulted in three edited books, whereby each Interdisciplinary Collaboration produced a chapter. For more see SSH CENTRE Interdisciplinary EU Policy Book Collection.

Transdisciplinary Knowledge Brokerage Initiative

The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

This Briefing Note is one of 10 that present the findings and recommendations from the evaluation of these epistemic experiments. For more, see the Introduction to the Briefing Note collection and the Formative Accompanying Research methodology.

Ensuring meaningful SSH integration requires addressing embedded assumptions and framing imbalances that limit their role in inter- and transdisciplinary collaboration.

Introduction

Social Sciences and Humanities (SSH) tend to be disadvantaged in inter- and transdisciplinary research. Despite a noticeable increase in inter- and transdisciplinary funding opportunities for SSH, there is still a strong tendency for research agendas to prioritize goals and approaches that relegate SSH to a service role, making them unable to set their own research agendas [1].Funders frequently regard SSH as a means to orient the market, encourage citizens to accept top-down policies or technologies, or simply to "service the needs" of STEM-led projects – i.e., to handle project communication or administer stakeholder activities rather than do core research [1,2].

This Briefing Note addresses balancing SSH and STEM contributions in inter- and transdisciplinary research. The inter- and transdisciplinary literature emphasizes that SSH contributions are often relegated to instrumental or supporting roles, with evaluation frameworks and funding structures privileging STEM priorities. The SSH CENTRE's design features – such as protected inception time, mentoring mechanisms, and explicit SSH (co)-leadership – supported meaningful SSH integration. However, the findings also reveal some of the limitations and prevailing influence of academic structures and paradigms hindering SSH engagement that are beyond the project's reach. The final part of this Briefing Note includes recommendations at individual, project, and systemic levels to foster the position of SSH within inter- and transdisciplinary research.

Problem description and literature insights

There are several reasons for the subordinate position of SSH. On a structural level, it is a matter of **how funding calls are written** and **how SSH research is valued** at research councils, among policymakers, and in the public. In the two recent Framework Programmes, the European Commission (EC) supported the implementation of SSH through flagging funding calls relevant for SSH disciplines and by integrating SSH into selected proposals. However, despite EC's emphasis on integrating SSH as a key constituent of Research & Innovation, the first monitoring report on SSH-flagged topics in Horizon Europe shows that SSH disciplines still receive only a small share of funding in Cluster 5 (Climate, Energy and Mobility): between 2021 and 2023, 26% of topics were flagged as SSH-relevant, yet SSH partners received only 27% of the SSH-flagged budget, corresponding to about 6% of the overall Cluster 5 budget [3]. The insufficiency of funding is not the only concern; the way funding is structured and the way call topics are framed can have a significant impact by putting SSH at a disadvantage. For example, call texts frequently centre STEM objectives and approaches, with SSH mentioned as an add-on and addressed in a disproportionately short and limited form. Proposals may require a technology work package (WP) with milestones, while SSH are framed purely to "enhance the societal impact", with no dedicated SSH WPs and no SSH-led outputs.

Indeed, the perceived role of SSH relative to STEM shapes how SSH is supported in research funding and practice. Within applied research, there is an ongoing **discussion on whether SSH are as useful as STEM disciplines** [4]. This often gets compared in terms of market efficiency and social utility.

One argument against the use of SSH is that they do not provide sufficient value for money. In policy language, value for money usually equates value with **market efficiency** – getting the greatest quantifiable output for the least input. However, Bozeman's concept of "public-value failure" demonstrates that market efficiency does not always capture all the essential public values [5]. Conversely, there are many instances where optimal market outcomes can result in negative public outcomes, including in science policy. For instance, when funding and assessment systems prioritize short-term, quantifiable outputs, STEM fields appear more "efficient" investments. While this may be optimal in market terms, it sidelines SSH disciplines, thereby undermining broader public values such as democratic deliberation, cultural understanding, and social justice.

Similarly, there is a perception that while STEM research has a high **social utility** (understood as the benefits derived by non-academic audiences from research), social sciences – and the humanities in particular – are a kind of luxury that, while providing cultural enjoyment, can simply be curtailed in times of crisis due to its low social utility [4]. In the climate, energy, and mobility fields, however, there is a clear shift among academic and policy communities to move research from merely producing knowledge about climate change to helping society create context-dependent, socially sensitive solutions [6]. Bérubé [7] points out that even among STEM disciplines, there is a great deal of theoretical research that has no direct social utility – which is a frequent criticism of SSH research – and, on the contrary, there are examples of SSH exploratory research that has later demonstrated major societal benefits, such as Bertrand Russell's philosophical exploration of logic and language that set the stage for artificial languages, fundamental to computer science [8].

Even in cases where **SSH** are part of inter- and transdisciplinary projects, their **involvement does not guarantee equal participation**. We can see a double inequality: firstly, among the disciplines invited to participate in inter- and transdisciplinary collaborations, and secondly, regarding the type of research SSH disciplines are assigned or enabled to do. Disciplinary inequality is related to the preference for certain SSH fields or methods that are similar to STEM approaches [9]. *The Integration of SSH in Horizon 2020* report indicates that over half of all SSH researchers were drawn from disciplines spanning economic studies, political science, public administration, and law. The next largest group comprised social scientists who were involved in projects in non-scientific roles, i.e., in project communication or management. Despite their extensive scope, the humanities constituted a mere 5% of all SSH researchers [10]. This approach results in the marginalisation of many fields, even when a project is flagged for SSH integration [1].

Therefore, SSH are frequently included in inter- and transdisciplinary projects only to fulfil formal requirements (so-called tokenism), with their role often confined to supporting communication strategies or facilitating stakeholder engagement [9]. **Declaring the integration of SSH disciplines and actually creating the conditions for meaningful integration are two very different things**. Inter- and transdisciplinary scholars warn that such narrow roles hinder the transformative potential of SSH, which lies in their capacity to foreground structural inequalities and ensure that transitions (e.g. to sustainability) are people-centred and socially just from the outset [11].

Another reason why SSH knowledge is marginalised is that it can be regarded as introducing controversial perspectives, particularly in climate and sustainability research – for example, because it raises uncomfortable questions about reflexivity on assumptions and values. **Sustainability problems are value-laden** [12]. How a problem is defined, by whom, and what the proposed solutions are is guided by normative values. However, traditional scientific approaches are often rooted in positivist epistemologies and tend to assume objectivity and value-neutrality [13]. SSH disciplines can

question this ideal and can further challenge the epistemic primacy of technology-focused solutions, highlighting the need for profound sociocultural and behavioural transformations. While sustainable technologies and resources are now more affordable and accessible than ever before [14,15], concerns regarding consumption patterns, culturally embedded behaviours, growing distrust of institutions [16,17], and legitimate worries about the social equity of certain sustainable solutions underscore the crucial role of SSH disciplines [11].

Manifestation in the SSH CENTRE

In the interdisciplinary teams, which focused on SSH-STEM collaborations, we observed changing perceptions among SSH and STEM researchers regarding the respective other discipline. Rather than outright doubt about the utility of SSH, what we noticed in perceptions of STEM researchers, particularly at the beginning of the collaboration, were genuine misconceptions around SSH's methods and goals and the frequent lack of aspiration to generalise.

> *It can be intricate for our colleagues from the "hard science", that you work with little samples – how you can come up with a "true science"?* (FEXP2, Interdisciplinary Collaborations)

One of the fundamental differences between natural and social sciences, originating in the work of Wilhelm Dilthey, is the distinction between explanatory (*erklärende*) and understanding (*verstehende*) approaches [18]. In the Interdisciplinary Collaborations, where there was direct collaboration between SSH and STEM scientists, this fundamental distinction was repeatedly manifested.

> *I'm glad. They [STEM colleagues] got a good understanding of social science[s] and humanities. Yes, it's the difference between proving and explaining or understanding. And we cannot have only one hypothesis to explain or [to] understand complex facets of the human behaviour in general. (…) And they look at us, "How can you explain the world with 20 interviews or 200 answers? Come on, guys?" Okay! Because yes, [we] are not trying to prove it, we are just trying to understand and explain.* (FEXP2, Interdisciplinary Collaborations)

A significant number of researchers also reflected on how their perspective on SSH disciplines had changed following the inter- and transdisciplinary collaboration. Several STEM researchers mentioned that they had realised the benefits of inter- and transdisciplinary work, particularly the importance of having a social science perspective. They recognised that an understanding of human behaviour, social dynamics, and contextual factors is crucial for the development of effective technologies and innovations that can be successfully adopted.

> *Yeah, I think it's really essential for any kind of project to have social science studies or humanities to be able to take into account all the different facet and perspective of energy, climate problematics or issues because it's a very complex system, so we need to take into account the technical parts, social parts, human parts and we need to mix all the different domains and science to be able to propose a most complete response as possible.* (MEXP1, Interdisciplinary Collaborations)

However, SSH were still sometimes understood instrumentally, i.e. as a means of engaging stakeholders or increasing acceptance of a technological solution. This was aptly described by one STEM researcher:

> *We need you, social scientists, to give us an advice and to teach us how to present our innovation to people and persuade them.* (MEXP3, Interdisciplinary Collaborations)

Nevertheless, SSH researchers were able to provide insights into barriers, perceptions, and ethical considerations and demonstrate their value beyond engagement roles.

There was no apparent marginalisation of SSH perspectives in the Transdisciplinary Knowledge Brokerage Initiative, as the project was explicitly designed to prioritise SSH sciences in its work with municipalities. However, in certain instances, there was an expectation by some of the municipalities that they would be provided with STEM knowledge, or a lack of clarity about how SSH scientists could contribute to the city through their research. As one mentor pointed out, it would be wrong to assume that municipalities are automatically aware of the SSH-related challenges they might want to address. At the same time, the tendency to seek technical solutions reflects the modus operandi of current climate crisis solutions. Notably, cities involved in the project that had a long-term plan and a clear vision for tackling the climate crisis showed a much stronger understanding of how SSH could be effectively utilised.

During the epistemic experiments themselves, it was once again confirmed that inter- and transdisciplinarity does not just happen; inter- and transdisciplinary collaboration requires considerable effort, and if not properly managed (see Briefing Note 7 – BN7), separate scientific collaborations can occur along the boundaries of SSH and STEM disciplines. A key area that demanded significant communication and learning was the management of differences in terminology, concepts, and methods (see BN6).

In terms of the systemic level of marginalisation of SSH, the SSH CENTRE project has facilitated conditions that support research in SSH. However, building on their previous experiences, researchers testified that SSH disciplines are often marginalised, as STEM researchers tend to dominate a wide range of projects, particularly on topics such as sustainability. Some scientists entered the epistemic experiments with prior experience of inter- and transdisciplinary collaborations from previous engagements or their home institutions. The success of the preceding collaboration had a positive impact on the researchers' inclination to pursue subsequent projects and fostered a deeper comprehension of the other disciplines. Conversely, past unsuccessful collaboration experiences tended to reinforce disciplinary divides and reduce willingness to collaborate across fields.

Recommendations at individual, project, and systemic levels

Persistent structural and framing barriers limit SSH contributions to service roles, yet evidence from SSH CENTRE shows their value when engaged as equal partners. The recommendations below outline actionable measures at researcher, project, and funding-system levels to ensure more balanced collaboration.

Recommendations at the individual/researcher level

For SSH researchers

- Pursue and accept leadership posts: proactively seek Principal Investigator (PI)/co-PI/WP-lead roles and rotate chairing responsibilities [1].
- Avoid self-censorship and self-censoring your ideas or critiques to conform to dominant STEM or policy imaginaries, which ultimately reproduces the existing imbalance [9].

For STEM researchers

- Acknowledge field and expertise limits; do not "DIY" SSH tasks without expertise [4].
- Recognise STEM privilege in agenda-setting [2].
- Focus on the societal challenges you aim to address with your research.

For both

- Cultivate the ability to understand the literature, concepts, theories, and methodologies of collaborating disciplines (SSH for STEM, and vice versa); this involves dedicating time to learning and relearning across disciplines [19,20].
- Critically analyse personal assumptions about science and the public, and question how outreach efforts or disciplinary inputs are conditioned by the political-economic and institutional context of your scientific field [21].

Recommendations at the project level

- Make the public-value of SSH contribution visible; for example, by crafting short impact narratives that evidence benefits not captured by narrow KPIs (key performance indicators) (e.g., deliberation capacity, equity, and democracy) [4,9].
- Expand the diversity of SSH within projects: recruit disciplines that go beyond economics/politics (e.g., anthropology, history, philosophy, STS); record the rationale in the consortium plan [22].
- Negotiate SSH roles that are not merely symbolic at the start of the project: document SSH responsibilities beyond communication/acceptance (e.g., problem formulation, ethics/justice analysis, governance design); include this section in the consortium agreement or a separate project handbook [2,9].
- Write a mixed-methods quality plan: specify how qualitative rigor (credibility, transferability, audit trails) will be assessed alongside quantitative metrics; run a short onboarding for STEM partners [9].
- Specify non-instrumental SSH deliverables: e.g., participatory governance prototypes, justice & equity assessments, socio-technical demand analyses [2,9].

Recommendations at the systemic/broader academia and funding level

- Launch funding opportunities that explicitly prioritize SSH disciplines (including also humanities and other social sciences than economics and law) to serve as intellectual leaders in setting the research agenda and advancing knowledge integration [1].
- Mandate SSH leadership: implement formal conditions requiring SSH researchers to have central or leading roles, such as (co-)principal investigators and work-package leaders [1].
- Ensure diverse peer review panels: actively recruit SSH expertise for proposal evaluator databases and review panels to ensure fair assessment of SSH contributions and methods [2].
- Recognise and fund bottom-up, SSH-led inter- and transdisciplinarity, where research questions and topics arise primarily from the scientific community; top-down approaches often fail to reach genuine knowledge integration and result in weaker projects with restricted role for SSH [1].

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References

1. 1. Välikangas A. The Limited Role of Social Sciences and Humanities in Interdisciplinary Funding: What are Its Effects? Soc Epistemol. 2024 Mar 3;38(2):152–72.
2. Sonetti G, Arrobbio O, Lombardi P, Lami IM, Monaci S. "'Only Social Scientists Laughed'": Reflections on Social Sciences and Humanities Integration in European Energy Projects. Energy Res Soc Sci. 2020 Mar;61:101342.
3. Directorate-General for Research and Innovation (European Commission). Integration of social sciences and humanities in Horizon Europe: first monitoring report on SSH flagged projects funded under Pillar II of Horizon Europe : 2021 2023 [Internet]. Publications Office of the European Union; 2025 [cited 2025 Nov 12]. Available from: https://data.europa.eu/doi/10.2777/6733555
4. Olmos-Peñuela J, Benneworth P, Castro-Martínez E. Are sciences essential and humanities elective? Disentangling competing claims for humanities' research public value. Arts Humanit High Educ. 2015 Feb;14(1):61–78.
5. Bozeman B. Public-Value Failure: When Efficient Markets May Not Do. Public Adm Rev. 2002;62(2):145–61.
6. Schipper ELF, Dubash NK, Mulugetta Y. Climate change research and the search for solutions: rethinking interdisciplinarity. Clim Change. 2021 Oct 18;168(3):18.
7. Bérubé M. The Utility of the Arts and Humanities. Arts Humanit High Educ. 2003 Feb 1;2(1):23–40.
8. Bate J, editor. The Public Value of the Humanities [Internet]. Bloomsbury Academic; 2011 [cited 2025 Jul 10]. Available from: https://library.oapen.org/handle/20.500.12657/58686
9. Royston S, Foulds C. The making of energy evidence: How exclusions of Social Sciences and Humanities are reproduced (and what researchers can do about it). Energy Res Soc Sci. 2021 Jul 1;77:102084.
10. Kania K, Bucksch R, editors. Integration of social sciences and humanities in Horizon 2020: participants, budgets and disciplines: 5th monitoring report on projects funded in 2018 under the Horizon 2020 programme. Luxembourg: European Commission; 2020. 1 p.
11. Cole M. The case for the "climate humanities": toward a transdisciplinary, equity-focused paradigm shift within climate scholarship. Sustain Sci. 2023 Nov;18(6):2795–801.
12. Popa F, Guillermin M, Dedeurwaerdere T. A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. Futur J Policy Plan Futur Stud. 2015;65:45–56.
13. Dudman K, de Wit S. An IPCC that listens: introducing reciprocity to climate change communication. Clim Change. 2021 Sep 7;168(1):2.
14. Gimon E, O'Boyle M, Clack CT, McKee SA. The coal cost crossover: economic viability of existing coal compared to new local wind and solar resources. Vibrant Clean Energy, LLC; 2019.
15. Mountford H, Colenbrander S, Brandon C, Davey E, Brand J, Erdenesanaa D. Putting people at the center of climate action. World Resour Inst. 2019;
16. Boda Z, Medgyesi M, Fondeville N, Özdemir E, European Foundation for the Improvement of Living and Working Conditions, editors. Societal change and trust in institutions. Luxembourg: Publications Office; 2018. 1 p.
17. Prats M, Smid S, Ferrin M. Lack of trust in institutions and political engagement: An analysis based on the 2021 OECD Trust Survey [Internet]. Organisation for Economic Co-Operation and Development (OECD); 2024 Nov [cited 2025 Jul 14]. (OECD Working Papers on Public Governance). Available from: https://www.oecd.org/en/publications/lack-of-trust-in-institutions-and-political-engagement_83351a47-en.html
18. Dallmayr F. Explanation Versus Understanding. In: Kaldis B, editor. Encyclopedia of philosophy and the social sciences. Los Angeles: SAGE Reference; 2013. p. 333–8.
19. Feldhoff B, Stockmann N, Fanderl N, Gahle AK, Graf A, Leger M, et al. Bridging Theories and Practices: Boundary Objects and Constellation Analysis as Vehicles for Interdisciplinary Knowledge Integration. Sustainability. 2019 Sep 27;11(19):5357.
20. Elixhauser S, Boni Z, Gregorič Bon N, Kanjir U, Meyer A, Muttenzer F, et al. Interdisciplinary, but how? Anthropological Perspectives from Collaborative Research on Climate and Environmental Change. Environ Sci Policy. 2024;151:103586-.
21. Cadman R, Syliboy A, Saunders M, Denny S, Denniston M, Barry E, et al. Using positionality and reflexivity to support equity in partnership-driven research. Conserv Biol. 2024;38(6):e14396-n/a.
22. Vadrot ABM, Rankovic A, Lapeyre R, Aubert PM, Laurans Y. Why are social sciences and humanities needed in the works of IPBES? A systematic review of the literature. Innov Eur J Soc Sci Res. 2018 Mar 30;31(sup1):S78–100.

2

Time demands in inter- and transdisciplinary collaboration

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Recognising time as a core resource enables more effective inter- and transdisciplinary collaborations.

Introduction

Time demands are one of the most significant challenges recurring in inter- and transdisciplinary research [1–5]. The inter- and transdisciplinary literature shows that integration across disciplines and with stakeholders requires substantial early investment of time for building shared language, trust, and new methods. The findings of the SSH CENTRE confirm this: both the SSH-STEM Policy Collaborations and the Transdisciplinary Knowledge brokerage Initiatives faced significant up-front and ongoing time requirements. As sufficient time was given to these activities, collaborations matured with this supporting the delivery of meaningful outputs.

This Briefing Note presents the challenge of time for inter- and transdisciplinary research, drawing upon existing literature. It then discusses this topic within the context of the SSH CENTRE project. The Briefing Note closes with recommendations on how to better account for time in inter- and transdisciplinary research at the individual, project, and systemic levels.

What did the SSH CENTRE project do?

SSH CENTRE (Social Sciences and Humanities for Climate, Energy aNd Transport Research Excellence) is a Horizon Europe project that focused on generating best practices for incorporating both Social Sciences and Humanities (SSH) and inter- and transdisciplinary research into the European Union's climate, energy, and mobility transition policy. The SSH CENTRE project deliberately created spaces for *epistemic experimentation* – i.e. structured collaborations that bridge different epistemic (knowledge) cultures to co-produce policy-relevant knowledge:

Interdisciplinary Collaborations for EU Policy Recommendations

The SSH CENTRE project facilitated nearly 30 novel collaborations between the SSH and STEM (Science, Technology, Engineering and Mathematics) disciplines, for strengthening European climate, energy, and mobility policy. These resulted in three edited books, whereby each Interdisciplinary Collaboration produced a chapter. For more see SSH CENTRE Interdisciplinary EU Policy Book Collection.

