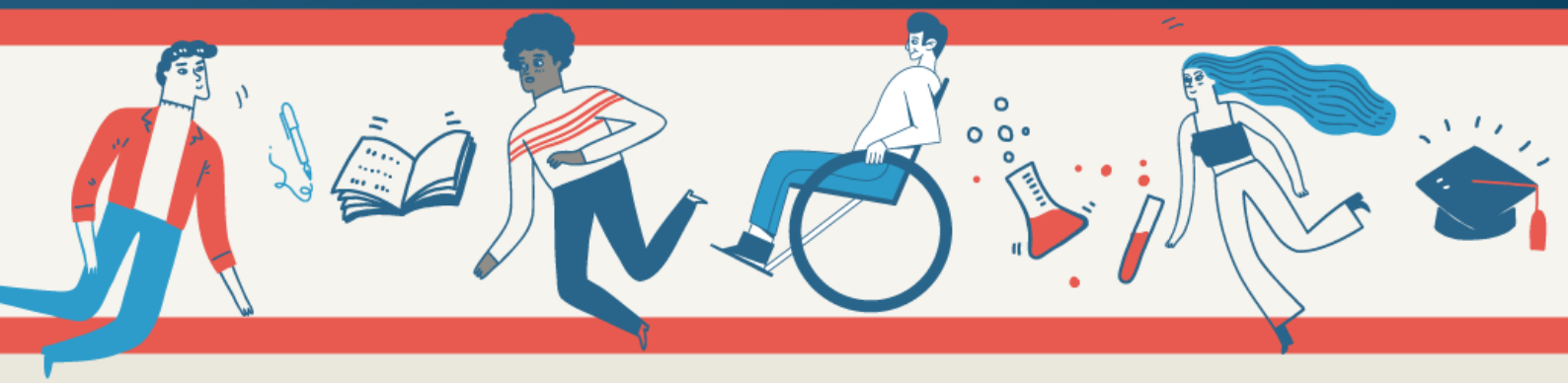
poiesis

TRUST IN SCIENCE

Disclaimer: This docment has not yet been reviewed by the European Commission. Its content might therefore change as a result of the review process.



Policy Recommendations for Promoting Trust in Science through Integrity, Integration, and Communication

Project acronym: POIESIS

Grant Agreement no.: 101057253

Editors: Tine Ravn & Simon Fuglsang

Contributors: Leonidas Ananiadis, Martin W. Bauer, Anne-Sophie Behm-Bahtat, Hannah Bunt, Michel Dubois, Marta Entradas, Bankole Falade, Serge P. J. M. Horbach, Alan Irwin, Panagiotis Kavouras, Niels Mejlgaard, Mariam Molavyzada, Irene Monsonís Payá, Inês Sousa, Eleni Spyrakou, Richard Woolley, Feng Yan

August 2025

Table of Contents

Contents

Executive Summary

POIESIS sets out to probe the impact of integrity and integration on societal trust in science. The project takes its departure in three widely held and intuitive assumptions on the relationship between science and society. First, that trust in science depends on scientists' capacity to demonstrate high standards of research integrity and breaches to research integrity will lead to mistrust. Second, that citizen and civil society's involvement in co-creating research and innovation agendas and contents makes research more relevant and responsive to society, strengthening co-ownership and trust. And finally, that institutions foster integrity and societal integration by enabling and supporting researchers to act responsibly.

