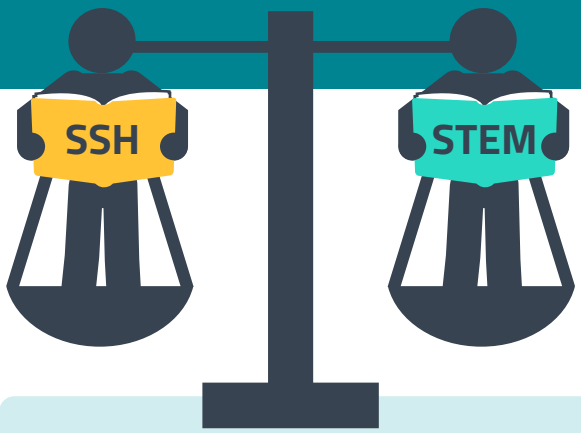

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Balancing SSH and STEM contributions in inter- and transdisciplinary collaboration

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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.

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