Transdisciplinary Knowledge Brokerage Initiative

The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

This Briefing Note is one of 10 that present the findings and recommendations from the evaluation of these epistemic experiments. For more, see the Introduction to the Briefing Note collection and the Formative Accompanying Research methodology.

Problem description and literature insights

Inter- and transdisciplinary research examines issues that cannot be adequately dealt with by a monodisciplinary approach [6]. The very nature of inter- and transdisciplinary research means that involving more disciplines or stakeholders increases the complexity of collaboration, which creates time demands. Monodisciplinary research often already has established ways in which it is conducted; researchers are able to share disciplinary jargon, theoretical frameworks or adopt different methodologies more easily. However, inter- and transdisciplinary work "does not just happen" [6] – it is not enough to simply bring researchers together and have them collaborate. As inter- and transdisciplinary research involves scholars and participants from diverse disciplines and social and work settings, they do not have a unified language, theoretical perspective, or overall approach to research. Consequently, the establishment of research approaches requires more time in inter- and transdisciplinary research than monodisciplinary research.

One broad area of time demands relates to **knowledge integration management**. Achieving genuine knowledge integration requires dedicated time and active management throughout the life of the project [7]. Integration is an iterative process and should happen as research is formulated and undertaken, rather than as an afterthought [1]. The management of inter- and transdisciplinary research should focus on supporting team work to achieve knowledge integration, and not be reduced to more administrative tasks like scheduling or handling the budget [6]. For example, a skilful leader can help ensure all team members sufficiently understand each other's contributions, mediate when misunderstandings arise between disciplinary perspectives, and facilitate ongoing dialogue across disciplinary divides. Due to the complexity of inter- and transdisciplinary work, it is necessary to take into account the various adaptations that occur during the research and possible delays when coordinating these projects. In transdisciplinary research in particular, flexibility in framing of the stakeholder engagement is key to better co-produced knowledge outcomes [8]. Briefing Note 7 (BN7) focuses on **coordination and leadership** in more detail, while allocating time for **developing shared vocabularies and understandings** is covered in BN6.

Another aspect of time demands concerns **investment in communication**. Such communication is not merely about sharing scientific findings but about communicating to create a functional inter- and transdisciplinary environment for collaboration. Inter- and transdisciplinary research connects not only different perspectives on a given topic, but also individuals from different research, work, and social cultures. Soft skills are essential for appreciation, recognition, and trust across different perspectives [6]. Therefore, the time demands of communication in inter- and transdisciplinary collaborations involve not only learning the terminology, methodology, and theoretical frameworks of other disciplines, but also becoming familiar with the participants' cultural and academic background, clarifying expectations to each other, and building trust [9,10]. In transdisciplinary work where non-academic participants are involved, an additional layer of time-intensive communication arises, requiring relationship-building, room for trial and error, negotiation, disagreement or even conflict, and ensuring that collaboration is a genuinely two-way process [11]. Regarding **spaces for communication**, see BN8.

The significant time demands of inter- and transdisciplinary collaboration frequently clash with **institutional and structural realities** [12]. Research projects are often confined to short lifespans due to funding patterns; this lack of protected time prevents researchers from building common ground effectively and limits the full development of collaborative practices. Short-term funding is widely deemed inadequate for the necessary long-term planning of inter- and transdisciplinary research [13,14]. Further institutional time constraints result in a conflict with research careers. Individual researchers, particularly early-career researchers, face challenges when trying to devote sufficient time to an inter- or transdisciplinary project while simultaneously meeting other demands and balancing disciplinary projects [15]. Additionally, students participating in inter- and transdisciplinary projects are often hired for a shorter period than the time needed for results to become visible [15].

Manifestation in the SSH CENTRE

Within the SSH CENTRE project, the time demands stemmed from the need to:

- establish a shared understanding and consensus across the inter- and transdisciplinary team;
- negotiate terminology and find a common language;
- develop new tools, methods, and approaches from scratch; and
- conduct extra coordination efforts.

The participants in the SSH-STEM Interdisciplinary Policy Collaborations and the Transdisciplinary Knowledge Brokerage highlighted the need for more time upfront to establish a shared understanding of each other's perspectives, and consensus regarding the expectations and goals of the research project. Time was seen as crucial for the success of the project; researchers repeatedly framed the build-up phase as a necessary investment to make knowledge integration possible. While such negotiations took time, potentially making the researchers struggle to see progress during early stages, they were invaluable in the long term. As researcher FEXP2 put it, the "entry barriers are quite high," requiring "a lot of time ahead," with returns only if the project is "long enough" to benefit from that investment.

> *For me, the time, this time is needed because if I was about to (…) do a project in my own discipline, I can build on my own research (…). But here, even though I had databases or stuff like that, I needed to start from nothing because, you know, I'm working with different people from different [disciplines]. So, we always… we will always need to start from nothing. And this is good, actually. But this time needs to be included in a future project (…). And it's not a lost time. For me, it's an investment because it will really be helpful for the deployment and the implementation of the project. We can be quicker, but we need more time at the beginning.* (FEXP2, Interdisciplinary Collaborations)

Similarly, developing a common language took time, with the terminology needing to be explained, sometimes

simplified, and agreed upon. Reaching a workable shared vocabulary cannot be rushed. Interviewees noted that even after one successful collaboration, subsequent collaborations will not be without such time demands. Developing shared terminology, as well as establishing a shared understanding remains an iterative process, proving that integration cannot be reduced to administrative coordination [1,6,7].

Another time-consuming part of the project was the development of the research procedure itself. Inter- and transdisciplinary work often entailed the development of new tools, methods, or new approaches in general, as existing disciplinary research methodologies did not allow to deal with the research problem sufficiently. As one researcher described:

> *We get the result, and we see that the tools and the classical tools in classical methodology were not fit and pertinent for all the text and we need to define our own tools. We get the result, and we have a lot of iteration like this. It was very, very complicated also because the timing, (…) so we organised [biweekly] meetings to be able to define the different tasks, (…) to be very responsive, to correct the different difficulties and issues.* (MEXP1, Interdisciplinary Collaborations)

Between the two epistemic experiments conducted within the SSH CENTRE, there were differences in terms of the dynamics of time requirements. In the SSH-STEM Interdisciplinary Policy Collaborations, time demands clustered up-front (establishing shared understanding, negotiating common vocabulary, and developing new methods) and around chapter review and revision processes. In the Transdisciplinary Knowledge Brokerage Initiative, time demands reflected different working regimes: municipal cycles, seasonal shutdowns, and shifting availability of all parties. In one case, a city workshop occurred just before the summer holidays, postponing feedback on the workshop. The Knowledge Brokerage programme required dynamic time availability from the researchers:

> *I think it was expected to be more or less like this. The only tricky thing is I always forget that when there is like half a day per week, it doesn't really mean half a day per every week. It means like no work at some weeks and some weeks you need to work like four days on it.* (FECR4, Transdisciplinary Knowledge Brokerage Initiative)

Taken together, the SSH CENTRE epistemic experiments illustrate how time demands in inter- and transdisciplinary collaborations are front-loaded investments in integration and require flexibility on the part of researchers. Nevertheless, the project and systemic levels – the framework in which the research takes place and the support that comes from project funders and call designers – are crucial and fundamentally contribute to the success of research collaborations. For example, the Knowledge Brokerage program had a support system in the form of mentors, which was widely appreciated, and as the program lasted one year, it enabled researchers to spread the work.

> *When I applied, (…) I didn't remember that we were going to have a mentor that actually follow us and also direct in some way our activities. And this work was really fundamental in my opinion, because sometimes in other kind of projects and courses, the participants are completely left alone to do something completely new without any suggestion. And in this case, we were really accompanied, I don't know how to say it, with [Mentor3] in this case. (…) And because it was spread among one year, we could have enough time to organize, to get ready for the workshop, then to finish workshop and now to write the brief.* (FECR5, Transdisciplinary Knowledge Brokerage Initiative)

Further suggestions for supporting inter- and transdisciplinary research at various levels are presented in the following section.

Recommendations at individual, project, and systemic levels

Both the literature and the SSH CENTRE experience show that protecting time for integration transforms time from a barrier into an asset. The recommendations below set out how to better account for time demands at three levels of research practice.

Recommendations at the individual/researcher level

- Develop an understanding of all disciplines involved in the research project: personally commit time to learn other's concepts, methods, and terminology early on in the project.
- Be honest about time availability: plan around uneven weekly loads and signal constraints tied to seasonal cycles.
- Schedule personal reflection time: dedicate moments for reflexivity and reviewing integration progress so that collaborative time is used more effectively [16].

Recommendations at the project level

- Schedule time at the beginning for intensive team building and developing effective communication [9,17].
- Make a non-negotiable 4-8-week build-up phase (scale to project) to do framing, roles, and integration design, with explicit deliverables: shared glossary, problem-framing canvas, integration map, and decision log [9].
- Schedule regular "time check-ins": include short, recurring "are we still on the same page?" moments throughout the project to prevent small misunderstandings from compounding into delays [14].

Recommendations at the systemic/broader academia and funding level

- Fund time for explicit knowledge integration: make dedicated hours for inception, facilitation, mentoring, and reflection eligible in budgets and required in proposals [1,7].
- Provide training and support to coordinators so that they have the knowledge and skills to navigate interdisciplinary teamwork.

- Fund training centres, seed grants, or team-teaching that give researchers "slow time" exposure to other fields before proposal deadlines [6].
- Encourage informal interactions between SSH and STEM colleagues within same institutions so they get a better understanding of their research interests and abilities

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References

1. Harris F, Lyon F, Sioen GB, Ebi KL. Working with the tensions of transdisciplinary research: a review and agenda for the future of knowledge co-production in the Anthropocene. Glob Sustain. 2024;7:e13.
2. Ignatieva M, Eriksson F, Eriksson T, Kätterer T, Tidåker P, Wissman J, et al. Pros and cons of transdisciplinary research: A case study of Swedish lawns and their sustainable alternatives. Urban For Urban Green. 2020 Dec;56:126799.
3. Deutsch S, Keller R, Krug CB, Michel AH. Transdisciplinary transformative change: an analysis of some best practices and barriers, and the potential of critical social science in getting us there. Biodivers Conserv. 2023 Sep;32(11):3569–94.
4. Felt U, Igelsböck J, Schikowitz A, Völker T. Transdisciplinary Sustainability Research in Practice: Between Imaginaries of Collective Experimentation and Entrenched Academic Value Orders. Sci Technol Hum Values. 2016;41(4):732–61.
5. Angelstam P, Andersson K, Annerstedt M, Axelsson R, Elbakidze M, Garrido P, et al. Solving Problems in Social–Ecological Systems: Definition, Practice and Barriers of Transdisciplinary Research. AMBIO. 2013 Mar;42(2):254–65.
6. Di Giulio A. Implementing Interdisciplinarity: Connecting the Mindset of a Worrier, a Dreamer, and a Bookkeeper. In: Practicing Interdisciplinarity [Internet]. Germany: Walter de Gruyter GmbH; 2024 [cited 2025 May 6]. p. 1–6. Available from: https://www.degruyter.com/document/doi/10.1515/9783111339849-001/pdf
7. Lyall C, Bruce A, Marsden W, Meagher L. The role of funding agencies in creating interdisciplinary knowledge. Sci Public Policy. 2013;40(1):62–71.
8. Bracken LJ, Bulkeley HA, Whitman G. Transdisciplinary research: understanding the stakeholder perspective. J Environ Plan Manag. 2015 Jul 3;58(7):1291–308.
9. Gilligan JM. Expertise Across Disciplines: Establishing Common Ground in Interdisciplinary Disaster Research Teams. Risk Anal. 2021;41(7):1171–7.
10. Elixhauser S, Boni Z, Gregorič Bon N, Kanjir U, Meyer A, Muttenzer F, et al. Interdisciplinary, but how? Anthropological Perspectives from Collaborative Research on Climate and Environmental Change. Environ Sci Policy. 2024;151:103586-.
11. Cook BR, Overpeck JT. Relationship-building between climate scientists and publics as an alternative to information transfer. WIREs Clim Change. 2019;10(2):e570.
12. Salmela M, Vienni-Baptista B, Cheas K. Towards the Recognition of Interdisciplinary and Transdisciplinary Researchers. Minerva [Internet]. 2025 Feb 28 [cited 2025 May 14]; Available from: https://doi.org/10.1007/s11024-025-09578-y
13. Välikangas A. The Limited Role of Social Sciences and Humanities in Interdisciplinary Funding: What are Its Effects? Soc Epistemol. 2024 Mar 3;38(2):152–72.
14. Pischke EC, Knowlton JL, Phifer CC, Gutierrez Lopez J, Propato TS, Eastmond A, et al. Barriers and Solutions to Conducting Large International, Interdisciplinary Research Projects. Environ Manag N Y. 2017;60(6):1011–21.
15. Singh P. Understanding Researchers' Positionality in Integrating and Designing the Transdisciplinary Research Process and Outcomes: A Case Study of Thriving Agriculture Project. PennState University; 2025.
16. Steger C, Klein JA, Reid RS, Lavorel S, Tucker C, Hopping KA, et al. Science with society: Evidence-based guidance for best practices in environmental transdisciplinary work. Glob Environ Change. 2021;68:102240-.
17. Bracken LJ, Oughton EA. 'What do you mean?' The importance of language in developing interdisciplinary research. Trans Inst Br Geogr [Internet]. 2006 Sep 30 [cited 2025 May 21];31(3). Available from: https://durham-repository.worktribe.com/output/1584800/what-do-you-mean-the-importance-of-language-in-developing-interdisciplinary-research

3

Organisational structures as challenges to inter- and transdisciplinary collaboration

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Meaningful inter- and transdisciplinary collaboration requires organisational support; yet structures in universities and funding bodies can undermine the very collaborations they call for.

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Interdisciplinary Collaborations for EU Policy Recommendations

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Transdisciplinary Knowledge Brokerage Initiative

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This Briefing Note is one of 10 that present the findings and recommendations from the evaluation of these epistemic experiments. For more, see the Introduction to the Briefing Note collection and the Formative Accompanying Research methodology.

Introduction

Organisational structures, especially those related to funding and career assessment, often hinder genuine inter- and transdisciplinary collaboration. This Briefing Note (BN) addresses a frequent contradictory policy logic, where high-level support for inter- and transdisciplinary work clashes with the mechanisms that govern and reward academic research (such as assessment metrics and departmental divisions). Universities and research institutions are usually organized by disciplines, which leads to silos that make inter- and transdisciplinary collaboration difficult. The SSH CENTRE experience confirms that while organisational rules often continue to constrain genuine inter- and transdisciplinary work, carefully designed project-level support and

the skills of individual researchers can create meaningful collaborations. Still, overcoming these challenges requires structural reforms that actively facilitate interdisciplinary engagement rather than merely endorse it in principle.

Problem description and literature insights

A pervasive issue is the 'paradox of inter- and transdisciplinarity', where such research is encouraged at the policy level but is poorly rewarded or inadequately supported by funding mechanisms and academic structures [1,2]. In governmental policy and strategy documents, inter- and transdisciplinary work is often presented as synonymous with innovation, but in many instances, it is used as a politically useful label that does not translate in meaningful research support. As BN4 and BN5 address further, evaluation metrics, policy directives, and associated governance mechanisms tend to rely on rigid, discipline-based classification systems for evaluation and funding, directly contradicting the stated goals of flexibility and inter- and transdisciplinary inquiry [3].

The **structure of academic institutions** is predominantly disciplinary. This affects individuals' professional careers at all stages, from recruitment to promotion and tenure [4]. Typically, publishing within a discipline and teaching in a department counts toward promotion and tenure; in contrast, researchers, especially early in their careers, are often discouraged from inter- and transdisciplinary work [5]. This is also true for doctoral students as well as organizers of doctoral programmes, as the pressure to rapid degree completion is unfavourable for inter- and transdisciplinary research, given the demands on time and resources [6].

Departmental divisions create further logistical and communication challenges to collaboration, for instance, simply by physical dispersion of team members or the lack of dedicated shared spaces for interaction and knowledge of each other's research [7]. The absence of standardised procedures for aspects such as determining which disciplines to include or the integration of findings results in further complications [8].

Funding systems play an important role here. When based on disciplinarity, they often reinforce these disciplinary silos [7]. While funding for inter- and transdisciplinary research has increased, evaluation remains challenging. Review panels, often discipline-specific or focusing on disciplinary autonomy, tend to exhibit bias against inter- and transdisciplinary projects and applicants and favour "low-risk" research [9]. Thus, inter- and transdisciplinary work consistently experiences lower funding success rates in competitive funding rounds compared to more narrowly defined disciplinary research [1].

Within universities and academic institutions, the **method of allocating resources** can also influence opportunities for inter- and transdisciplinary research. For example, the way overheads are allocated between disciplinary departments can shape whether such collaborations are rewarded and resourced or discouraged through a negative impact on departmental finances [5]. Further, although many research grants are now inter- or transdisciplinary, departmental structures can create pressure for authorship within individual disciplines by rewarding lead authorship – whereas inter- and transdisciplinary work often leads to shared authorship or involves a collaboration with many partners, which is often not counted within departments [5].

Similarly, **academic reward systems** often fail to adequately incentivize inter- and transdisciplinarity. This is related to the departmental control over faculty hiring, promotion, and tenure decisions that prioritize individual disciplinary efforts over collaborative interdisciplinary ones. An example would be the recruitment of a person with a strong publication record in their discipline ahead of someone with fewer publications but who has invested their time in meaningful inter- or transdisciplinary collaborations. There is a "vicious circle" where a lack of organisational support leads to low participation by able researchers, hindering the development of strong intellectual foundations for inter- and transdisciplinary research and the ability to assess its quality [10].

The presence of organisational barriers to inter- and transdisciplinary collaboration also influences the **professional culture** and behaviour of individual researchers. Those engaged in inter- and transdisciplinary fields often face greater difficulties in career advancement, which can diminish motivation and heighten uncertainty about initiating or maintaining such work. Compared with traditional, discipline-based research, inter- and transdisciplinary research typically require more effort and a broader range of skills (particularly in teamwork and communication) due to the absence of shared mental models, languages, and assumptions across disciplines [4–8].

Manifestation in the SSH CENTRE

The SSH CENTRE created supportive conditions for fostering collaborations between SSH and STEM disciplines and overall use of SSH in climate, energy, and mobility research. However, research carried out within the project was not isolated from the organizational structures where scholars were employed, educated, or collaborating. Organisational barriers experienced by participants of SSH CENTRE experiments included siloed organisational structure despite formal support to inter- and transdisciplinarity, metric-driven systems discouraging experimental and risk-taking work, and lack of support for collaboration manifesting in unawareness of potential collaborators from other disciplines.

Participants repeatedly described the policy-practice gap: despite formal encouragement from funders and university councils, these institutions often do not support inter- and transdisciplinary collaboration in practice. Organisational support is, nevertheless, essential, as it can create conditions conducive to inter- and transdisciplinary work. In the interdisciplinary book chapters, researchers from SSH and STEM disciplines collaborated on chapters consisting of policy recommendations on EU's Green Deal climate, mobility, and energy strategies. Coming from institutions organized by disciplinary departments, some of them mentioned rather tokenistic declarations of inter- and transdisciplinary work at their institutions:

> *[T]he way that universities are structured nowadays, it actually makes it much more difficult to collaborate, even though*

> *everybody at universities, everybody at research councils is saying "Oh, we want people to collaborate and to do things together", but the structural reforms that are necessary to enable that are not there.* (MEXP8, Interdisciplinary Collaborations)

The SSH CENTRE could not initiate wide structural reforms by itself. However, as one of the aims of the project was to stimulate effective collaborations between SSH and STEM, it offered substantial support for inter- and transdisciplinary work through its epistemic experiments. In fact, the SSH CENTRE was regarded by most of the researchers as encouraging for further inter- and transdisciplinary scholarship and for the establishment of new inter- and transdisciplinary partnerships.