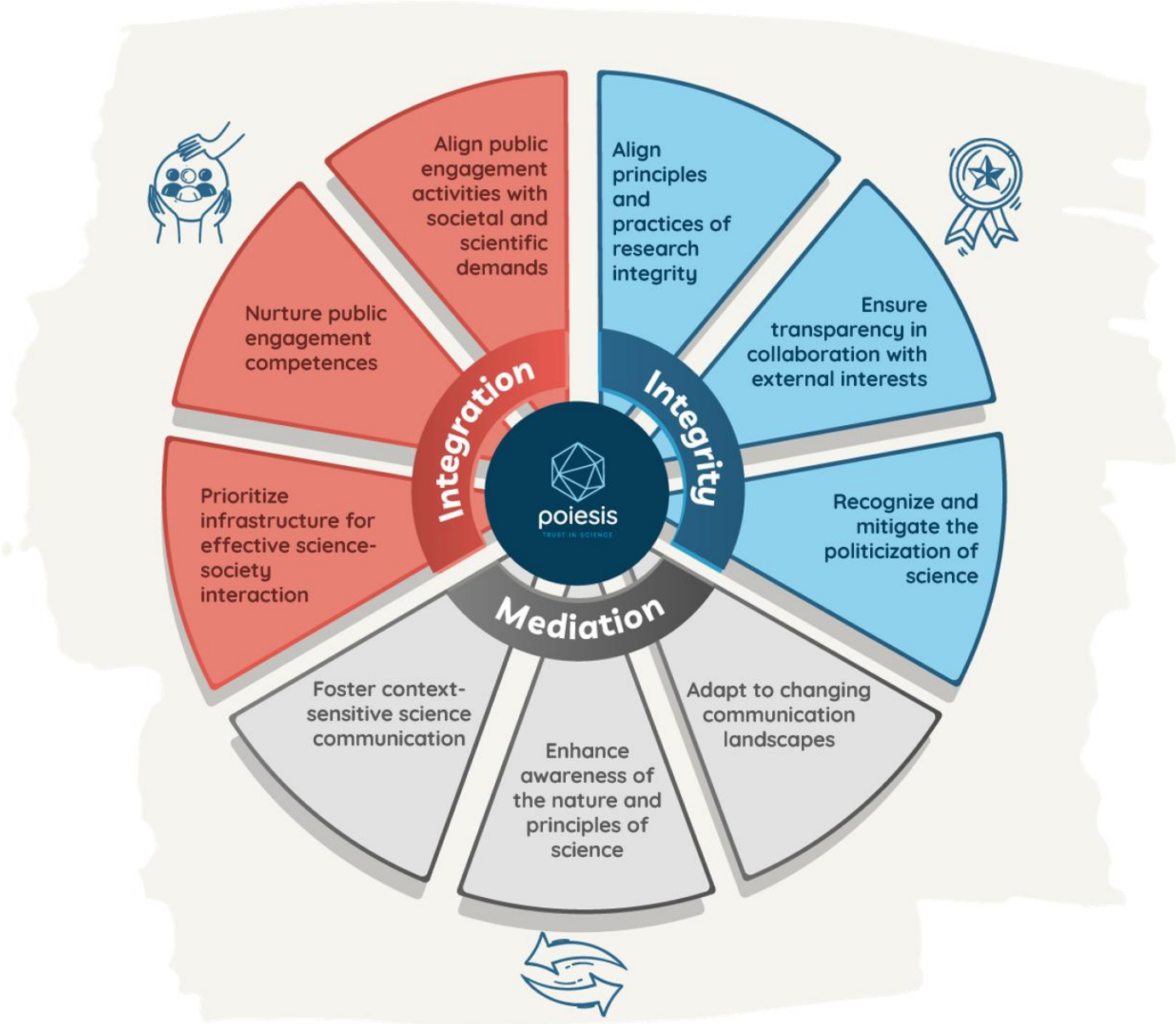
While these assumptions are widespread for good reason, they have only received limited empirical scrutiny. POIESIS aims to critically assess the processes that are implied in these assumptions. Moreover, POIESIS stipulates that for integrity and integration to matter for the societal conversation on science and subsequently science, this requires strong links between science and society through solid chains of mediation.

To deepen our understanding of these processes, POIESIS implements an ambitious empirical programme that interrogates the processes through which integrity and integration impact and shape public trust, and the role of institutions and science communication for these processes. The multi-method, cross-national, and multi-stakeholder approach of POIESIS provides a robust empirical basis for understanding how and when integrity and integration matters for societal trust in science.

Crucially, POIESIS reaffirms that trust in science is high, but simultaneously identifies cracks in the relationship between science and society that should be kept in mind to ensure that trust in science is maintained or even strengthened. Moreover, POIESIS provides considerable nuances to the three assumptions highlighted above. While the assumptions all contain some truth, all assumptions need updating and can and should be nuanced and better understood: Research integrity in a narrow sense is not found to be a key challenge to trust, however external and political challenges to the integrity of science are. Public engagement with science is seen as a promising avenue for strengthening science-society ties, but at the same time pose potential challenges for the quality and independence of science. Mediation as science communication is key for ensuring trust in science, but is pressured by changing communication landscapes, changing media habits, and the proliferation of alternative information streams.

To address these concerns, and work towards bolstering the science-society relationship, POIESIS provides a set of nine recommendations that highlight how European and national policymakers, research performing organisations, research funding organisations, researchers, and mediators can work to maintain trust in science and address current and future challenges. These

recommendations address the three core areas of research integrity, societal integration in science, and science mediation, and build directly on the findings of the POIESIS project to provide robust empirically founded recommendations. Furthermore, all recommendations are accompanied by specific actions for relevant stakeholders, who are to be pivotal in ensuring societal trust in science.