> *The collaboration was in general really great. We are really happy to have known each other and we are still trying to collaborate in the future.* (FECR5, Transdisciplinary Knowledge Brokerage Initiative)

> *For me, the expectations were completely met and even exceeded because from this first experience, (…) we want to keep on our collaboration and to develop it and to apply for new projects, new initiatives together.* (FEXP3, Interdisciplinary Collaborations)

> *I appreciate the opportunity to collaborate with my colleague from STEM. And it was interesting because we established new form of cooperation, and we are working together on start-ups and new technologies. And I believe that this cooperation will last (…) several years and we will develop new approaches and products (…).* (MEXP3, Interdisciplinary Collaborations)

This was in striking difference with the lack of support for collaboration by their home institutions mentioned by some researchers. Fragmentation of research institutions into disciplinary-organised departments is one of the main causes, manifesting in obstacles as simple as unawareness of potential partnerships.

> *I'm trying to establish several similar collaborations, but [Institution H] and [Nationality C] system of universities are extremely fragmented, there are a lot of people who are doing something like me, but we do not know about [each other]. And this is ineffective.* (MEXP3, Interdisciplinary Collaborations)

One SSH-STEM collaboration formed between researchers from two departments residing in the same building and the same corridor, which, nonetheless, would not happen if it were not for the SSH CENTRE project; they were not aware of the research carried out in the other respective department and did not interact.

> *It feels quite weird that even though we're so close together geographically, we don't communicate. Because (…) when I talked about it with my promoter, it was like "Oh yeah that's a very cool idea because indeed we don't work together enough between those two research groups" and I'm like "But how does that happen". It's very funny that it needs some kind of a trigger, like middle person, to form this kind of connection.* (MECR1, Interdisciplinary Collaborations)

Scientists mentioned that they often do not know who they should reach out to, and expressed interest in matchmaking and cross-pollination events to "know what other departments can and cannot achieve" and to "showcase examples [of Interdisciplinary Collaborations] that did work" (MECR1).

Notwithstanding the limitations that organizational structures placed on inter- and transdisciplinary work, there were also positive experiences that supported collaboration within the SSH CENTRE. For instance, researchers considered having previous inter- and transdisciplinary experience to be very beneficial to such collaborations.

> *I think having some people who had worked in this realm before was really super helpful because they knew what to expect already.* (FECR6, Transdisciplinary Knowledge Brokerage Initiative)

Taken together, these findings confirm that inter- and transdisciplinary collaboration does not fail for lack of willingness, but for lack of structural enabling conditions. Building on what worked in the SSH CENTRE, the following recommendations outline how to create those conditions at individual, project, and systemic levels.

Recommendations at individual, project, and systemic levels

The recommendations highlight what individual researchers can do to make their contributions visible and press for change, what projects can implement to mitigate structural barriers in practice, and what systemic reforms are required if universities and funding bodies are to align their support with their stated ambitions for inter- and transdisciplinary research.

Recommendations at the individual/researcher level

- Proactively connect across silos in your institution to counteract structural fragmentation – even in small steps (informal seminars, joint teaching, collaborations over coffee).
- Join or initiate inter- and transdisciplinary researcher networks or early-career groups that lobby for recognition, training, or shared infrastructure.
- When carrying out inter- and transdisciplinary research projects, identify, clarify and keep the focus on three key aspects that motivate researchers: the practical importance of the work, the learning opportunities offered by the project and the possibilities for career advancement.

Recommendations at the project level

- Invest additional support to bring researchers together physically and in training to develop interactional expertise (the ability to understand other disciplines and communicate effectively) [11,12].

- Hold regular structured sessions where participants reflect on institutional barriers encountered and feed them into recommendations for funders/universities.
- Embed learning about effective inter- and transdisciplinary practices so they do not have to be "re-invented on every occasion" [11].

Recommendations at the systemic/broader academia and funding level

- Dedicate inter- and transdisciplinary funding: establish funding streams explicitly dedicated to inter- and transdisciplinary research, which helps ensure these proposals are not dismissed in the first review stage [11].
- Tailor evaluation processes appropriately for inter- and transdisciplinary research: ensure adequate training for staff and select external review panel members for their experience in inter- and transdisciplinarity [11].
- Provide more recognition for early career inter- and transdisciplinary researchers and acknowledge, reward, or encourage cross-disciplinary collaboration beyond traditional metrics. Implementing the Declaration on Research Assessment (DORA) principles and using narrative CVs are promising pathways to recognizing qualitative achievements [2].
- Develop mentorship schemes tailored to researchers working in inter- and transdisciplinary research in order to help them expand team network and collaboration [13].
- Create permanent research-focused academic posts for inter- and transdisciplinary scholars to address their lack of access to disciplinary teaching posts [2].
- Support inter- and transdisciplinary PhD training that includes resources for methods from more than one discipline [11].

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References

1. Bromham L, Dinnage R, Hua X. Interdisciplinary research has consistently lower funding success. Nat Lond. 2016;534(7609):684–7.
2. Salmela M, Vienni-Baptista B, Cheas K. Towards the Recognition of Interdisciplinary and Transdisciplinary Researchers. Minerva [Internet]. 2025 Feb 28 [cited 2025 May 14]; Available from: https://doi.org/10.1007/s11024-025-09578-y
3. Woelert P, Millar V. The paradox of interdisciplinarity in Australian research governance. High Educ. 2013;66(6):755–67.
4. Mehta SV, Polasky S, Tsakakis E. The Role of Transdisciplinary Approaches in Environmental Economics. Annu Rev Resour Econ. 2024;16(1):233–54.
5. Boden D, Borrego M. Academic Departments and Related Organizational Barriers to Interdisciplinary Research. High Educ Rev. 2011;8.
6. Siedlok F, Hibbert P. The Organization of Interdisciplinary Research: Modes, Drivers and Barriers. Int J Manag Rev IJMR. 2014;16(2):194–210.
7. Jacobs N, Amos M. Removing Barriers to Interdisciplinary Research. 2010 [cited 2025 May 6]; Available from: https://arxiv.org/abs/1012.4170
8. Bammer G. Disciplining Interdisciplinarity: Integration and Implementation Sciences for Researching Complex Real-World Problems. 1st ed. Canberra: ANU E Press; 2013.
9. Gläser J, Laudel G. Governing Science: How Science Policy Shapes Research Content. Eur J Sociol. 2016 Apr;57(1):117–68.
10. Lyall C, Bruce A, Tait J, Meagher L. Interdisciplinary Research Journeys : Practical Strategies for Capturing Creativity. In: Lyall C, Bruce A, Tait J, Meagher L, editors. Interdisciplinary Research Journeys : Practical Strategies for Capturing Creativity [Internet]. 1st ed. London: Bloomsbury Academic; 2011 [cited 2025 May 6]. Available from: https://www.bloomsburycollections.com/monograph?docid=b-9781849661782
11. Lyall C, Bruce A, Marsden W, Meagher L. The role of funding agencies in creating interdisciplinary knowledge. Sci Public Policy. 2013;40(1):62–71.
12. Gilligan JM. Expertise Across Disciplines: Establishing Common Ground in Interdisciplinary Disaster Research Teams. Risk Anal. 2021;41(7):1171–7.
13. Brown SA, Sparapani R, Osinski K, Zhang J, Blessing J, Cheng F, et al. Team principles for successful interdisciplinary research teams. Am Heart J Plus Cardiol Res Pract. 2023 Aug;32:100306.

4

Evaluation metrics in inter- and transdisciplinary collaboration

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Conventional metrics devalue inter- and transdisciplinary research by privileging short-term, quantifiable outputs over process and integration.

Introduction

This Briefing Note (BN) delves into the challenges of assessing the quality and impact of inter- and transdisciplinary work. The literature shows that inter- and transdisciplinarity are difficult to measure using current metrics. This difficulty is related, on the one hand, to the nature of inter- and transdisciplinary research, and on the other hand, to prevailing disciplinary and STEM-based norms that disadvantage inter- and transdisciplinary research, and SSH disciplines therein. The SSH CENTRE experiments confirm this, showing the benefits and limits of creating a conducive environment for greater SSH engagement in inter- and transdisciplinary research within a research collaboration. These insights highlight that overcoming metric barriers requires action across multiple levels, and the note concludes with corresponding recommendations for researchers, projects, and broader academic systems (including funding).

What did the SSH CENTRE project do?

SSH CENTRE (Social Sciences and Humanities for Climate, Energy aNd Transport Research Excellence) is a Horizon Europe project that focused on generating best practices for incorporating both Social Sciences and Humanities (SSH) and inter- and transdisciplinary research into the European Union's climate, energy, and mobility transition policy. The SSH CENTRE project deliberately created spaces for *epistemic experimentation* – i.e. structured collaborations that bridge different epistemic (knowledge) cultures to co-produce policy-relevant knowledge:

Interdisciplinary Collaborations for EU Policy Recommendations

The SSH CENTRE project facilitated nearly 30 novel collaborations between the SSH and STEM (Science, Technology, Engineering and Mathematics) disciplines, for strengthening European climate, energy, and mobility policy. These resulted in three edited books, whereby each Interdisciplinary Collaboration produced a chapter. For more see SSH CENTRE Interdisciplinary EU Policy Book Collection.

Transdisciplinary Knowledge Brokerage Initiative

The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

This Briefing Note is one of 10 that present the findings and recommendations from the evaluation of these epistemic experiments. For more, see the Introduction to the Briefing Note collection and the Formative Accompanying Research methodology.

Problem description and literature insights

The fundamental metric barriers in inter- and transdisciplinary collaboration stem from the reliance on traditional, narrow measures of academic quality that are incompatible with the nature and goals of inter- and transdisciplinary research. Such reliance creates significant disadvantages, particularly for the SSH disciplines. The metric barriers can be grouped into three areas: the failure to capture the evolving process of inter- and transdisciplinary knowledge integration and the long-term character of outcomes; the dominance of conventional metrics and quantification bias; and the issue of standards of generalizability and quantifiability.

Rather than static, inter- and transdisciplinary research is fundamentally dynamic and **evolving processes of knowledge integration** [1–3]. Knowledge integration is not a single event but is often undertaken in phases, such as problem framing, co-production of knowledge, and the integration and application of results [4–6]. Current output measures often fail to adequately capture these dynamic processes, assessing the products of research, such as publications and citations, rather than the quality of integration processes [2,7]. Furthermore, because the impacts of inter- and transdisciplinary research are long-term and often unforeseeable, dispersed across diverse areas, and can be delayed in time, it makes them difficult to capture with a priori measures [1]. Many inter- and transdisciplinary funding programmes explicitly aim for societal transformations that involve structural changes in worldviews, power relations, social networks, or physical infrastructure [4]. Such impacts are inherently long-term and systemic, making it exceptionally difficult to attribute them, using a logic of direct linear causality, to a single research project [8].

Another of the most significant barriers is the persistent use of **conventional academic output metrics**, which typically prioritize disciplinary research [3,6]. Evaluation is primarily based on measures of academic outputs, such as the number of publications, the prestige of the publishing journal (often expressed through its impact factor), and citation counts. This metric inherently favours fields, often in STEM, where data are standardised and traditional journal publications are the primary output [2,3]. However, SSH authors often publish in book chapters and regional non-English journals, which are typically not covered by major bibliometric databases like ISI or Scopus, thus making their contributions less visible and measurable [2]. Importantly, there is a strong preference in evaluation documents and funding calls for quantified performance indicators and statistical evaluation metrics, rather than qualitative judgements of research quality [9]. The push for standardised, quantifiable, and scalable metrics often reflects a STEM-centric worldview that misunderstands and devalues the unique contributions and validation standards of SSH, thereby creating significant barriers to genuine knowledge integration and reinforcing power asymmetries [9–11].

This issue comes from a **fundamental misunderstanding of the differences between SSH and STEM disciplines**. Inter- and transdisciplinary research often involves both SSH and STEM fields, yet traditional forms of academic evaluation are largely shaped by STEM norms (such as the number of patents or citations) [1]. However, SSH and STEM disciplines study fundamentally different kinds of phenomena. STEM fields typically investigate phenomena that follow regular, law-like patterns, whereas social sciences study phenomena that are culturally and socially dependent [12,13]. For that reason, **many branches of social sciences and humanities do not look for general laws but interpret behaviours and meanings instead**. Even when social sciences employ quantitative methods to identify patterns and correlations, the interpretation of these patterns requires contextual and cultural understanding. It is impossible to understand society without understanding meaning, and meaning cannot be found in a similar way as natural laws are.

Values, ethics, and reflexivity are important in inter- and transdisciplinary research, which acknowledges that researchers themselves, and the research processes, shape the way in which phenomena are studied and understood [12,14]. A strength of SSH is its centring of the role of positionality and its acknowledgment of subjectivity. When SSH is pushed towards evaluation metrics that originate in STEM logics (i.e. a positivist paradigm), it loses its power to contribute with understandings that recognize the specificities of the (social) phenomena it studies.

Of course, science often studies phenomena that fall within the remit of *both* SSH and STEM research. This is precisely when inter- and transdisciplinary research is highly relevant. However, if the metrics used to evaluate such research are unable to recognise the value of SSH disciplines, it can have negative consequences ranging from research being rejected due to an inability to assess its SSH dimension, to internal tensions within research teams where SSH disciplines are considered subordinate (which, as BN1 shows, is common).[1]

Manifestation in the SSH CENTRE

The SSH CENTRE actively created a conducive environment for greater SSH engagement in inter- and transdisciplinary research, but of course, the project was not isolated from dominant metric regimes. Metric standards in the SSH CENTRE project were manifested both directly, through norms (especially disciplinary ones), which were an important influence that needed to be addressed, and indirectly, through previous experiences with other researchers' projects. At the level of project and broader academia norms, researchers mentioned how metric regimes create structural disincentives for inter- and transdisciplinarity – especially in contrast to the SSH CENTRE.

> *Universities are run increasingly on the basis of metrics and the basis of outputs and the basis of being able to quantify everything, which then gets in the way of taking risks, which gets in the way of talking to people from outside your disciplines because in order to maximise your own metrics, all you want to do is just gather as much as you can for yourself and then, you know, use that as a basis for evaluation.* (MEXP8, Interdisciplinary Collaborations)

1 These concerns echo ongoing reform movements. At the international level, initiatives such as DORA (Declaration on Research Assessment), the Leiden Manifesto, and the Coalition for Advancing Research Assessment (CoARA) advocate replacing simplistic metrics with broader, qualitative evaluation principles.

Multiple researchers mentioned that in academia, there is a structural embedding of metric barriers that favour predominantly quantifiable and short-term results. This leads both funders and researchers to avoid exploratory or experimental inter- and transdisciplinary work, as their outcomes are uncertain, hard to measure, and slow to emerge. Moreover, metric-driven incentives can discourage collaboration across disciplines, even when researchers may personally value it.

As mentioned in the previous section, a significant part of the discrepancy between metrics and inter- and transdisciplinary research stems from STEM-based standards, which are unable to appropriately capture the benefits of SSH disciplines. Recognising the different but equally valid approaches of SSH and STEM disciplines was a very important part of scientists' reflection within the SSH CENTRE activities, enabling the inter- and transdisciplinary collaboration itself. The SSH CENTRE fostered the position of SSH in inter- and transdisciplinary collaborations, but this did not happen by itself and negotiations between different disciplines were, of course, necessary – and these processes show the continuing influence of dominant STEM standards.

Among some STEM researchers, there was a noticeable tendency to rely on quantitative methods in the overall inter- and transdisciplinary research design. When confronted with ambiguous or value-laden goals (e.g., citizen engagement), some resorted to quantitative targets, which created friction at the start of integration and required negotiation. This illustrates the process-metric misfit mentioned in the literature above: project goals around deliberation, inclusion, or values cannot easily be reduced to metrics, yet some STEM members, drawing on their disciplinary education, tried to recast them into quantifiable form. In a debrief interview for the Knowledge Brokerage Programme, a mentor described an initial insistence of one STEM researcher on numbers and quantification, which eased later through the collaborative process and exposure to other logics. Inter- or transdisciplinary leadership and mentorship were vital in such cases (see BN7). Similarly, one participant mentioned a friction in the Knowledge Brokerage Programme related to disagreement about methodology:

> *At the beginning, for example, [Researcher20] was really strong in the fact of proposing some methods, quantitative methods and data, and was going on with this for months. So, we were literally talking different languages and with different perspectives. That doesn't mean that we were angry at each other, but that it was really hard to move on something different than quantitative.* (FECR2, Transdisciplinary Knowledge Brokerage Initiative)

The continuous negotiation of different research logics and the value of an alternative approach to the dominant STEM-based, quantification-driven approach was particularly evident in the interdisciplinary experiments, which directly targeted SSH-STEM collaborations. Throughout and after the collaboration, many STEM scientists repeatedly mentioned that they recognized the value of SSH science when they understood the methodology of measurement or differing abilities to generalize. One STEM researcher described SSH as exploring "more erratic" subject matters:

> *For the same situation, you have two different behaviour[s]. And [to] understand why these people behave like this, and those ones behave like this – for me, that's social studies. So it's something very difficult for us in [STEM] because (…) we work most of the time in the deterministic world and sometimes, like in [a field of physics] (…), it's [a] probabilistic world, but the human behaviour, that's something more erratic. So, it's very difficult to develop an exact mathematical model to explain the behaviour and people's choices.* (MEXP1, Interdisciplinary Collaborations)

The relationship between STEM and SSH disciplines is discussed in greater detail in BN1, which also mentions the experienced difference between proving and explaining as distinct approaches in STEM and SSH fields as manifested in the SSH CENTRE project.

Recommendations at individual, project, and systemic levels

Because conventional evaluation metrics misrepresent the quality of inter- and transdisciplinary work, overcoming metric barriers requires action across multiple levels: individual researchers, project design, and systemic evaluation frameworks.

Recommendations at the individual/researcher level

- Do not assume that the value of your inter- and transdisciplinary approach is self-evident. Explicitly justify your methods and demonstrate how they meet both disciplinary and inter/transdisciplinary quality standards, especially if your work violates established disciplinary tenets or reveals limitations [1].
- Clearly articulate how your outputs transcend disciplinary silos and achieve epistemic integration, including practicing active reflexivity [2].
- Embrace your inter- and transdisciplinary identity as valuable and distinct, rather than viewing it as a deviation from disciplinary norms. It can be particularly helpful to participate in supportive communities that engage in an honest exchange of vulnerabilities among colleagues for mutual empowerment [15].

Recommendations at the project level

- Adopt context-specific quality criteria. One proposed solution is a rubric-based assessment tool grounded in four core principles: relevance, credibility, legitimacy, and effectiveness [3].
- Invest in developing and using "process knowledge" – the methods and structures that help design, execute, and evaluate inter- and transdisciplinary research – and employ evaluation frameworks that align with SSH values such as fairness, inclusivity, and long-term impact [5].
- Integrate formative tools like logic models, log-frame analysis, or radar-like graphs to define and track progress toward integration and learning goals throughout the project lifecycle [1].

Recommendations at the systemic/broader academia and funding level

- Move beyond conventional "proxy" metrics (e.g., publications, citations) and develop direct measures of quality that assess the substance of the research, such as its coherence, novelty, experimental rigour, or problem-solving effectiveness [1].
- Reform peer review of research proposals to be fairer to inter- and transdisciplinary research. Key recommendations include:
  - Select review panel members for their experience in inter- and transdisciplinarity [3].
  - Use matrix panels that combine disciplinary and interdisciplinary experts [1].
  - Train staff and reviewers to distinguish genuine interdisciplinarity and provide clear instructions aligned with the inter- and transdisciplinary goals of the funding call [16].
  - Allocate time at the start of panel meetings for reviewers to develop a common understanding of the evaluation criteria [16].
  - Ensure evaluation guidelines are more open to different ways of doing and writing science and stop systematically excluding qualitative analyses.
- Identify emergent fields that do not fit into existing categories through co-citation networks and term clustering – with the goal to create flexible assessment frameworks tailored to context, scale, and stage of integration, rather than enforcing universal standards [2].
- Allow for projects to 'fail'. All project funding seems to ask for success-related evaluations (such as KPIs), with no space to say it did not work. Likewise, so-called experimental approaches are often talked about in terms of scaling-up before the project ever begins.
- Allow fixed-term researchers to lead grant applications and design reward mechanisms that value transformative societal outcomes, not just publications [1].

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References

1. Klein JT. Evaluation of Interdisciplinary and Transdisciplinary Research. Am J Prev Med. 2008 Aug;35(2):S116–23.
2. Wagner CS, Roessner JD, Bobb K, Klein JT, Boyack KW, Keyton J, et al. Approaches to understanding and measuring interdisciplinary scientific research (IDR): A review of the literature. J Informetr. 2011 Jan 1;5(1):14–26.
3. Belcher BM, Rasmussen KE, Kemshaw MR, Zornes DA. Defining and assessing research quality in a transdisciplinary context. Res Eval. 2016 Jan 1;25(1):1–17.
4. Schneider F, Buser T, Keller R, Tribaldos T, Rist S. Research funding programmes aiming for societal transformations: Ten key stages. Sci Public Policy. 2019;46(3):463–78.
5. Lawrence MG, Williams S, Nanz P, Renn O. Characteristics, potentials, and challenges of transdisciplinary research. One Earth. 2022 Jan 21;5(1):44–61.
6. Singh P. Understanding Researchers' Positionality in Integrating and Designing the Transdisciplinary Research Process and Outcomes: A Case Study of Thriving Agriculture Project. PennState University; 2025.
7. Garner J, Porter AL, Borrego M, Tran E, Teutonico R. Facilitating social and natural science cross-disciplinarity: Assessing the human and social dynamics program. Res Eval. 2013;22(2):134–44.
8. Gläser J, Laudel G. Governing Science: How Science Policy Shapes Research Content. Eur J Sociol. 2016 Apr;57(1):117–68.
9. Royston S, Foulds C. The making of energy evidence: How exclusions of Social Sciences and Humanities are reproduced (and what researchers can do about it). Energy Res Soc Sci. 2021 Jul 1;77:102084.
10. Woelert P, Millar V. The paradox of interdisciplinarity in Australian research governance. High Educ. 2013;66(6):755–67.
11. Olmos-Peñuela J, Benneworth P, Castro-Martínez E. Are sciences essential and humanities elective? Disentangling competing claims for humanities' research public value. Arts Humanit High Educ. 2015 Feb;14(1):61–78.
12. Montuschi E. The objects of social science. London: Continuum; 2003. 160 p.
13. Little D. Chapter 12. On the Scope and Limits of Generalizations in the Social Sciences. In: Microfoundations, method, and causation: Essays in the philosophy of the social sciences. Transaction Publishers; 1998.
14. Montuschi E. Scientific objectivity. In: Cartwright N, Montuschi E, editors. Philosophy of social science: A new introduction. Oxford: Oxford University Press, USA; 2014. p. 123–44.
15. Salmela M, Vienni-Baptista B, Cheas K. Towards the Recognition of Interdisciplinary and Transdisciplinary Researchers. Minerva [Internet]. 2025 Feb 28 [cited 2025 May 14]; Available from: https://doi.org/10.1007/s11024-025-09578-y
16. Lyall C, Bruce A, Marsden W, Meagher L. The role of funding agencies in creating interdisciplinary knowledge. Sci Public Policy. 2013;40(1):62–71.

5

Disciplinary design and evaluation standards in inter- and transdisciplinary collaboration

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How funding calls are designed and reviewed determines whether SSH can meaningfully contribute to inter- and transdisciplinary research.

Introduction

SSH researchers often encounter barriers to meaningful engagement in inter- and transdisciplinary collaboration, stemming from disciplinary expectations that are applied during funding call design and review processes of both proposals and research outputs. Funders, call designers, and reviewers act as gatekeepers, determining which knowledge is considered valuable and which collaborations and outputs receive support. When knowledge contributions are defined by disciplinary or STEM-based standards, they block SSH involvement and hinder genuinely integrative inter- and transdisciplinary work.

Building on literature insights, this Briefing Note (BN) first outlines where gatekeeping occurs and delves into the

What did the SSH CENTRE project do?

SSH CENTRE (Social Sciences and Humanities for Climate, Energy aNd Transport Research Excellence) is a Horizon Europe project that focused on generating best practices for incorporating both Social Sciences and Humanities (SSH) and inter- and transdisciplinary research into the European Union's climate, energy, and mobility transition policy. The SSH CENTRE project deliberately created spaces for *epistemic experimentation* – i.e. structured collaborations that bridge different epistemic (knowledge) cultures to co-produce policy-relevant knowledge:

Interdisciplinary Collaborations for EU Policy Recommendations

The SSH CENTRE project facilitated nearly 30 novel collaborations between the SSH and STEM (Science, Technology, Engineering and Mathematics) disciplines, for strengthening European climate, energy, and mobility policy. These resulted in three edited books, whereby each Interdisciplinary Collaboration produced a chapter. For more see SSH CENTRE Interdisciplinary EU Policy Book Collection.

Transdisciplinary Knowledge Brokerage Initiative

The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

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persistent disciplinary standards in science, including how this influences the design of funding calls, the evaluation of proposals submitted to them, and the knowledge outputs produced. It then demonstrates how concrete design choices within the SSH CENTRE project shaped the possibilities for meaningful SSH engagement in inter- and transdisciplinary research. Building upon these two sections, the Briefing Note concludes with recommendations at three levels – the individual, the project and the systemic.

Problem description and literature insights

In the design of funding calls, a fundamental problem is the expectation that inter- and transdisciplinary research should fit into general, discipline-oriented funding calls, despite this being problematic for inter- and transdisciplinary proposals [1]. As such, the literature strongly advocates for the **creation of new funding schemes and dedicated funding streams specifically designed for inter- and transdisciplinary research** to overcome inherent biases in traditional systems [2]. For example, the short-term funding format conflicts with the long-term aspects of inter- and transdisciplinary research, including the necessary negotiation and build-up phase (see BN2 on Time demands), methodologies with a longer duration, and the long-term nature of results [3].

Funding calls often fail to clearly articulate the need for genuine integration of knowledge, methods, and perspectives, distinguishing it from superficial multidisciplinary juxtaposition. Similarly, in cases where funding calls are determined top-down, i.e., using pre-set policy goals alone, they rarely achieve meaningful integration of knowledge [4]. Our Research and Innovation Agenda explores this issue further and offers recommendations for how applied science can be rethought for policy relevance.

When evaluating and reviewing proposals to funding calls, evidence still suggests that **interdisciplinary proposals face lower funding success** [5]. While some reviewers have prior interdisciplinary experience, review panels remain dominated by disciplinary experts who may lack sufficient familiarity with both SSH and STEM or inter- and transdisciplinarity itself [2,6]. The issue is further compounded by a lack of agreed indicators for inter- or transdisciplinary quality, leading reviewers to resort to disciplinary criteria [2,7]. As a result, strong inter- and transdisciplinary proposals may be undervalued even though they meet the call objectives.

These recurring barriers in the design of funding calls and in the evaluation of submitted proposals and outputs in inter- and transdisciplinary collaboration stem from deeper structural issues. A fundamental root cause is the persistence of **disciplinary** (rather than inter- and transdisciplinary) **standards** in science. Other central issues are covered elsewhere in this series of Briefing Notes (BNs): *STEM-based dominance* is discussed in BN4 (Evaluation metrics in inter- and transdisciplinary collaboration) and BN1 (Balancing SSH and STEM contributions), while overall *misunderstanding of the nature of inter- and transdisciplinary work* is addressed, among others, in BN2 (Time demands) and BN3 (Organisational structures).

The issue of disciplinarity is constantly present for inter- and transdisciplinary researchers, since science is, generally, governed by distinct disciplines. Since the 19th century, the norm of the single-discipline expert has become increasingly entrenched, against which inter- and transdisciplinary work often appears unconventional or erroneous [1,8]. Although disciplinary approaches have recently been questioned in the context of urgent, "wicked problems" of the present (e.g., climate change, sustainability, global inequality) [9–11], which cannot be adequately addressed by monodisciplinary approaches, it remains the dominant mode of organizing science [1]. There is a frequent "paradox of interdisciplinarity", where there is widespread policy encouragement for inter- and transdisciplinary research, but it is often poorly rewarded by funding instruments [1,5].

This disciplinary approach shapes the **design of funding calls**, the **evaluation of proposals** submitted to them, and the **knowledge outputs** that are produced. On the design side, disciplinary norms inform the structure of calls and templates, which often assume mono-disciplinary outputs and short-term methods, leaving little space for negotiation, integration, or long-term inter- and transdisciplinary approaches. On the evaluation side, disciplinarity produces reviewer mismatch and a lack of appropriate evaluation criteria. Reviewer mismatch refers to a situation where proposals are assigned to reviewers who are ill-equipped to evaluate all parts of an interdisciplinary project [2,5]. Reviewers, anchored in their own fields, may also penalise unconventional approaches and favour their own scientific views (called "cognitive cronyism") [12]. Furthermore, there can be a misalignment of evaluation criteria with the objectives and methodologies of inter- and transdisciplinary proposals. As many reviewers apply their own disciplinary perspectives and disciplinary quality criteria, many inter- and transdisciplinary research proposals have difficulty obtaining funding [13]. These difficulties can also extend to the peer review of research outputs, particularly when they are judged by disciplinary standards and expectations.

Manifestation in the SSH CENTRE

As part of the SSH CENTRE project, epistemic experiments were conducted that created space for inter- and transdisciplinary collaboration – both between SSH-STEM researchers and between researchers and municipalities (see the first page). These opportunities offered through the SSH CENTRE project took the form of research funding calls. This format allowed us to observe the processes of designing and evaluating funding calls, as well as the opportunity to identify challenges associated with inter- and transdisciplinary cooperation and the involvement of SSH disciplines. Importantly, we were able to explore the funding and collaboration processes, as well as the production of outputs (book chapters and knowledge brokerage reports).

The 29 Interdisciplinary Collaborations funded through the SSH CENTRE project were selected from applications received to an open call. The internal criteria were established by the book editors, who were members of the SSH CENTRE consortium. These criteria were informed by commitments made when designing the overall project, with these commitments in turn aligning with the Horizon Europe framework and the funding call that funds the SSH CENTRE project. In practice, this meant that some strong chapter

proposals with a local focus were dropped despite the importance of the topic because the link to EU-scale policy was not explicit in the proposal.

> *One of the chapters we were excited was from a country in Central and Eastern Europe, but it was on agriculture, and it was very locally focused so they couldn't do the link with European policy making (…). At the end that was a pity (…) because we found that agriculture is a very important topic, but obviously, as the books needed to be very linked with policy at the European level, we couldn't accept that.* (Project Partner 1, Interdisciplinary Collaborations)

This project partner mentions a broader issue of the imperative of European-scale applicability, which is addressed by our Research and Innovation Agenda in a section on recognition of local manifestations of sustainability challenges and solutions.

An important criterion when selecting the Interdisciplinary EU Policy Collaboration teams was that the SSH and STEM researchers had not previously collaborated across the SSH-STEM boundary of the group (previous collaboration within SSH-only or STEM-only researchers was allowed). This created a relatively strict criterion for applicants, as it meant that they had to find suitable collaborators across the disciplinary divide.

> *I think there was a constraint [that] you should not have worked together before within the same SSH and STEM team [i.e. across SSH and STEM]. That was still, I would say, fine, but it's a constraint nevertheless, because the first people who comes to your mind when you would like to write a book chapter or a paper is the ones you already have a connection with.* (Project Partner 2, Interdisciplinary Collaborations)

The selection committee was concerned because new applications were initially slow to come in and they received many queries about this criterion; they thus considered extending the call. However, the committee ultimately decided against doing so, as the goal was to publish the books by September 2024, and further delays caused by issuing another call would have meant less time for the teams and editors. It also became apparent that the calls submitted allowed for the selection of high-quality proposals that met the evaluation criteria. This, however, illustrates the trade-off between procedural flexibility and hard project deadlines; building functioning interdisciplinary teams requires long-term relationship-building and trust, which can conflict with time pressures. Ultimately, tight timelines narrow the space for adaptive proposal design.

The committee further debated how to treat STEM-heavy proposals with tenuous SSH links, as well as the inverse – SSH-led interdisciplinary teams with weak links to STEM disciplines. In either direction, imbalanced interdisciplinarity leads to tokenism.

> *For instance, there was one [application] that we all quite liked, but on closer inspection, [it] turned out that they just didn't have any STEM background. (…) We had to pull them [out] even though I think we're all kind of expecting that we're going to accept them. We thought they'd be an SSH led project, empowering SSH led project teams, but actually, it was just complete tokenism and there wasn't any STEM in it. (Project Partner 3, Interdisciplinary Collaborations)*

Paradoxically, it was helpful to focus on the disciplinary background of individual applicants and to evaluate and categorise it quite strictly – thereby ensuring the interdisciplinary character of the collaboration. Referring to the literature insights above, this shows the importance of clear evaluation and dedicated inter- and transdisciplinary criteria to counter monodisciplinarity and to support genuinely integrative work.

Similar selection dynamics were evident in the Transdisciplinary Knowledge Brokerage Programme. Here, the selection committee sought not only disciplinary diversity when identifying successful applicants, but also alignment in how applicants conceptualised key themes such as 'energy communities'. Strongly divergent epistemic framings were judged unproductive, so panels intentionally selected teams that were different in discipline but convergent in goals. At the same time, inclusion criteria such as gender balance and Global South participation were given weight in the selection process, although external structural barriers – most strikingly visa restrictions – still excluded some selected participants. This demonstrates that even when inter- and transdisciplinary calls are carefully designed for fairness and inclusivity, external systems and rigid timelines may undermine these intentions.

Disciplinary standards also posed challenges to the researchers when producing their book chapters, particularly in the peer review process. Chapters submitted to the Interdisciplinary EU Policy Collaboration book series were subjected to double-blind peer review. In the second interview series, 7 of 15 researchers commented on this process. Several of them expressed appreciation for the level of detail included, with the overall peer-review process being regarded as very thorough – but this too has sometimes been considered a complication. As this project was of an interdisciplinary nature, the reviewers were drawn from a variety of SSH and STEM disciplines. This diversity of perspectives ensured that the reviewers contributed a range of insights that might not have been apparent to the authors. As researchers noted, it improved the quality of chapters, but it also often added another

> *layer of complexity (…) [to the] already complex writing process that we [the researchers] faced because of our [disciplinary] differences.* (FEXP2, Interdisciplinary Collaborations)

Assessment processes can hinder or facilitate inter- and transdisciplinary work. For example, in the context of the peer-review process, researchers frequently mentioned strict limits on the number of words and figures that did not allow for flexibility. Yet, if slightly exceeding the limit improves the overall quality, many felt it could have been justified. Researchers from SSH disciplines experienced this limitation in the literature review section, which some felt restricted their ability to contextualise their research more broadly. A researcher from a STEM discipline pointed out that only one equation could be included in the entire chapter, so he created an online appendix to explain the model he used. Despite these reservations, scientists noted that the limitations contributed to the conciseness of their chapters.

> *I think it forces you to write sentences (…) maybe into a style that's a bit different, that you wouldn't use normally. But from the other side, I have all the understanding for the*

editors (…), you have a fixed limit because otherwise you can go haywire and everyone can submit a bit what they desire and then you don't have a good structure in the rest of your book. (MECR1, Interdisciplinary Collaborations)

The SSH CENTRE's calls and review processes illustrate how concrete design choices – such as the scale of policy relevance required, eligibility rules for team composition, time constraints, criteria for balancing SSH and STEM, reviewer expertise, and even formatting limits – directly shape the possibilities for meaningful SSH engagement in inter- and transdisciplinary research. While some mechanisms support inter- and transdisciplinarity and improved quality, others sideline valuable perspectives or reinforce disciplinary defaults. These findings highlight the pivotal role of call design and review practices (of both proposals and outputs) in either enabling or constraining genuine integration.

Recommendations at individual, project, and systemic levels

As the design and evaluation of funding calls take place at the systemic level, this is where the most decisive changes are required. Yet, meaningful progress also depends on how projects structure their collaborations and how individual researchers present and defend interdisciplinarity in their work.

Recommendations at the individual/researcher level

- Explicitly demonstrate interdisciplinarity: show how SSH and STEM are integrated in your research proposals.
- Learn to "translate" across disciplines: justify methods in terms legible both to SSH and STEM evaluators/reviewers.

Recommendations at the project level

- Emphasise SSH contributions: SSH issues need to be deeply integrated into the concept phase (setting the project direction), not merely added on later as a tool for knowledge transfer or impact generation [9].
- Balance inclusivity with feasibility: balance SSH and STEM participation without lapsing into tokenism, ensuring teams are integrative rather than artificially mixed.
- Provide mentorship and leadership: guidance (as in the Knowledge Brokerage programme) can help manage epistemic differences and ensure alignment across diverse framings.
- Ensure adequate time and flexibility: recognise that achieving genuine integration, particularly in collaboration with non-academic stakeholders, requires significant time to build mutual understanding and shared frameworks [2] (see also BN2 on Time demands).

Recommendations at the systemic/broader academia and funding level

- Ensure both programme officers and academic reviewers (of proposals and outputs) receive adequate training to distinguish genuine inter- and transdisciplinarity from superficial multidisciplinarity. Review panels evaluating inter- or transdisciplinary funding proposals must be composed of external members selected for their experience in interdisciplinarity, and review panel discussions should dedicate time at the outset to establish a shared understanding of the program goals and criteria for judging inter- and transdisciplinary proposals [2].
- Where the goal is genuine knowledge integration, encourage bottom-up inter- or transdisciplinary approaches, whereby questions arise from the scientific or stakeholder community, rather than relying solely on strategic top-down approaches [4].
- Explicitly acknowledge SSH disciplines: funding calls, such as those within Horizon Europe climate, energy, and mobility topics, should explicitly consider and report which specific SSH disciplines they are focusing attention on, rather than using SSH as a generic blanket term [9].
- Cross-funder collaboration: when multiple funders invest together, sharing ownership and modelling good inter- and transdisciplinary collaborative practice (e.g., good communication and collective vision), success is enhanced [2]. The UK's Rural Economy and Land Use Programme (RELU) is an example of joint funding and decision-making by multiple research councils, including specific seed-corn funding mechanisms to build novel inter- and transdisciplinary partnerships [14].

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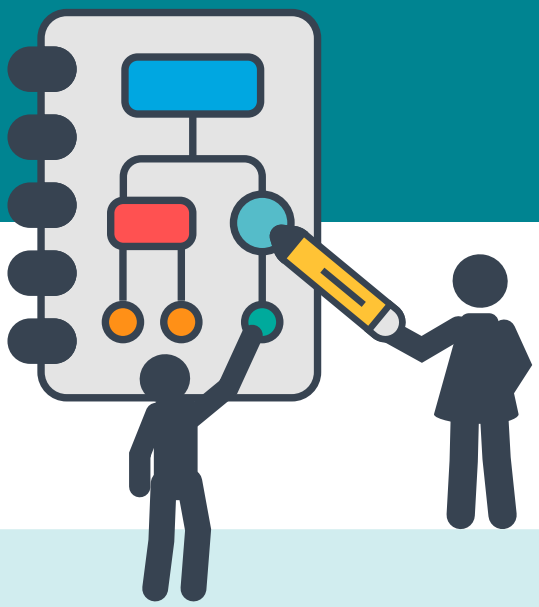
References

1. Salmela M, Vienni-Baptista B, Cheas K. Towards the Recognition of Interdisciplinary and Transdisciplinary Researchers. Minerva [Internet]. 2025 Feb 28 [cited 2025 May 14]; Available from: https://doi.org/10.1007/s11024-025-09578-y
2. Lyall C, Bruce A, Marsden W, Meagher L. The role of funding agencies in creating interdisciplinary knowledge. Sci Public Policy. 2013;40(1):62–71.
3. Pischke EC, Knowlton JL, Phifer CC, Gutierrez Lopez J, Propato TS, Eastmond A, et al. Barriers and Solutions to Conducting Large International, Interdisciplinary Research Projects. Environ Manag N Y. 2017;60(6):1011–21.
4. Välikangas A. The Limited Role of Social Sciences and Humanities in Interdisciplinary Funding: What are Its Effects? Soc Epistemol. 2024 Mar 3;38(2):152–72.
5. Bromham L, Dinnage R, Hua X. Interdisciplinary research has consistently lower funding success. Nat Lond. 2016;534(7609):684–7.
6. Woelert P, Millar V. The paradox of interdisciplinarity in Australian research governance. High Educ. 2013;66(6):755–67.
7. Klein JT. Evaluation of Interdisciplinary and Transdisciplinary Research. Am J Prev Med. 2008 Aug;35(2):S116–23.
8. Wagner CS, Roessner JD, Bobb K, Klein JT, Boyack KW, Keyton J, et al. Approaches to understanding and measuring interdisciplinary scientific research (IDR): A review of the literature. J Informetr. 2011 Jan 1;5(1):14–26.
9. Sonetti G, Arrobbio O, Lombardi P, Lami IM, Monaci S. "'Only Social Scientists Laughed'": Reflections on Social Sciences and Humanities Integration in European Energy Projects. Energy Res Soc Sci. 2020 Mar;61:101342.
10. Chung JY. Stakeholder-engaged research: a multidisciplinary historical analysis. Res All [Internet]. 2024 Jul 10 [cited 2025 Apr 17];8(1). Available from: https://journals.uclpress.co.uk/r4a/article/id/3227/
11. Singh P. Understanding Researchers' Positionality in Integrating and Designing the Transdisciplinary Research Process and Outcomes: A Case Study of Thriving Agriculture Project. PennState University; 2025.
12. Gläser J, Laudel G. Governing Science: How Science Policy Shapes Research Content. Eur J Sociol. 2016 Apr;57(1):117–68.
13. Schneider F, Buser T, Keller R, Tribaldos T, Rist S. Research funding programmes aiming for societal transformations: Ten key stages. Sci Public Policy. 2019;46(3):463–78.
14. Lowe P, Phillipson J. Barriers to Research Collaboration across Disciplines: Scientific Paradigms and Institutional Practices. Environ Plan A. 2009;41(5):1171–84.