The first areas of recommendations regard research integrity, which has been an area of high interest and concern in recent decades. Most pressingly for POIESIS, is the concern that lacking research integrity and failure to adhere to its principles undermines the relationship between science and society. POIESIS does not provide support for such a mechanical relationship. Rather, while research integrity

is recognized as crucial to research quality and, by extension, the trustworthiness of science, it is less likely to enter public consciousness. Even when it does, detrimental cases are often attributed to individual actors misbehaving rather than to systemic issues. Nevertheless, there are a series of tensions between the ideals of research integrity and the reality in which research is being performed. These factors might threaten science's ability to maintain its image as a domain of high integrity and trustworthiness. Achieving this requires that science works to align principles and practices of research integrity.

While narrow conceptualisations of research integrity are not particularly salient to the general public, there are some key concerns regarding how the integrity of science may be compromised by outside influences. Recognizing and mitigating these concerns are key to ensuring societal trust in science. There are widespread concerns about the ability of science to withstand outside influences and the potential issues that failing to do so may entail. To better meet such concerns, we recommend that steps are taken to ensure transparency in collaboration with external interests. Focusing on the way in which interests outside of science matter for the impact and direction of science and being open to public scrutiny on this is key for trust.

Adding to this, there are widespread critiques and concerns that science is being politicized, and that findings and conclusions reflect not only scientific rigour and methods but are also shaped by subjective political views. Ensuring that science works to recognize and mitigate the politicization of science and engage with such concerns is crucial for ensuring the societal authority of science and trust.

These recommendations highlight the position that the integrity of science is not so much perceived to be threatened by problematic practices or lack of professional scrutiny inside science itself, but rather by non-scientific logics slipping into science and compromising its principles. Such concerns also highlight the inherent tension between the need for science to be responsive and impactful on the one hand and ensuring academic independence and objectivity on the other hand, which further underlines the need to ensure alignment between principles and practices of science.

The second area of recommendations concerns societal integration and public engagement in science. These are seen as a key avenue for ensuring that science and society are connected and that trust is built through familiarity and inclusion. By ensuring that society is invited into the scientific processes, treated as a valuable partner, and given a say in the direction of science, ties will be strengthened, mutual understanding will be achieved, and trust will be ensured. However, while such engagement is intuitively effective for trust in science, POIESIS highlights widespread concerns about both the ability to live up to these aims and the potential issues connected to increased public engagement. In fact, this area is the most controversial of the areas covered by the project, and concerns are present among all stakeholder groups, including citizens.

These concerns take many forms, but a key point is that public engagement is not universally perceived as having only positive outcomes; many participants also

raise issues regarding the quality and independence of research when public engagement is involved. There are concerns that public engagement is not sufficiently attuned to the needs of science nor society, and that differential conditions and potentials for public engagement across fields of research has not been sufficiently addressed. As such, it is pivotal to align public engagement activities with societal and scientific demands. It is critical to ensure that public engagement does not become a box-ticking exercise in which engagement is merely a tool to legitimize science rather than representing genuine interest in including society for the betterment of science.

Moreover, there are concerns that the prerequisites of societal integration are not sufficiently met. There are calls to nurture public engagement competences, highlighting particularly that training and meriting on the academic side is lacking, and that this might stand in the way of public engagement fulfilling its potential for building trust. Alongside this, there are concerns that the conditions under which public engagement takes place are insufficient, leading to calls for prioritizing infrastructure that supports effective science–society interaction. Taken together, these recommendations highlight the importance of ensuring that public engagement is deliberate and that the craft and resources involved in engaging in public engagement need to be respected and prioritized. Public engagement is seen as a potential trust-building tool, but it is also often associated with pitfalls that might undermine trust and trustworthiness. Working to ensure that such concerns are more deeply understood and building capacity to address them are key to realizing the potential of public engagement for trust in science.

Finally, to understand the way in which integrity and integration matters for trust in science, it is necessary to recognise that most interaction between science and society is mediated. As such, it is crucial to ensure that the chains of mediation that connect science and society are intact and that the quality of science communication is high. This position is broadly shared, and science communication is universally seen as a key component to societal trust in science. However, there is also consensus that multiple challenges to science communication are present. The communication landscape is ever-changing, and there are widespread concerns around changes to communication technologies, changing media habits of audiences, and the rise of alternative (mis)information streams. Stakeholders are concerned that these issues may limit the ability of science communication to reach public consciousness, facilitate productive conversation and subsequently foster trust in science.