6

Navigating terminology, concepts, and methods in inter- and transdisciplinary collaboration

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Effective inter- and transdisciplinary research depends on treating the reflection and discussion of terminology, concepts, and methods as core work, not a side task.

Introduction

The way researchers understand, name, and approach reality shapes the scientific knowledge they produce [1]. This, in turn, shapes the possibilities for collaboration across scientific disciplines. Naturally, scholars from disciplines as diverse as, for example, physics and sociology make different assumptions about the nature of the world they research (referred to as ontology) [2,3] and about what constitutes valuable knowledge (epistemology) [1,3]. These different

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The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

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assumptions manifest as distinct terminologies, concepts, and methods.

The challenge for inter- and transdisciplinary research is that differences in terminology, concepts, and methods are not just a matter of mere linguistic translation but reflect domain specificity – the tacit, practice-embedded ways disciplines construct and validate knowledge [4]. *Domain specificity* means that researchers' skills, terms, concepts, methods, and values are finely tuned to narrow problem spaces and are not easily transferable or comparable across disciplines [1].

This Briefing Note addresses the challenge of navigating terminology, concepts, and methods in inter- and transdisciplinary research. The literature insights show that managing these differences is not trivial and can undermine collaboration if left unaddressed. Empirical findings from the SSH CENTRE demonstrate how such obstacles can be worked through when supported by adequate effort, time, and openness to learning. The recommendations translate these insights into practical actions for individuals, projects, and funders.

Problem description and literature insights

In the literature evaluating inter- and transdisciplinary research, disciplines are metaphorically described as having their own languages or dialects – researchers from different disciplines are effectively "talking different scientific languages" [5]. Each discipline develops a **unique terminology**, which is necessary for the specific problems it investigates. However, this also creates barriers to understanding the broad, complex interdisciplinary research problems [6]. Further, seemingly shared terms have divergent meanings in different scientific fields whilst using the same word. This requires researchers to be prepared to recognize these "false friends" and discuss the different meanings.

Bracken and Oughton [7] distinguish three language forms that inter- and transdisciplinary researchers encounter when **negotiating common terminology**: dialects, metaphors, and articulation. *Dialects* refer to terminology with different meanings across disciplines. For example, "dynamic" is a term that a physical geographer may understand as referring to short-term geological variability, but may denote a longer-term societal change to a social scientist [7]. Secondly, *metaphors* are used among scholars to conceptualise complex ideas. They are shared so commonly within a speech community that it requires a certain reflexivity to recognise them; but metaphors can also work productively by offering a relatively empty term that researchers can fill with a new meaning. For example, Bracken and Oughton showcase the use of metaphor of "mapping" as a way of imagining multi-layered social-ecological relations [7]. A third form of terminology usage is through the process of *articulation*. This is a dialogic mode of explanation and understanding that requires trust, time, and openness. Conscious articulation leads researchers to reveal assumptions about terminology, allowing for collective reinterpretation and integration in inter- and transdisciplinary research, builds shared understanding through dialogue, and fosters trust among researchers.

Beyond language, researchers frequently clash over what counts as valid evidence and rigor [4]. **Presupposed hierarchies of knowledge** – often privileging quantitative, experimental designs – can delegitimize qualitative and interpretive approaches, producing friction over indicators, generalization, and standards of proof [8]. These are not merely technical disagreements but value-laden disputes about methodological and conceptual credibility. Particularly problematic are hierarchies that prioritize quantitative over qualitative measurements, where interpretive contributions may be dismissed as anecdotal or insufficiently rigorous, despite their essential role in understanding meaning and context [8]. Similar tensions are discussed in BN1 (Briefing Note 1), which shows how SSH contributions are often relegated to a subordinate, service role in inter- and transdisciplinary collaborations, and in BN4, which highlights how prevailing STEM-based evaluation metrics systematically disadvantage SSH and overlook the long-term nature of inter- and transdisciplinary knowledge integration.

Ultimately, successful navigation of terminological, conceptual, and methodological divides depends on the **capacities and wisdom of researchers**. One requirement is *epistemic reflexivity* – the ability to critically examine one's own disciplinary assumptions, methods, and values, and to recognize how these shape problem framing [9,10]. Within this series of Briefing Notes, BN9 addresses the practice of reflexivity in inter- and transdisciplinary collaborations in more detail. Closely related is *intellectual humility*, the recognition that one's own expertise is partial and that other forms of knowledge may be equally valid or necessary [8]. Finally, researchers need to cultivate *interactional expertise*: while it is unrealistic to expect contributory mastery of multiple fields, researchers can learn enough of the terminology, concepts, and methods of other disciplines to collaborate effectively [4]. However, all these requirements must be supported by time and budget at the project level, and enabled by funders through call texts that make such activities eligible and properly resourced.

Manifestation in the SSH CENTRE

Across the experiments in the SSH CENTRE, it is evident that establishing a common understanding of terminology, concepts, and methods necessitated a considerable investment of time and effort, especially at the outset.

With regard to the differences in terminology, these were not only evident between researchers from different disciplines (whether between STEM and SSH or between scientists from applied and formal research institutions), but also, in the case of transdisciplinary research, between researchers and stakeholders. The negotiation phase of the research – the early scoping and planning period when objectives, roles, and methods are agreed – required openness to learning. In this phase, participants had to gradually learn a new "language" outside their own area of expertise. Like acquiring a foreign language, it is not solely the meanings of words that need to be grasped, but also the cultural values and practices of disparate knowledge environments [11].

One such practice was academic writing. A notable distinction emerged in the writing practices between the SSH and STEM sciences. In the context of the SSH CENTRE

project, STEM scientists were used to more concise, hypothesis-driven texts. In contrast, SSH researchers underscored the significance of a more expansive, exploratory framework, often emphasising the necessity of incorporating a broad literature review.

Although all examples below come from the SSH CENTRE experiments, participants also drew on experiences from their earlier interdisciplinary work. A remark by one researcher illustrates how a term – such as "standardisation" – functions as a disciplinary dialect (see Bracken and Oughton's three language forms above [7]).

> *We were having a team meeting (…) and there was a mix of social scientists, me as the humanities kind of person, and then an engineer in the room. And we were talking about standardising models of energy communities. And the STEM guy [said]: "But why on earth would you want to do a project on this? This is very, very boring." And we thought, well, it's kind of cool that you have all these interesting things – like: "What about participation? How did you make sure people are involved in the right way? Or what would you do to make sure that you meet these standards?" And after a while of him being like that, thinking standardisation is boring and we're kind of confused, it turns out standardisation to him means like: what lengths will the pipe be, what voltage will this thing be? So, it's a very different kind of connotation surrounding what seems like normal language to each discipline.* (MECR2, Transdisciplinary Knowledge Brokerage Initiative)

This example underscores the need for conscious articulation where assumptions are made explicit and negotiated into shared definitions.

Methodological differences within the SSH CENTRE often meant that researchers had to abandon existing, "traditional" methods and develop novel, more inter- and transdisciplinary approaches. This was quite resource intensive. Despite its difficulty, researchers regarded the need to innovate as positive because it allowed them to address the research problem in a comprehensive and genuinely inter- and transdisciplinary manner. However, finding such approaches was not a trivial task. Research teams observed that when two different disciplinary methods were used, the collaborating researchers automatically tended to split along disciplinary boundaries. Another challenge pertained to the expectations and assumptions that others had regarding the methodologies of other disciplines, without knowing their actual capabilities.

> *The first thing that we needed was the time to set, to clarify the objectives, why we are doing what we are doing, and then, having gained this stage, we needed to clarify the language. (…) What is meant by this concept from SSH versus what is meant from the STEM perspective. And then, the methodology also took quite a lot of time, to be implemented and to be understood, and why we are doing this methodology and what can be the benefits that would be reaped from this methodology.* (FEXP2, Interdisciplinary Collaborations)

At the conceptual level, the sharpest contrasts emerged between the SSH and STEM disciplines, rather than between e.g. two SSH or two STEM fields. Researchers entered the collaborations with preconceived understandings about the other group of disciplines – sometimes sceptical of rigor, sometimes wary of reductionism – which were both challenged and, in some cases, reinforced during collaboration. One of the key areas of divergent conceptualisations of doing science related to what was considered scientific evidence and method between SSH and STEM. STEM researchers tended to focus on proving hypotheses and implementing testable solutions, while SSH researchers emphasized understanding complex human behaviour through multiple perspectives. Some STEM researchers initially viewed SSH approaches as lacking rigor, while some SSH researchers felt STEM researchers were overly reductive in their framing.

> *At the beginning, we knew that we came with our too wordy works and (…) the samples and interviews and [tried] to understand things (…). And they [STEM researchers] look at us, "How can you explain the world with 20 interviews or 200 answers? Come on, guys?" Okay! Because yes, you are not trying to prove it, we are just trying to understand and explain.* (FEXP2, Interdisciplinary Collaborations)

Several factors made negotiations of terminology, concepts, and methods more productive. Good leadership, project coordination, and role clarity (see BN7) provided structure and ensured that translation and integration work was shared rather than falling to one individual. Respect and openness to learn were essential, too:

> *I did learn quite a bit. And what [MEXP8] said about models and equations being useful, even though for me they're tough to understand often, but the one that we've included in the chapter, I think that's a useful way to understand information. So I think that was a learning experience for me and a learning process. Even though I still have a lot to understand.* (FECR3, Interdisciplinary Collaborations)

Openness to new forms of reasoning did not erase difficulty but reframed it as an opportunity to learn and supported the integration of interdisciplinary expertise between SSH and STEM disciplines. Finally, team members with previous inter- and transdisciplinary experience could draw on established practices and orient in such collaborations more effectively.

Recommendations at individual, project, and systemic levels

The literature and SSH CENTRE experiments show that integration improves when projects explicitly clarify and negotiate terminology, concepts, and methods well in advance, in an open and cooperative atmosphere, and use a variety of support mechanisms.

Recommendations at the individual/researcher level

- Name and translate dialects and metaphors: when a term feels "obvious," pause to articulate your meaning and invite others to share theirs; practice active listening to surface misunderstandings [7].
- Adopt a pluralist and reflexive stance toward methods: treat competing epistemic standards (quantitative/qualitative; positivism/constructivism) as productive

disturbances rather than problems. Make your assumptions explicit and stay open to revising them [9,12].

Recommendations at the project level

- Schedule early and recurring sessions to explain dialects and metaphors, agree on term meanings, and document decisions in a living shared lexicon – for an example of such lexicon, see [13].
- Employ boundary objects: boundary objects are shared artefacts – concepts, models, templates, maps, indicators, prototypes – that are structured yet flexible enough to mean slightly different things to each group, thereby reducing talking-past-each-other by anchoring discussion in something co-owned and revisable, rather than in one side's definitions [7,14].

Recommendations at the systemic/broader academia and funding level

- Legitimise pluralism in evaluation: signal that multiple epistemic standards and inquiry modes are acceptable (e.g., quantitative & interpretive & second-order analyses) and assess projects on how transparently they negotiated concepts/methods rather than on a single "gold standard."
- Require and fund explicit tasks/deliverables for epistemic reflection (e.g., shared lexicon, reflexivity workshops, boundary-object prototypes), with designated budget.
- Normalise boundary-object deliverables: accept boundary objects (e.g., constellation maps, shared indicators, co-developed scenarios) as legitimate outputs that demonstrate negotiated meaning across domains [14].

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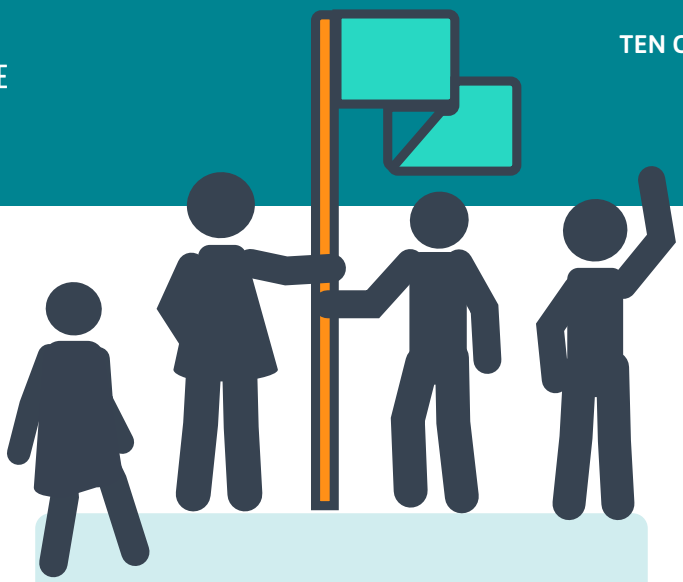
References

1. Skjølsvold TM. How do we know what we know? Ontological and epistemological debates in sustainability transitions research. In: Introduction to Sustainability Transitions Research [Internet]. Cambridge University Press; 2024 [cited 2025 May 20]. Available from: https://www.cambridge.org/engage/coe/article-details/6758575af9980725cf9e07d7
2. Campbell K. Ontology. In: Borchert DM, editor. Encyclopedia of philosophy. Detroit: Thomson Gale, Macmillan Reference; 2006. p. 21–7.
3. Graeber D. Radical alterity is just another way of saying "reality": A reply to Eduardo Viveiros de Castro. HAU J Ethnogr Theory. 2015;5(2):1–41.
4. MacLeod M. What makes interdisciplinarity difficult? Some consequences of domain specificity in interdisciplinary practice. Synthese. 2018 Feb 1;195(2):697–720.
5. Tobi H, Kampen JK. Research design: the methodology for interdisciplinary research framework. Qual Quant. 2018 May;52(3):1209–25.
6. Stephenson J. What does energy mean? An interdisciplinary conversation. Energy Res Soc Sci. 2017 Apr;26:103–6.
7. Bracken LJ, Oughton EA. 'What do you mean?' The importance of language in developing interdisciplinary research. Trans Inst Br Geogr [Internet]. 2006 Sep 30 [cited 2025 May 21];31(3). Available from: https://durham-repository.worktribe.com/output/1584800/what-do-you-mean-the-importance-of-language-in-developing-interdisciplinary-research
8. Elixhauser S, Boni Z, Gregorič Bon N, Kanjir U, Meyer A, Muttenzer F, et al. Interdisciplinary, but how? Anthropological Perspectives from Collaborative Research on Climate and Environmental Change. Environ Sci Policy. 2024;151:103586-.
9. Hamborg S, Meya JN, Eisenack K, Raabe T. Rethinking resilience: A cross-epistemic resilience framework for interdisciplinary energy research. Energy Res Soc Sci. 2020 Jan;59:101285.
10. Salmon RA, Priestley RK, Goven J. The reflexive scientist: an approach to transforming public engagement. J Environ Stud Sci. 2017;7(1):53–68.
11. Turnbull D. Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge. Hoboken: Taylor and Francis; 2003. 269 p.
12. Lewis MW, Grimes AJ. Metatriangulation: Building Theory from Multiple Paradigms. Acad Manage Rev. 1999;24(4):672–90.
13. Foulds C, Rosie R. The SHAPE ENERGY Lexicon - interpreting energy-related social sciences and humanities terminology. Cambridge: SHAPE ENERGY; 2017.
14. Feldhoff B, Stockmann N, Fanderl N, Gahle AK, Graf A, Leger M, et al. Bridging Theories and Practices: Boundary Objects and Constellation Analysis as Vehicles for Interdisciplinary Knowledge Integration. Sustainability. 2019 Sep 27;11(19):5357.



7

Coordination and leadership in inter- and transdisciplinary collaboration

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Fostering clear leadership creates spaces for constructive integration across disciplines and knowledges.

Introduction

One of the major challenges of managing inter- and transdisciplinary teams is how to handle their complexity. Such teams have heterogenous composition; they consist of scientists from many different disciplines, and in the case of transdisciplinary research include stakeholders from practice. Such diversity within teams enables the investigation of complex climate, energy and mobility issues [1,2]. However, while inter- and transdisciplinary teams are considered to be better equipped for addressing highly complex problems [3], the heterogeneous composition of research teams and the complexity of research problems can make it difficult to coordinate and manage them.

This Briefing Note addresses coordination and leadership in inter- and transdisciplinary research. The inter- and transdisciplinary literature emphasizes that managing such teams require active integration, trust building, and mediation to transform heterogeneity into cohesive results. The findings of the SSH CENTRE confirm this: teams functioned well when one or multiple researchers took on the role of a team

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Interdisciplinary Collaborations for EU Policy Recommendations

The SSH CENTRE project facilitated nearly 30 novel collaborations between the SSH and STEM (Science, Technology, Engineering and Mathematics) disciplines, for strengthening European climate, energy, and mobility policy. These resulted in three edited books, whereby each Interdisciplinary Collaboration produced a chapter. For more see SSH CENTRE Interdisciplinary EU Policy Book Collection.

Transdisciplinary Knowledge Brokerage Initiative

The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

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leader – whether formally appointed or emerging organically – and assumed responsibility for coordinating operational tasks, mediating between disciplines, and supported mutual understanding based on previous inter- and transdisciplinary experiences. The final part of this Briefing Note (BN) includes best practice solutions at individual, project, and systemic levels, as identified by literature and the Interdisciplinary Collaborations and Knowledge Brokerage teams.

Problem description and literature insights

A review of the literature on inter- and transdisciplinary collaborations reveals that **an inter- or transdisciplinary project is unlikely to progress in the desired direction without proper oversight and guidance from a leader** [4]. Compared to monodisciplinary teams, such collaborations face a range of additional challenges – differences in how problems and solutions are framed and envisaged [9], misconceptions about how the other disciplines work [5], and greater risks of imbalances in power distribution within the team [8]. Laissez-faire leadership, which relies on organic integration of the different parts of inter- and transdisciplinary work, has been demonstrated to be ineffective, as the different parts tend to drift further apart, making integration later on even more difficult [3].

Integration is, therefore, an important task in the coordination of inter- and transdisciplinary teams. Integration can be defined as the combination of knowledge, methods, and perspectives to "create a new whole which is greater than the sum of its parts" [5 p40]. Effective integration requires outlining the project's purpose, setting strategic goals, defining success criteria, mapping out key phases, identifying stakeholders, and planning their engagement at the outset of a project [6]. At the same time, team management should avoid over-defining project outcomes, as successful projects require flexibility and the capacity to evolve over time [3].

An important prerequisite for such integration, and inter- and transdisciplinary collaboration in general, is **building trust** among the research team. When team members do not share a common language, have limited casual interactions, or are not in physical proximity, establishing trust can be challenging [5]. Thus, it is recommended to dedicate time early in the project to structured teambuilding activities. These efforts help foster open communication and align team members around shared understandings of the research goals [7].

Once the project gets underway, **the role of the leader or coordinator is to facilitate contributions from each area of expertise and to encourage interdisciplinary synthesis** [5,8]. Due to their complexity and heterogeneity, inter- and transdisciplinary teams have a high potential for disagreement and conflict. In such situations, the role of the leader is to mediate and balance the interests of the parties involved. It is important to allow space for conflict to surface, as suppressing it may lead to more serious issues later. At the same time, effective inter- and transdisciplinary collaboration requires a tolerance for ambiguity and an understanding that consensus may not always be reached within the team [4]. Although researchers tend to avoid interference in the domains of the other individual disciplines, in inter- and transdisciplinary research it can be beneficial, and an experienced leader can create "controlled confrontation" to harness the advantages offered by team heterogeneity [3].

Strategic planning, active integration, trust-building, facilitation of collaboration, conflict mediation, tolerance for ambiguity, and overall ability to manage complexity and diversity are all traits of good inter- and transdisciplinary team leadership. Of course, what the specific role that fulfils these traits looks like can vary from one research team to another. The literature emphasizes that leaders, coordinators, or research community managers (RCMs) [6] should have a flexible and not overly strict style, fostering freedom of research and dynamic development [9]. An inter- and transdisciplinary leader needs to be supra-disciplinary – valuing the perspectives of other disciplines and recognizing the limits of their own discipline [5]. Research indicates that the most effective leaders tend to be those who possess an inter- and transdisciplinary background or at least have previous experience, and who facilitate spaces for learning from others [4]. Indeed, opportunities for peer learning and clarification of disciplinary perspectives must be actively created within the project, as there will always be a need to explain terms and concepts. Taking the time to discuss and develop a shared understanding of key ideas is fundamental to building a strong and productive research partnership [10] (see BN2 on Time demands).

Manifestation in the SSH CENTRE

The evaluation of the SSH CENTRE experiments shows how team leaders emerged without authoritative or rigidly hierarchical processes. It was common for team leadership in both Interdisciplinary Collaborations and Knowledge Brokerage Initiative (see the first page) to emerge organically, with scientists naturally allocating roles. This worked well in most cases – it was one of the things that several teams independently highlighted as a positive and smooth process.

The organic division of team roles allowed sufficient flexibility and space for researchers from different disciplines to collaborate. In the Interdisciplinary Collaborations, the leadership role was often naturally associated with a lead author, though not necessarily one person each time. As this was a collaboration between SSH and STEM disciplines, there were sometimes two leads, one for each "group". In Knowledge Brokerage teams, researchers differentiated roles according to skills and seniority. However, in one case, the team did not organically develop a leader, which caused coordination issues. This role was filled by a partner from the SSH CENTRE consortium and eventually, one researcher took the lead role.

The teams noted that leading inter- and transdisciplinary teams requires a combination of many different skills, which means the role may not always be embodied in just one person. A very important quality was that of "interdisciplinary leadership" – someone enabling contributions and facilitating integration between disciplines.

> *It's a kind of learning how (…) to become two-headed, (…) which means understanding the technical side and grasping the social challenges and trying to balance between both. (…) In our case, what was very specific is that [MEXP1, a*

> *STEM researcher] got an initial appetite for social science. And personally, I [FEXP2, an SSH researcher] got an initial appetite for technical stuff. So yes, this helped us to get together and yet to co-lead this project and to advance. So, this is something very important. If you don't have someone that may have the appetite of others' knowledge and others' discipline etc., it might not be very easy to conduct this type of project.* (FEXP2, Interdisciplinary Collaborations)

Two scientists from different disciplines took on the role of interdisciplinary leaders in this team. In other cases, this role was filled by a single researcher – often someone with an interdisciplinary background or previous experience in this type of research. Such a background was highly valued across research teams:

> *I had a really good group. We had a couple of people who had already had a little bit of experience in these types of things so they could be leaders in that way, which was very helpful.* (FECR6, Transdisciplinary Knowledge Brokerage Initiative)

More operational matters such as task allocation, note-taking, creating clear internal deadlines, and the organization, frequency, and regularity of meetings were also regarded as an important part of the research work organization. As noted, this did not have to be held by a single researcher, nor was it necessarily associated with an overall leadership role.

In the Knowledge Brokerage Initiative, researchers were accompanied by mentors, who were members of the SSH CENTRE consortium and supported leadership and coordination. The mentors provided valuable support throughout the program. They were not necessarily subject matter experts, but had experience with the relevant methods, theory, and background literature, which was helpful. In several cases, some researchers dropped out of the Knowledge Brokerage collaboration (for reasons ranging from personal issues to visa problems), which required the intervention of a mentor. The mentors checked in regularly, made time for feedback, and helped the teams overcome challenges, such as if communication with the cities stalled. They also acted as mediators between the team members, while letting the teams to take the lead, and provided them with guidance when needed, for example, by structuring meetings. The mentoring was well-received by participants, who valued the offered support, often lacking in other inter- and transdisciplinary projects.

> *[The mentor] was never like [in a] pyramid position. It was more coordination and mediation because also we need some mediation between us. And [the mentor] was really good in this because as a person that was 'external' in the practical activity that we were asked to do, he could sometimes mediate among us.* (FECR5, Transdisciplinary Knowledge Brokerage Initiative)

Team leaders and mentors had in common that they were not directive in their approach and had previous inter- and transdisciplinary experience, which they put to good use.

Despite the overall success of coordination and team leadership within the SSH CENTRE experiments there were challenges if leadership was contested. Members of some teams had differing work styles, and specifically some members pre-emptively took the lead. This sometimes excluded others from decisions or led to duplicated/dissected work.

Recommendations at individual, project, and systemic levels

Across literature and the SSH CENTRE experience, it is clear that fostering coordination and leadership is about creating spaces in projects for discussion. Some of this leadership is practical, in terms of keeping good meetings, notes and deadlines. Other aspects of leadership are more about steering the project, offering insight, wisdom and finding ways to navigate interpersonal dynamics.

Recommendations at the individual/researcher level

- Take initiative in sharing your disciplinary perspective: prepare a short "disciplinary primer", e.g., select key texts from your discipline or give an introductory presentation on your fields.
- Practice reflexivity on conflicts and disagreements: reflect on where tensions come from (disciplinary assumptions, communication styles, personal expectations) and share this reflection with the team [4].

Recommendations at the project level

- Maintain good coordination procedures: establish internal deadlines, clear task division, and circulate notes after each meeting.
- Use mentors as neutral mediators to structure regular meetings and to facilitate space for confrontation where disagreements can surface productively [3,6].
- Distribute leadership roles across scholars from multiple disciplines, preventing single-background bias, or ensure the leader has an inter- or transdisciplinary background.
- Ensure coordination activities are properly resourced: allocate budgeted time and funds for integration activities such as in-person meetings, note-taking, and mentor sessions [6].
- Dedicate time early in the project to structured team-building activities [7].

Recommendations at the systemic/broader academia and funding level

- Encourage diverse leadership: design calls to support PIs (Principal Investigators) with explicit inter- and transdisciplinary experience, co-PIs (SSH+STEM) or leadership committees, avoiding single-discipline dominance.
- Recognise integration activities: treat workshops, boundary objects, and facilitation roles as legitimate outputs in evaluation.
- Ensure funding covers time, travel, and administrative work needed for coordination; make these eligible costs [6].

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References

1. Tkachenko O, Ardichvili A. Critical factors impacting interdisciplinary university research teams of small size: A multiple-case study. Team Perform Manag. 2020;26(1/2):53–69.
2. Bammer G. Disciplining Interdisciplinarity: Integration and Implementation Sciences for Researching Complex Real-World Problems. 1st ed. Canberra: ANU E Press; 2013.
3. Hollaender K, Loibl MC, Wilts A. Management: Management of Transdisciplinary Research. In: Handbook of transdisciplinary research. Springer; 2008. p. 385–97.
4. Lyall C, Bruce A, Tait J, Meagher L. Interdisciplinary Research Journeys : Practical Strategies for Capturing Creativity. In: Lyall C, Bruce A, Tait J, Meagher L, editors. Interdisciplinary Research Journeys : Practical Strategies for Capturing Creativity [Internet]. 1st ed. London: Bloomsbury Academic; 2011 [cited 2025 May 6]. Available from: https://www.bloomsburycollections.com/monograph?docid=b-9781849661782
5. Vladova G, Haase J, Friesike S. Why, with whom, and how to conduct interdisciplinary research? A review from a researcher's perspective. Sci Public Policy. 2025;52(2):165–80.
6. Sharan M, Karoune E, Hellon V, van Praag CG, Kayumbi G, Bennett A, et al. Professionalising Community Management Roles in Interdisciplinary Research Projects. 2024 [cited 2025 May 6]; Available from: https://arxiv.org/abs/2409.00108
7. Di Giulio A. Implementing Interdisciplinarity: Connecting the Mindset of a Worrier, a Dreamer, and a Bookkeeper. In: Practicing Interdisciplinarity [Internet]. Germany: Walter de Gruyter GmbH; 2024 [cited 2025 May 6]. p. 1–6. Available from: https://www.degruyter.com/document/doi/10.1515/9783111339849-001/pdf
8. Morss RE, Lazrus H, Demuth JL. The "Inter" Within Interdisciplinary Research: Strategies for Building Integration Across Fields. Risk Anal. 2021;41(7):1152–61.
9. Gray B. Enhancing Transdisciplinary Research Through Collaborative Leadership. Am J Prev Med. 2008;35(2):S124–32.
10. Stephenson J. What does energy mean? An inter-disciplinary conversation. Energy Res Soc Sci. 2017 Apr;26:103–6.

8

Spaces for communication in inter- and transdisciplinary collaboration

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Spaces for communication are the foundation of trust, relationships, and dialogue, underpinning effective inter- and transdisciplinary collaboration.

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Introduction

Effective communication across disciplinary and stakeholder boundaries is fundamental for successful inter- and transdisciplinary research. This communication has two directions: it occurs between researchers themselves and between researchers and non-academic parties (such as audiences and other non-academic stakeholders in transdisciplinary research). Both directions of communication involve navigating different disciplinary, work, and social cultures. This, on the one hand, entails communication about the research, such as its aims, the terminology and methods used (Briefing Note 6 – BN6), how to interpret the results, and how to involve other stakeholders (BN10). On the other hand, it involves communicating to create a functional environment for inter- and transdisciplinary collaboration. Key

to these is skilful management (BN7), cultivating trust and interpersonal teamwork dynamics, and creating genuine dialogue space. The last point is particularly important, because, as addressed in BN1, SSH fields are frequently perceived as supplemental to STEM disciplines, tokenized, or relegated to a "service role," rather than being integrated as equal partners. All these conditions for communication require sufficient time (BN2) and reflexivity on the side of the researchers (BN9).

In this note, we focus on those aspects of the communication space that are not covered in the other Briefing Notes, that is, the cultivation of interpersonal teamwork dynamics and the creation of genuine dialogue spaces. The literature emphasises the importance of developing trust among researchers, building interpersonal relationships (not only between researchers but also with stakeholders), and the practice of "good listening". The insights from the SSH CENTRE confirm the importance of communication; across both inter- and transdisciplinary experiments, teams reported that trust and relationship building were crucial. Stakeholder engagement varied, with clarification of objectives and communication formats playing an important role. Based on findings from the literature and the SSH CENTRE experiments, the Briefing Note concludes with recommendations on how to support spaces for meaningful communication.

Problem description and literature insights

In inter- and transdisciplinary research, the literature consistently emphasizes that **trust and communication** are deeply intertwined and fundamental to successful collaboration. Trust is often taken for granted and its requirement for continuous negotiation and reassurance is frequently underestimated [1]. Building trust is shaped by previous experiences, institutional histories, and changing personnel, and it takes time – but it is worth investing in, because in the long run, it "can help mitigate or solve communication, time, integration, logistical, and personal relationship barriers to conducting fieldwork" [2 p1018]. Together with openness, mutual respect, and humility, trust builds rapport – across researchers themselves and between researchers and stakeholders.

In the context of fostering the position of SSH disciplines, trust and similar communication values are particularly important because they **allow researchers to challenge existing disciplinary hierarchies and to value diverse knowledge**. In inter- and transdisciplinary research, SSH researchers are often expected to contextualize or translate STEM-driven innovations rather than contribute as an equal partner. For acknowledging the unique contributions of SSH research, funders should explicitly legitimize SSH approaches, enabling researchers to integrate their theoretical perspectives, ways of knowing, and methods from the very beginning of a project [3,4]. This includes recognizing that qualitative research and local knowledge are as legitimate and valuable as quantitative scientific data [5,6].

Spaces for communication are essential for building trust and interpersonal relationships between researchers from different disciplines. Such communication allows all research participants to better understand each other's priorities and perspectives [7]. Importantly, a factor that significantly influences interpersonal relationships is the format of meetings. **Periodic and ideally face-to-face contact** is vital for maintaining trust, satisfaction, and commitment, especially in relationships spanning geographical distances [1,3]. The physical separation of disciplinary departments is among the reasons that contribute to the mistrust between science fields. In-person encounters and platforms for sharing experiences can mitigate emotional tensions, such as feeling of inadequacy or discomfort that can arise when researchers venture beyond their disciplinary comfort zones [8,9]. Additionally, frequent meetings can facilitate the management of expectations.

Spaces for communication are also important for **stakeholder engagement and the creation of research impact**. The traditional "deficit model", which assumes public disengagement is due to a lack of understanding that can be solved by providing more scientific information, is widely critiqued and deemed inadequate [10,11]. Research in science communication has demonstrated that merely disseminating information between experts and the public frequently results in public misunderstanding or non-participation [12]. Instead, Cook and Overpeck [12 p10] propose "relationship building" as a new approach that changes the means and ends of interactions between experts and stakeholders, defined as "a long-term consensual interaction between individuals, conducted respectfully and transparently". Reimagining communication as a bi-directional exchange through the principle of reciprocity fosters equitable conversations across diverse knowledges and socio-cultural perspectives [10].

A prominent approach to fostering reciprocity is through "**good listening**". Good listening is a 'weak method', meaning it provides guidance and structure to collaborations without assuming a predetermined form or specific goals [13]. Generally, the process of listening involves four main components: receiving, processing, interpreting, and responding. The attributes of good listening include presence and curiosity in receiving, intellectual humility and cognitive complexity in processing, empathy and compassion in interpretation, and constructive feedback (including disagreeing) in responding [13]. This practice is important for both teamwork within a research team and transdisciplinary collaboration with other stakeholders (for more on their engagement, see BN10).

Manifestation in the SSH CENTRE

Experiments carried out within the SSH CENTRE confirmed the importance of communication at all mentioned levels: between researchers themselves, between research teams and stakeholders, and regarding both communicating the merit of the research as well as to support the creation of a functional environment for inter- and transdisciplinary collaboration.

Within research teams, trust, openness, and motivation for inter- and transdisciplinary cooperation proved to be crucial. For successful communication, people need to build a certain level of trust in each other.

> *I think there's something to be said about establishing first kind of cohort of people that you already feel that you have*

> *a good understanding with, and that also makes it largely a much more smooth and positive experience. Not to say that you can only work with people that you work well with, but I think that makes it a much more positive environment for everyone, if you are already on the same page and willing to work in interdisciplinary way. That already is the biggest challenge out the door because everyone comes with the same motivation.* (FECR1, Interdisciplinary Collaborations)

Successful communication requires gaining trust to create a positive environment. One of the most important factors for that was the regularity and frequency of the meetings; in-person meetings, even if occasional, were very beneficial. Whereas in the Interdisciplinary Collaborations for EU Policy Recommendations the research teams met in person more often both due to organising writing retreats and due to teams' composition (some were based in the same cities or institutions), there was slightly less such contact in the Transdisciplinary Knowledge Brokerage Initiative. Overall, the teamwork communication across the experiments was considered good, with some occasional communication gaps. The researchers and consortium partners reported that the project was quite demanding and sometimes more time was needed than anticipated, which needed to be well-communicated in advance.

> *I think we had a good team dynamic and all of us were working in good faith. None of us wanted to be the one who was letting the other ones down.* (MECR3, Transdisciplinary Knowledge Brokerage Initiative)

In contrast to communication within teams, the contact with cities in the Transdisciplinary Knowledge Brokerage Initiative was more challenging. The communication with the partner cities took two different forms. The first form was exemplary, with an active contact person, and the cities being proactive and coming up with their own ideas and goals. The second form was passive or even lax, meaning it was difficult to get in touch with the city staff, and it was not clear what the city's goal was regarding the collaboration. Crucial to the level of city involvement was the effort to negotiate ideas of what this transdisciplinary initiative could bring. Meaningful involvement required timely alignment of objectives, supported by clear translation of research concepts and realistic involvement with regard to the workload of the city's contact person. In several cases, municipalities "did not know exactly what they wanted", which prolonged the definition of the scope.

> *First, we were trying to figure out together with them what are the topics they would be interested in, but they didn't really come up with anything because they were saying "We are technicians, you are the social scientist, you should come up with some issues". And we're like "OK, but we need to know, I don't know, what bothers you or something." So, then we tried to come up with something, but we were not sure if it's useful, if it's not useful and the feedback was "Yeah, we are OK with that". I was like "OK, then we are probably gonna do this." And then we did it and then there was the workshop and then we were like "OK, maybe we could have done something different if we knew this."* (FECR4, Transdisciplinary Knowledge Brokerage Initiative)

Another communication factor that influenced the transdisciplinary collaboration was the ability of researchers to translate academic knowledge into language understandable to the municipality. This was not just a matter of simplifying technical terminology, but an overall clarification of researchers' ways of thinking. For instance, in one case a municipality understood the scientists' research questions as criticisms in a way that they became defensive.

> *I think that there is also an (…) aspect to take into consideration because they felt kind of attacked from the researchers (…). Maybe "attacked" is a strong word, but when [the researchers] (…) were asking [the municipality personnel] a question on how that was working and how they were thinking to improve it, they saw this as a criticism, so their approach was to defend their position and not to underline the things that were not working or the challenges to work together on that. So, they were like: "But this is normal in a city like this, but we do this, this, this, this." (…) Maybe the researchers and we were not that able to make them understand it was a normal process.* (ProjectPartner3)

Part of these differences between the academy and the municipalities were different working regimes. As one mentor noted, the project had a rule that only the SSH CENTRE coordinator communicated directly with the cities, as researchers tended to overwhelm city partners with a wide range of questions through many emails, which is undesirable for a situation where cities are engaged in research beyond all their responsibilities.

Regarding the specific role of SSH in communicating with stakeholders, it has emerged that it is possible to utilise the strengths of these disciplines without resorting to a purely instrumental approach, i.e. one that is solely intended to persuade the public. One researcher emphasised the political role of the SSH:

> *What came out of this research (…) is that a lot of people simply do not feel heard at all. It doesn't mean that they want everyone to necessarily agree with them, (…) but (…) they feel like it's such a top-down decision that they are not consulted at all. I think that's also very important part where social science can really play a role to involve citizens, give them the idea that this is also about them and not just about (…) the government somewhere far away.* (FECR2, Interdisciplinary Collaborations)

This reflection underscores a key value of SSH – helping to design communication processes where citizens feel recognised, even if consensus is not reached. Such spaces strengthen legitimacy and ensure that policies are not perceived as distant impositions. They also build trust: people feel heard even without agreement, which keeps dialogue open for the next engagement. As another participant stressed, communication should not be episodic but continuous. SSH disciplines are particularly well-placed to sustain contact with administrations, stakeholders, and citizens over time:

> *Try to keep in touch with the administration, with the different stakeholders (…) is something that is really the aim. It should be the aim of the social science and humanities in mobility. Really interact with the administrations, the people, the citizens.* (FECR5, Transdisciplinary Knowledge Brokerage Initiative)

In other words, striving for equal involvement of SSH does not mean that their role cannot involve stakeholder

engagement; it just must not be reduced to that. One of the strengths of SSH is in curating the ongoing relationships that underpin transdisciplinary collaboration.

Overall, in the evaluative interviews the researchers frequently reflected on the crucial role of communication in inter- and transdisciplinary research. Because it aims to produce a novel knowledge across the gap between disciplines and between academia and non-academic stakeholders, developing knowledge in such collaborations necessitates intensive communication – which in turn requires appropriate support at multiple levels.

Recommendations at individual, project, and systemic levels

Creating protected spaces for communication – within teams and with stakeholders – builds trust and relationships that sustain inter- and transdisciplinary work. The recommendations below specify how to support those spaces across three levels.

Recommendations at the individual/researcher level

- Talk with stakeholders in a relatable, human voice: communicate with empathy and clarity rather than detached jargon, as personal approach can foster trust, inviting others to share their knowledge in return [10].
- Engage with a mindset of mutual respect and openness to plural rationalities: when engaging with local knowledges, recognize the value and legitimacy of, e.g., anecdote, story, or spiritual perspectives of nature [14].
- Adopt good listening as a weak method to guide collaborations without presupposing outcomes, focusing on generating collaborations and dismantling barriers. Cultivate core listening attributes:
  - *Receiving* requires being present, open, curious, and caring.
  - *Processing* requires intellectual humility (recognizing one's cognitive limitations) and cognitive complexity (shifting cognitive frames).
  - *Interpretation* benefits from mindfulness, empathy, and compassion to avoid habituated or disciplinary biases [13].
- Reflect on your own epistemology to make space for other ways of knowing [15]; see BN9 for more on reflexivity.

Recommendations at the project level

- Dedicate time and resources for ongoing, active dialogue between researchers and stakeholders, moving beyond instrumental knowledge transfer; use collaborative methods like participatory filmmaking or focus-group discussions in small, familiar settings to initiate social learning [5,10,16].
- Communicate responsibilities clearly and make roles explicit for all participants, including stakeholders, to prevent feelings of being relegated to a "service role".
- Tolerate a degree of conflict and pluralism: rather than forcing a single lowest common denominator consensus, allow multiple perspectives to be expressed to avoid silencing minority views [15].
- Adopt the good listening framework as a structural element of collaboration: set ground rules that institutionalize good listening (e.g. rotating facilitation roles in meetings, or listening sessions where team members deeply engage with one colleague's perspective at a time) [13].
- Focus on the format of meetings: ensure they are frequent and regular and encourage face-to-face gatherings; dedicate resources for physical meetings (such as writing retreats) in geographically dispersed teams.

Recommendations at the systemic/broader academia and funding level

- Fund the creation of interdisciplinary centres or hubs that host regular meetings and provide sustained interactions to promote understanding, build trust, and develop collaboration outside specific projects [3].
- Support capacity-building programs to equip researchers with the essential knowledge and skills for effective inter- and transdisciplinary communication, such as training scientists in intercultural competencies [14,17].
- Envision broader systemic change where expert institutions become more democratic and participatory: establish an ongoing advisory council of civil society or Indigenous representatives that interface with research groups [10].
- Institutionalize pluralistic, reflexive processes as the norm: evolve beyond one-size-fits-all epistemologies by reflecting on institutional epistemology and recognizing how knowledge practices become stabilised; rotate experts from diverse epistemic backgrounds to shift the institutional knowledge culture over time [15].

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References

1. Armstrong A, Flynn E, Salt K, Briggs J, Clarke R, Vines J, et al. Trust and temporality in participatory research. Qual Res. 2023 Aug 1;23(4):1000–21.
2. Pischke EC, Knowlton JL, Phifer CC, Gutierrez Lopez J, Propato TS, Eastmond A, et al. Barriers and Solutions to Conducting Large International, Interdisciplinary Research Projects. Environ Manag N Y. 2017;60(6):1011–21.
3. Elixhauser S, Boni Z, Gregorič Bon N, Kanjir U, Meyer A, Muttenzer F, et al. Interdisciplinary, but how? Anthropological Perspectives from Collaborative Research on Climate and Environmental Change. Environ Sci Policy. 2024;151:103586-.
4. Lyall C, Bruce A, Tait J, Meagher L. Interdisciplinary Research Journeys : Practical Strategies for Capturing Creativity. In: Lyall C, Bruce A, Tait J, Meagher L, editors. Interdisciplinary Research Journeys : Practical Strategies for Capturing Creativity [Internet]. 1st ed. London: Bloomsbury Academic; 2011 [cited 2025 May 6]. Available from: https://www.bloomsburycollections.com/monograph?docid=b-9781849661782
5. Schmidt L, Falk T, Siegmund-Schultze M, Spangenberg JH. The Objectives of Stakeholder Involvement in Transdisciplinary Research. A Conceptual Framework for a Reflective and Reflexive Practise. Ecol Econ. 2020;176:106751-.
6. Vadrot ABM, Rankovic A, Lapeyre R, Aubert PM, Laurans Y. Why are social sciences and humanities needed in the works of IPBES? A systematic review of the literature. Innov Eur J Soc Sci Res. 2018 Mar 30;31(sup1):S78–100.
7. Ferguson L, Chan S, Santelmann MV, Tilt B. Transdisciplinary research in water sustainability: What's in it for an engaged researcher-stakeholder community? Water Altern. 2018 Feb 1;11(1):1–18.
8. Salmela M, Vienni-Baptista B, Cheas K. Towards the Recognition of Interdisciplinary and Transdisciplinary Researchers. Minerva [Internet]. 2025 Feb 28 [cited 2025 May 14]; Available from: https://doi.org/10.1007/s11024-025-09578-y
9. Di Giulio A. Implementing Interdisciplinarity: Connecting the Mindset of a Worrier, a Dreamer, and a Bookkeeper. In: Practicing Interdisciplinarity [Internet]. Germany: Walter de Gruyter GmbH; 2024 [cited 2025 May 6]. p. 1–6. Available from: https://www.degruyter.com/document/doi/10.1515/9783111339849-001/pdf
10. Dudman K, de Wit S. An IPCC that listens: introducing reciprocity to climate change communication. Clim Change. 2021 Sep 7;168(1):2.
11. Salmon RA, Priestley RK, Goven J. The reflexive scientist: an approach to transforming public engagement. J Environ Stud Sci. 2017;7(1):53–68.
12. Cook BR, Overpeck JT. Relationship-building between climate scientists and publics as an alternative to information transfer. WIREs Clim Change. 2019;10(2):e570.
13. Branny A, Maurer M, Andersson E, McPhearson T, Raymond CM, Faehnle M, et al. Introducing listening as a weak method for advancing sustainability and interdisciplinary scholarship. Sustain Sci. 2025 Jan 1;20(1):77–94.
14. Löfmarck E, Lidskog R. Bumping against the boundary: IPBES and the knowledge divide. Environ Sci Policy. 2017 Mar 1;69:22–8.
15. Borie M, Mahony M, Obermeister N, Hulme M. Knowing like a global expert organization: Comparative insights from the IPCC and IPBES. Glob Environ Change. 2021 May 1;68:102261.
16. Boaz A, Hanney S, Borst R, O'Shea A, Kok M. How to engage stakeholders in research: design principles to support improvement. Health Res Policy Syst. 2018 Dec;16(1):60.
17. Singh P. Understanding Researchers' Positionality in Integrating and Designing the Transdisciplinary Research Process and Outcomes: A Case Study of Thriving Agriculture Project. PennState University; 2025.

9

Positionality and reflexivity in inter- and transdisciplinary collaboration

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Effective inter- and transdisciplinary collaboration depends on reflexive practices that enable the recognition of diverse knowledges and countering power imbalances.

What did the SSH CENTRE project do?

SSH CENTRE (Social Sciences and Humanities for Climate, Energy aNd Transport Research Excellence) is a Horizon Europe project that focused on generating best practices for incorporating both Social Sciences and Humanities (SSH) and inter- and transdisciplinary research into the European Union's climate, energy, and mobility transition policy. The SSH CENTRE project deliberately created spaces for *epistemic experimentation* – i.e. structured collaborations that bridge different epistemic (knowledge) cultures to co-produce policy-relevant knowledge:

Interdisciplinary Collaborations for EU Policy Recommendations

The SSH CENTRE project facilitated nearly 30 novel collaborations between the SSH and STEM (Science, Technology, Engineering and Mathematics) disciplines, for strengthening European climate, energy, and mobility policy. These resulted in three edited books, whereby each Interdisciplinary Collaboration produced a chapter. For more see SSH CENTRE Interdisciplinary EU Policy Book Collection.

Transdisciplinary Knowledge Brokerage Initiative

The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

This Briefing Note is one of 10 that present the findings and recommendations from the evaluation of these epistemic experiments. For more, see the Introduction to the Briefing Note collection and the Formative Accompanying Research methodology.

Introduction

In inter- and transdisciplinary research, it is crucial for researchers to reflect on their positionality and engage in reflexive practices. This involves understanding the researcher's individual social and disciplinary background as well as their role in the research project, both within the scientific team and within the organisations with which they are involved. This Briefing Note (BN) begins by exploring positionality and reflexivity in inter- and transdisciplinary collaboration in literature, showing how addressing complex societal problems through integration of diverse forms of knowledge requires recognizing positionality and valuing reflexivity as a way to identify and counter power imbalances. The manifestation of reflexivity and positionality in SSH CENTRE experiments highlights the value of reflexive practices in inter- and transdisciplinary work but points out that these require deliberate project design and supportive

mechanisms. The note thus concludes with recommendations on how reflexivity can be supported systematically, not improvised.

Problem description and literature insights

Positionality is the **recognition of one's own place and power in the research process**. It refers to the values and biases of the researcher that stem from their upbringing, experiences, access to resources, institutional background, and the social and economic power structures that shape them [1,2]. Reflexivity is then an **inward-looking and ongoing practice in which researchers revisit their position, power, and assumptions actively during the research process**. It requires self-inquiry and a willingness to analyse their underlying assumptions, their relationship to social power structures, and the way they shape their own actions and outreach [2,3].

Reflexivity helps to **identify and counter power imbalances**, whether these are between disciplines or between academic researchers and non-academic stakeholders [2,4,5]. If the objective of inter- and transdisciplinary research is to address complex societal problems through integration of diverse forms of knowledge [6,7], then it requires engagement with different scientists, stakeholders, and civic society in ways that value their diverse knowledges [1]. Collaborative research, and the way such diverse knowledge is seen and heard, is inevitably affected by power dynamics [2].

Positionality and reflexivity are terms that originally come from social science fields like anthropology and sociology. Anthropology in particular, with its focus on non-Western cultures, has raised the issue of the hierarchy of different knowledge systems and the need to reflect on the researcher's position as a tool for creating data. We can divide reflexive practices into subjective reflexivity and epistemological reflexivity. **Subjective reflexivity** assumes that the researcher is necessarily part of the research process and, as such, shapes it – whether through the choice of topic, research subjects, and relationships with them, or through their personality and positionality. Reflecting on researcher's positionality serves to identify biases that can lead to moral judgments and unqualified assumptions when interpreting data [2]. **Epistemological reflexivity** then encompasses the scientific tools used in research, from methodological decisions (such as sample design, data creation and analysis) to theoretical background and interpretation [8].

Despite the frequent use of the terms positionality and reflexivity in inter- and transdisciplinary literature, there is a lack of clarity in how reflexivity should be operationalised [9]. A common misconception is the assumption that the need for reflexivity can be dealt with at the beginning of the research or in one reflexive paragraph and then no longer needs to be addressed. However, reflexivity is not about mere acknowledgement of the researcher's position, as if it defines a fixed perspective from which the research is based. Similarly, it should not focus just on researcher's personal experiences and emotions, as this approach risks becoming self-centred [10]. Reflexivity is not just an internal thought process, but a form of thinking coupled with action, enabling new ways of acting [3]. Reflexivity is therefore **an ongoing practice that encompasses the research planning phase, data creation, data processing, and the writing up of results**. In research, we are conditioned by limitations and possibilities that need to be reflected upon in themselves; however, we also make a number of decisions between alternatives for which we bear epistemic and ethical responsibility [10].

One aspect of research that is influenced by scientists' ability to reflect is, from the very beginning of the project, **the management of expectations**. Stakeholder involvement is regarded as an integral part of transdisciplinary research, yet in many cases the underlying objectives that precipitate such involvement remain abstruse. This absence of clarity is considered as a cause of dissatisfaction among researchers and stakeholders. Therefore, reflexivity is an important aspect for the management of expectations – it enables clarification of which objectives motivate stakeholder engagement [11].

Manifestation in the SSH CENTRE

This section presents four main moments where reflexivity has proven to be important in inter- and transdisciplinary collaboration. First, the SSH CENTRE transdisciplinary experiments with municipalities demonstrated the importance of positionality, especially regarding the differences between academic and stakeholder environments and the differences between Eastern and Western Europe. Secondly, reflexivity was evident in the researchers' reflections on their role, which, especially in the Knowledge Brokerage Initiative, prompted adjusting and negotiating the purpose and fit of the research. The third moment of reflection was the interdisciplinary cooperation between SSH and STEM disciplines, where researchers' awareness of the differences in perspectives and the importance they placed on this diversity supported integration. The fourth reflection concerns the role of SSH as bringing ethical considerations into the collaboration.

The municipalities engaged in the Knowledge Brokerage Initiative operated in a significantly different mode than the academics in this collaboration. The ability of researchers to reflect on their own position, communication methods, and differing expectations of research were important for successful cooperation. Municipalities generally had very limited space reserved for consultations on the ongoing initiative and usually did not have a clear assignment for researchers. This created a certain amount of frustration, as the researchers were eager to contribute usefully through their research, but the objective of some municipalities for the research remained unclear for a long time – or only became apparent at a later stage when the research was already moving in a different direction. This required researchers to have the reflexive ability to constantly consider their own role, methods of communication, and expectations, i.e., to flexibly adapt the intensity and form of their involvement to the needs of the municipalities without compromising the scientific quality of their work.

In most cases, the researchers demonstrated a high degree of reflexivity. When working with municipalities, scientists emphasized the need to adapt their thinking and approach to the specific local context, especially since the transferability of solutions from other contexts was limited. This was particularly evident when comparing between participants

from Eastern and Western Europe, whose situations differed significantly.

> *In the workshops, we had a couple of representatives from [Western European country] come which was really helpful, because they had gone through these processes before and so they knew. But the context was just so wildly different that even what the [Western European city 1] or the [Western European city 2] people were suggesting, like that wasn't an issue in [Eastern European city 1] or it wasn't even in the realm of the thing. So, it was interesting to have the information, but it was, yeah, not applicable really, which is where we need to be creative and find how it is.* (FECR6, Transdisciplinary Knowledge Brokerage Initiative)

The researchers also became aware that the solutions and proposals they initially favoured might be impractical, for example because they exceeded the local scale of a specific city, or because the abstract approach of some social sciences focuses on a high degree of generalization and works with a level of analysis that is distant from the specific needs of the city.

> *So, for example, we were quite [excited] about the idea of making a list of recommendations about inclusivity and certain steps you can take to promote inclusivity in energy communities. But then, going through that process – I think, maybe, it's about reflexivity – (…) you think actually a lot of these things aren't municipality specific, or there's not a clear way [of] how they would do them (…) [so it] would be very hard to actually say "we did this thing" or "we achieved this outcome". So, one thing I learned is that it's a continually reflexive process of a lot of discussion back and forth.* (MECR2, Transdisciplinary Knowledge Brokerage Initiative)

In this instance, reflexivity involves continually reassessing the purpose, fit, and process of the knowledge brokering work while it is happening, rather than assuming the initial plan will be sufficient. The following quote illustrates that researchers' reflexivity also lies in recognizing the tension between academic generalization and practical applicability for local actors.

> *As social science researchers in particular, we tend to focus at a relatively high level of aggregation intellectually. We're generalizing between situations and making statements about things that are vague enough to be applied to multiple different contexts, which means that we tend to pretty quickly jump up a level of analysis. And I worry that this means that the proposals and solutions that we are initially going to gravitate towards are going to be impractical. Either because the city scale, even a large city like [Western European city 3], is not the appropriate scale at which to attempt something like this, or because it's a very upstream attempt to change the preconditions of a problem that is being expressed in a very concrete and immediate way.* (MECR3, Transdisciplinary Knowledge Brokerage Initiative)

Reflecting on one's own role is also related to the position in which researchers find themselves when approaching stakeholders such as municipalities. Transdisciplinary collaboration is mediated by social ties. For example, the entry point (a specific contact person) is pivotal because it shapes access and perceptions gained.

> *You really need to understand where in an organization you are positioned. You are coming in from the outside and you have a contact point. And that contact point has other relationships, both hierarchical and informal. And the usefulness of your work and the way it will be used are a social and political process.* (MECR3, Transdisciplinary Knowledge Brokerage Initiative)

A very positive aspect of the reflections of researchers in the Interdisciplinary Collaborations was the appreciation of the role of SSH in addressing complex societal issues, for example in questions about the role of technology in climate change mitigation. In the second wave of interviews after the collaboration, many STEM researchers reflected on a change in their perception of SSH disciplines, moving from an initial scepticism about its ability to *prove*, as is done in engineering or mathematical sciences, to recognizing its value in *understanding* amidst the inherent complexity of social phenomena.[1]

> *My opinion of the social science quite very shifted during the collaboration because (…) [SSH] people try to develop some very specific concept, but does that have the possibility to prove the ideas? (…) Because when you work with people, when you work with human behaviour, it's not possible to prove human behaviour, so we need to try to understand, to test, to define a complexity (…). The human behaviour, organisation of human, it's a really complex system, so it's not possible to describe it only by a mathematical formula. Yeah, it's very difficult.* (MEXP1, Interdisciplinary Collaborations)

The role of SSH is also to raise ethical questions. For example, according to one researcher, SSH enables a deeper inquiry into the "why" behind actions to uncover underlying values and ensure that solutions do not inadvertently harm people – a perspective that STEM fields might not be equipped to fully consider. Similarly, researchers noticed that humanities and arts tend to be involved in a very limited way and reflected upon their value:

> *It became more clear to me that it's not only the (…) social sciences that I should integrate in the process or even in my team, in the research that I do, but also the humanities and even art. I realised that if we really want to have effective answers to give to the politicians and even to the general public, we need to take this on board, you know, this perspective. And this project made that more clear to me.* (FEXP3, Transdisciplinary Knowledge Brokerage Initiative)

Taken together, the findings highlight the value of reflexive practices in inter- and transdisciplinary work – be it calibrating proposals to local contexts, navigating organisational entry points, or broadening epistemic communities.

1 See BN1 for an example of the difference between the explanatory (*erklärende*) and understanding (*verstehende*) approaches and how they are manifested in the SSH CENTRE project.

Recommendations at individual, project, and systemic levels

Collaboration succeeds when reflexivity is structured, not improvised. It requires researchers themselves to deliberately embody reflexive practices. However, positionality and reflexivity cannot only be an initiative of passionate researchers. They require deliberate project design and supportive mechanisms. This section converts the literature insights and empirical findings into concrete recommendations.

Recommendations at the individual/researcher level

- Practice *epistemological* reflexivity to understand how your methods, values, and assumptions influence the research [3,12].
- Employ *subjective* reflexivity and engage in personal, introspective, and emotional work to confront your biases and positionality, especially concerning systemic power imbalances [2].
- Engage in continuous reflection on your professional identity and worldview, being able to articulate it and, when necessary, step back from it [3,12].
- Acknowledge the existence of disciplinary blind spots and implicit biases (including your own) and encourage reflexive practices to address them.
- Instead of insisting on a discipline's value, highlight when researchers' disciplinary expertise is visibly contributing to inter- and transdisciplinary collaboration.

Recommendations at the project level

- Build reflexivity into every stage of the research process: use collective reflection and discussion to address tensions, challenges, and aspirations throughout the project lifecycle [2,12].
- Design teams to intentionally include humanities and arts roles (e.g., historians, ethicists, designers, artists) to enhance policy relevance, public resonance, and the translation of complex findings.
- Use participatory reflexivity methods (e.g., citizens' juries, consensus panels, scenario planning) into project design to co-define solutions [9].
- Recognize that researchers and stakeholders from marginalised perspectives often take on roles (such as mentorship, translation, and safeguarding) essential for ethical and relevant research, and these contributions must be valued beyond typical academic metrics [2].

Recommendations at the systemic/broader academia and funding level

- Train scientists to make them aware of their personal and discipline's positionality; meet them "on home turf" (such as science conferences) with accessible, non-threatening formats (using images and humour) to open dialogue about assumptions and roles [3].
- Educate researchers during early university studies on the subject of worldviews & research paradigms and how they may impact inter- and transdisciplinary research; thread reflexivity (politics of field, institutions, self) through curricula and professional training [3].
- Shift evaluation from quantity to quality using PES-grounded (Public Engagement with Science) indicators (e.g., learning intentions, feedback loops) and portfolio-based peer review (external PES references, participant feedback, evidence of dialogic impact). See Haywood and Besley [13] and Salmon, Priestley, and Goven [3] for more on PES.
- Acknowledge and accommodate the time, skills, and resources required for collaborative, reflexive practice in funding schemes [14].

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References

1. Singh P. Understanding Researchers' Positionality in Integrating and Designing the Transdisciplinary Research Process and Outcomes: A Case Study of Thriving Agriculture Project. PennState University; 2025.
2. Cadman R, Syliboy A, Saunders M, Denny S, Denniston M, Barry E, et al. Using positionality and reflexivity to support equity in partnership-driven research. Conserv Biol. 2024;38(6):e14396-n/a.
3. Salmon RA, Priestley RK, Goven J. The reflexive scientist: an approach to transforming public engagement. J Environ Stud Sci. 2017;7(1):53–68.
4. Harris F, Lyon F, Sioen GB, Ebi KL. Working with the tensions of transdisciplinary research: a review and agenda for the future of knowledge co-production in the Anthropocene. Glob Sustain. 2024;7:e13.
5. Klenk N, Meehan K. Climate change and transdisciplinary science: Problematizing the integration imperative. Environ Sci Policy. 2015 Dec 1;54:160–7.
6. Lawrence MG, Williams S, Nanz P, Renn O. Characteristics, potentials, and challenges of transdisciplinary research. One Earth. 2022 Jan 21;5(1):44–61.
7. Salmela M, Vienni-Baptista B, Cheas K. Towards the Recognition of Interdisciplinary and Transdisciplinary Researchers. Minerva [Internet]. 2025 Feb 28 [cited 2025 May 14]; Available from: https://doi.org/10.1007/s11024-025-09578-y
8. Novotná H. Kvalitativní strategie výzkumu. In: Novotná H, Špaček O, Jantulová MŠ, editors. Metody výzkumu ve společenských vědách. Praha: FHS UK; 2019. p. 257–87.
9. Popa F, Guillermin M, Dedeurwaerdere T. A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. Futur J Policy Plan Futur Stud. 2015;65:45–56.
10. Stöckelová T, Ghosh YA. Úvahy o etnografii: od dogmatu k heterodoxii. In: Etnografie: Improvizace v teorii a terénní praxi. 1st ed. Praha: Sociologické nakladatelství (SLON); 2013.
11. Schmidt L, Falk T, Siegmund-Schultze M, Spangenberg JH. The Objectives of Stakeholder Involvement in Transdisciplinary Research. A Conceptual Framework for a Reflective and Reflexive Practise. Ecol Econ. 2020;176:106751-.
12. Di Giulio A. Implementing Interdisciplinarity: Connecting the Mindset of a Worrier, a Dreamer, and a Bookkeeper. In: Practicing Interdisciplinarity [Internet]. Germany: Walter de Gruyter GmbH; 2024 [cited 2025 May 6]. p. 1–6. Available from: https://www.degruyter.com/document/doi/10.1515/9783111339849-001/pdf
13. Haywood BK, Besley JC. Education, outreach, and inclusive engagement: Towards integrated indicators of successful program outcomes in participatory science. Public Underst Sci. 2014 Jan 1;23(1):92–106.
14. Schneider F, Buser T, Keller R, Tribaldos T, Rist S. Research funding programmes aiming for societal transformations: Ten key stages. Sci Public Policy. 2019;46(3):463–78.

10

Engaging stakeholders and audiences in inter- and transdisciplinary collaboration

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The quality of stakeholder engagement determines whether inter- and transdisciplinary work translates into credible and usable outcomes.

What did the SSH CENTRE project do?

SSH CENTRE (Social Sciences and Humanities for Climate, Energy aNd Transport Research Excellence) is a Horizon Europe project that focused on generating best practices for incorporating both Social Sciences and Humanities (SSH) and inter- and transdisciplinary research into the European Union's climate, energy, and mobility transition policy. The SSH CENTRE project deliberately created spaces for *epistemic experimentation* – i.e. structured collaborations that bridge different epistemic (knowledge) cultures to co-produce policy-relevant knowledge:

Interdisciplinary Collaborations for EU Policy Recommendations

The SSH CENTRE project facilitated nearly 30 novel collaborations between the SSH and STEM (Science, Technology, Engineering and Mathematics) disciplines, for strengthening European climate, energy, and mobility policy. These resulted in three edited books, whereby each Interdisciplinary Collaboration produced a chapter. For more see SSH CENTRE Interdisciplinary EU Policy Book Collection.

Transdisciplinary Knowledge Brokerage Initiative

The Knowledge Brokerage Initiative for sustainability transitions gathered 30 early- and mid-career SSH researchers working on themes of climate, energy, and mobility. These researchers actively engaged in accelerating the transition process towards a carbon-free society by working with six European cities on sustainability issues and brokering SSH knowledge. The researchers organised workshops and produced a range of reports that provided knowledge to support the cities' transitions. For more see Knowledge Brokerage Reports.

Debating Europe Citizens' Engagement

Debating Europe conducted online focus groups with 160 citizens of 25 nationalities on the four sustainability-focused EU Horizon Europe Missions. Building on these discussions, four policy panels engaged senior policy makers and experts to explore how citizen's perspectives could inform Mission implementation across EU institutions. Insights were synthesised into Citizen-led recommendations for the Horizon Europe Missions on sustainability.

This Briefing Note is one of 10 that present the findings and recommendations from the evaluation of these epistemic experiments. For more, see the Introduction to the Briefing Note collection and the Formative Accompanying Research methodology.

Introduction

Engaging stakeholders and adapting communication for diverse audiences are central to the effectiveness and impact of inter- and transdisciplinary research, particularly for addressing complex societal challenges such as climate change [1,2]. This Briefing Note builds on literature insights that present what stakeholder engagement in inter- and transdisciplinary research is, what it requires, and what is the role of funding and institutional support. This scholarship urges a move beyond unidirectional stakeholder engagement, where researchers simply "disseminate findings", toward sustained, collaborative dialogue [1,3]. The SSH CENTRE experiments document how effective stakeholder engagement depends on clarity about who is involved and what motivates them, and underscore the importance of reflexivity, Open Science practices, and of transparency about impact.

We deliberately include interdisciplinary research alongside transdisciplinary research in this Briefing Note. Typically, transdisciplinary research is understood as going beyond academic boundaries to include societal actors, whereas interdisciplinary research typically concerns collaborations between researchers from distinctive disciplines [4]. However, interdisciplinary projects also increasingly recognize the importance of engaging stakeholders and reaching relevant audiences. Even when collaboration is primarily between academic fields, outputs must be translated for policymakers, practitioners, and other end-users if the research is to achieve societal impact. In this sense, stakeholder and audience engagement is a shared challenge across both interdisciplinary and transdisciplinary collaboration.

Problem description and literature insights

Stakeholder engagement is broadly defined as an iterative process of actively seeking the knowledge, judgment, values, and experience of relevant individuals or organizations to achieve a shared understanding and to make transparent and effective decisions [1,5]. Stakeholders are then understood as individuals, organisations or communities with a vested interest in the process and outcomes of a particular project, research or policy initiative [1].

There are typically four rationales for stakeholder involvement in inter- and transdisciplinary research: improving research quality, increasing the acceptance of research results, ensuring fairness and legitimacy, and fostering mutual learning [6].[1] **Improving the quality of research** involves integrating diverse perspectives and knowledges to co-produce a holistic and socially grounded understanding of problems. Stakeholders can contribute with valuable local knowledge, adding relevance to research projects [7]. **Increasing the acceptance of research results** includes enhancing impact and long-term usage. The experience of having an influence on the research process can create a sense of ownership among participating stakeholders, fostering trust and engagement in the project and its results, including sharing learned insights [6]. **Ensuring fairness and legitimacy** supports the democratic principle that those affected by the research project should have the right to express their views on its conduct and results. Further, meaningful engagement of stakeholders creates more credibility and dissemination opportunities [8]. Finally, **fostering mutual learning** often influences politically contentious power dynamics and indirectly supports changes in social systems [6].

Stakeholders can take numerous roles and be involved at all stages of the research and project process, from problem formulation and priority-setting to contributions during the work. Those contributions may include providing feedback on assumptions and methods, co-collecting or validating findings, and involvement in the dissemination and translation of outputs. A fair engagement of stakeholders requires **adapting public outputs to be relevant to all stakeholders involved**. Both the language used and the results should be as simple and widely understandable as possible [9]. It is reported that stakeholders appreciate when findings are shared freely and in a version that suits their ability to understand [10]. The understandability criteria, however, extend beyond the outputs and indicate that all communication with stakeholders should be carried out with them in mind.

While having many benefits, stakeholder engagement also introduces some challenges. As the literature emphasizes, **engagement is essentially a relationship-building process**. Briefing Note 8 (BN8), which focuses on spaces for communication in inter- and transdisciplinary research, highlights that this requires developing trust and mutual respect – which in turn requires sufficient time and dedicated space within the research project (see BN2), as well as effective support through skilful leadership (BN7). It also relates to overcoming communication barriers, for example, due to specialized terminology of researchers; as elaborated in BN6, inter- and transdisciplinary projects must devote effort to the creation of shared vocabularies and common understandings. A real dialogue takes place only when communication also involves active listening.

Funding agencies and academic institutions play a crucial role as drivers of inter- and transdisciplinary research, because **achieving effective stakeholder engagement requires explicit support, resources, and institutional flexibility** [11]. Dedicated time, skills training, and financial support should be foreseen in call design and project budgets, rather than improvised during the project [1]. At present, academic reward systems often undervalue engagement activities, creating a structural disincentive. Addressing this mismatch is essential for meaningful stakeholder engagement [9]. Importantly, this is not a recognition of any engagement of stakeholders without a nuance – historical analyses show that across disciplines, engagement frameworks have evolved in diverse ways. Recognising this diversity can help funders and institutions to provide more flexible support structures rather than imposing a one-size-fits-all model [2].

Manifestation in the SSH CENTRE

Within the SSH CENTRE project, stakeholders were engaged in three experiments: in the Interdisciplinary EU Policy Collaboration, in the Knowledge Brokerage Initiative, and in the Debating Europe Citizens' Engagement. One of the most significant findings was the importance of having a good understanding of who the stakeholders and audiences are. Such understanding allows for easier choices regarding communication and relationship-building with stakeholders.

In the Knowledge Brokerage Initiative, it was important to understand stakeholders' motivations. Such understanding supported in setting up the format of collaboration. It required balanced communication where researchers had to assess both the extent to which they should encourage interactions with busy city partners, and the degree of independence to give them in defining research objectives.

> *We had a specific relation with the city, I would say, which (…) in the end (…) turned out quite OK. After the workshop, they were quite nice to us, but we didn't have that much opportunity to actually talk (…) and I don't think they really knew why they want to be part of this. And we (…) were expecting maybe them to know what they need help*

1 Schmidt et al. name them as *normative, substantive, social learning*, and *implementation objectives* respectively [6].

with. (FECR4, Transdisciplinary Knowledge Brokerage Initiative)

This citation highlights a common challenge in transdisciplinary work: partners may lack a clear sense of their own research needs, requiring researchers to invest extra effort in clarifying expectations. In cases where municipalities were not clear regarding the aim of the collaboration, research teams had to deal with this sort of uncertainty and use their knowledge brokerage skills to make the research meaningful for both parties.

> *I think a big part of [the knowledge brokerage] was coming back to [help] municipalities (…) to work out what questions they would like to ask. And that seemed to be a really big part of it. And then, once you have a question down that you can nail down and focus on, that makes things a lot easier. I think it's sometimes tricky to know what you're brokering for the person or whether it really does align with what they would like. (…) So I think one thing I learned is that it's a continually reflexive process of a lot of discussion back and forth.* (MECR2, Transdisciplinary Knowledge Brokerage Initiative)

The excerpt illustrates that effective brokerage is not a one-off negotiation but a reflexive, ongoing process of alignment, demanding flexibility, and patience from both sides.

Understanding who are the stakeholders that researchers are engaging with also means understanding who is missing. In the Debating Europe focus groups, several participants described a bubble effect: debates tended to draw pro-EU, environmentally minded, and highly educated participants, making it hard to connect across oppositional opinions. As one participant put it:

> *Well, I think the problem is mainly that there are bubbles, like these pro-European bubbles and the anti-European (…). And it's really hard to connect across or between these sorts of publics, they're sort of separated. For example, if I have someone who's reading these right-wing papers (…), then I don't think that this person will go and read the reports that Debating Europe publishes or take them into account when forming [their] own position.* (Citizen9, Debating Europe Citizens' Engagement)

Importantly, limited reach did not equate to poor participant experience. Those who took part consistently described high process quality – the process of participation was appraised positively, having a pleasant atmosphere, competent and relatively diverse debaters, and experienced moderators. Where participants' views diverged was on the perceived impact of participation – some citizens felt that their contributions could influence policy, while others doubted that the discussions would reach decisionmakers. Overall, the citizens participating were interested to know if the outputs are delivered anywhere that matters and wanted to understand the potential impact of their contribution.

> *Yes, it is useful, definitely. Is it useful enough? I'm not sure, I don't know. I cannot evaluate the impact that we have. Usually, from other discussions with Friends of Europe [the think-tank that Debating Europe is part of], what happens is a very nice-looking report generated in the end, quoting participants and so on, which is something I completely support, it's very nice. The problem is (…) I don't know what happens. We're definitely making some noise, but I don't know if it's enough.* (Citizen7, Debating Europe Citizens' Engagement)

Openness regarding outputs and transparency throughout the research collaboration was also an important topic for researchers. Researchers within interdisciplinary SSH-STEM teams emphasised the principles of Open Science, which are an essential part of the overall design of the SSH CENTRE project.

> *I see it as a way to make science more available to the general public, way to make it more democratic so that it can reach anyone, you know, from any social or economic position (…). And also that can bring people that initially can think that "oh you know, I can never be a scientist" (…) or "no one works in science around me".* (FEXP3, Interdisciplinary Collaborations)

Publishing the data used by researchers (e.g. on the Zenodo platform), organising public discussions, publishing in open-access journals, and using participatory techniques such as citizen science (see SSH CENTRE info sheet) are all ways of fulfilling the aforementioned four rationales for stakeholder involvement in inter- and transdisciplinary research.

Recommendations at individual, project, and systemic levels

Drawing on both literature and SSH CENTRE experiences, the following recommendations suggest how engagement of stakeholders and audiences can be strengthened in practice.

Recommendations at the individual/researcher level

- Maintain and demonstrate trust throughout the collaboration by being transparent, keeping promises, and engaging in two-way communication; consider remaining present even after formal projects end (staying in touch via calls, emails, occasional visits) to maintain trust at a distance [1,12,13].
- Employ cultural sensitivity: incorporate anthropological insights, such as culturally sensitive storytelling, visual representation, and narrative analysis, to effectively communicate complex research findings to diverse audiences, including policymakers and the public [14].
- Develop "interactional expertise" – the capacity to understand and translate the language, priorities, and practices of other disciplines and stakeholder groups – to collaborate effectively across knowledge systems [13].

Recommendations at the project level

- Jointly negotiate, clarify, and communicate the underlying objectives of stakeholder involvement, which may include the goals of improving research quality, increasing the acceptance of research results, ensuring fairness and legitimacy, and fostering mutual learning [6].
- Dedicate adequate resources (time, money, personnel) to support meaningful stakeholder participation from

the project's inception to completion; explicitly recognize that negotiating and co-producing knowledge takes more time to achieve genuine integration [8,15].

- Ensure that citizens' perspectives and local knowledge are meaningfully integrated into initiatives, valuing informal and community-based insights alongside academic expertise and using SSH competences for that.
- Organize stakeholder workshops not only during the project design and implementation phases but also at the stage of disseminating results, to ensure outputs are meaningful, understood, and actionable for diverse audiences [8].
- When working with policy makers, involve them early and actively in the project to ensure co-ownership of goals and outcomes, fostering stronger alignment between research and policy needs.
- Provide training for researchers on how to present their methods and tailor communication to different audiences, ensuring clarity and accessibility. Similarly, offer joint training for researchers and policy professionals to establish a shared understanding of terminology, issues, and challenges, thereby building a common ground for collaboration (see also BN6).

Recommendations at the systemic/broader academia and funding level

- Explicitly legitimize and reward stakeholder engagement from the beginning of funding investments to avoid relegating SSH to a mere communication or impact add-on at the end of technical projects [11].
- Tailor evaluation processes for inter-/transdisciplinary research: broaden evaluation criteria to include metrics that explicitly recognise high-quality stakeholder engagement, assessing not only academic outputs but also the salience, inclusivity, and credibility of research processes.
- Provide inter- and transdisciplinary education and capacity-building to equip researchers with essential skills and conceptual clarity regarding stakeholder and audiences' engagement [10,11].
- Ensure that funding agencies and institutional structures include good internal collaborative practices, especially when multiple entities are involved in funding or management, through good communication and shared vision [11].

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References

1. Boaz A, Hanney S, Borst R, O'Shea A, Kok M. How to engage stakeholders in research: design principles to support improvement. Health Res Policy Syst. 2018 Dec;16(1):60.
2. Chung JY. Stakeholder-engaged research: a multidisciplinary historical analysis. Res All [Internet]. 2024 Jul 10 [cited 2025 Apr 17];8(1). Available from: https://journals.uclpress.co.uk/r4a/article/id/3227/
3. Dudman K, de Wit S. An IPCC that listens: introducing reciprocity to climate change communication. Clim Change. 2021 Sep 7;168(1):2.
4. Välikangas A. The Limited Role of Social Sciences and Humanities in Interdisciplinary Funding: What are Its Effects? Soc Epistemol. 2024 Mar 3;38(2):152–72.
5. Deverka PA, Lavallee DC, Desai PJ, Esmail LC, Ramsey SD, Veenstra DL, et al. Stakeholder participation in comparative effectiveness research: defining a framework for effective engagement. J Comp Eff Res. 2012 Mar;1(2):181–94.
6. Schmidt L, Falk T, Siegmund-Schultze M, Spangenberg JH. The Objectives of Stakeholder Involvement in Transdisciplinary Research. A Conceptual Framework for a Reflective and Reflexive Practise. Ecol Econ. 2020;176:106751-.
7. Bracken LJ, Bulkeley HA, Whitman G. Transdisciplinary research: understanding the stakeholder perspective. J Environ Plan Manag. 2015 Jul 3;58(7):1291–308.
8. Ferguson L, Chan S, Santelmann MV, Tilt B. Transdisciplinary research in water sustainability: What's in it for an engaged researcher-stakeholder community? Water Altern. 2018 Feb 1;11(1):1–18.
9. Harris F, Lyon F, Sioen GB, Ebi KL. Working with the tensions of transdisciplinary research: a review and agenda for the future of knowledge co-production in the Anthropocene. Glob Sustain. 2024;7:e13.
10. Singh P. Understanding Researchers' Positionality in Integrating and Designing the Transdisciplinary Research Process and Outcomes: A Case Study of Thriving Agriculture Project. PennState University; 2025.
11. Lyall C, Bruce A, Marsden W, Meagher L. The role of funding agencies in creating interdisciplinary knowledge. Sci Public Policy. 2013;40(1):62–71.
12. Armstrong A, Flynn E, Salt K, Briggs J, Clarke R, Vines J, et al. Trust and temporality in participatory research. Qual Res. 2023 Aug 1;23(4):1000–21.
13. Gilligan JM. Expertise Across Disciplines: Establishing Common Ground in Interdisciplinary Disaster Research Teams. Risk Anal. 2021;41(7):1171–7.
14. Elixhauser S, Boni Z, Gregorič Bon N, Kanjir U, Meyer A, Muttenzer F, et al. Interdisciplinary, but how? Anthropological Perspectives from Collaborative Research on Climate and Environmental Change. Environ Sci Policy. 2024;151:103586-.
15. Schneider F, Buser T, Keller R, Tribaldos T, Rist S. Research funding programmes aiming for societal transformations: Ten key stages. Sci Public Policy. 2019;46(3):463–78.

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