Taking these concerns seriously and continuing to work towards broader appeal and accessibility of science communication is key, and to achieve this it is imperative that we strive to foster context-sensitive science communication, working to meet audiences where they are and in ways that are familiar and approachable to them. Science cannot rely on society adopting its preferred ways of communicating but must work alongside mediating actors to ensure that science has a broad reach. If this is achieved, there is considerable potential to strengthen trust in science, particularly by increasingly highlighting how science

works, by working to enhance awareness of the nature and principles of science. Multiple actors fear that, particularly in times of societal or scientific crisis, a lack of understanding of the disagreement and uncertainty inherent in the scientific process can be detrimental for trust in science, and that science communication is key to overcoming this. Finally, as technological advancements change the way in which we communicate, it is crucial that science seeks to adapt to changing communication landscapes, harnessing new opportunities and overcoming new challenges. Only by proactively adapting to changes in the communication landscape can science communication ensure broad reach and help shape public understanding and debate on science.

While POIESIS reaffirms that there is no crisis of trust in science, it also highlights areas where the science–society relationship faces challenges. The nine final recommendations of POIESIS aim to provide guidance on sustaining current initiatives that bolster trust and trustworthiness, while also addressing existing challenges and further strengthening the relationship. All recommendations are accompanied by targeted actions for key stakeholders, and none of the recommendations are the sole responsibility of a single actor nor are they the product of shortcomings that are solely the fault of science nor society. Improving research integrity and societal integration in science has reasons beyond building trust, and lack of trust or scepticism towards science is not by definition problematic. However, POIESIS provides a firmer understanding of how integrity, integration, and trust are connected, and provides directions for how challenges to these relationships can be addressed in future research and science policy.

1 Introduction

Science and society are mutually dependent. Society relies on sound scientific advice, technological development and science education. Science, in turn, depends on the public's adoption of technology and innovation, as well as the public's understanding and appreciation of science. Given this interdependence, public trust in science, technology and innovation are essential. This need is amplified in today's increasingly complex, digitalized societies, which offer unprecedented access to scientific information but also face widespread misinformation and the growing influence of AI technologies[1].

POIESIS, derived from the Greek *ποίησις*, refers to the product and impact of a creative process, in contrast to *praxis*, which emphasizes the intrinsic value of the action itself. POIESIS engages with both concepts; it acknowledges the deontological value of adhering to the highest standards of "good practices" in science and involving societal stakeholders throughout the research process, highlighting research integrity and societal integration as key components of responsible research. At the same time, it examines how these practices influence societal trust in research, systematically assessing the effects of both responsible and irresponsible research conduct on public trust.

Addressing global and local challenges equally depends on credible evidence and innovation - both responsibly governed and responsive to societal transformations and needs. In this context, research is understood as part of a broader research ecosystem that encompasses science, technology, and innovation (STI). This ecosystem involves the interplay of multiple actors, including research institutions, research foundations, policymakers, mediating organisations, the general public, and others - each of whom, individually and collectively, contributes to enhancing the shared accountability and engagement of all stakeholders in knowledge and innovation processes.

Although we have solid knowledge on the nature of public trust in science and its roots in relationships with science, worldviews, and the lived experience of the individual, we know far less about how the conduct and inclusiveness of science itself influences societal trust. Likewise, little research addresses how institutional efforts, such as those of research-performing organisations (RPOs), affect individual perceptions of science. The POIESIS project addresses these gaps by probing the impact of integrity and

[1] See; Hendriks, Hendriks, F., Kienhues, D., & Bromme, R. (2016). Trust in science and the science of trust. In Trust and communication in a digitized world: Models and concepts of trust research (pp. 143-159). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-28059-2_8; see also; UN (2024). United Nations Global Principles For Information Integrity. Recommendations for Multi-stakeholder Action. https://www.un.org/en/information-integrity/global-principles

integration on societal trust in science in the form of the following three main objectives. POIESIS:

- Investigates the relationship between research integrity, public engagement in research, and trust in research.
- Examines how scientific misconduct, questionable research practices, poor or absent communication, and/or misinformation affect public trust.
- Examines the various role that institutions related to research, communication, and funding play in promoting a research climate that is conducive to society's trust in science.

In doing so, we understand research as an ecosystem that encompasses science, technology, and innovation. Similarly, POIESIS adopts a broad definition of science, following the German *Wissenschaft*, which equates science with all branches of academic inquiry [2]. Moreover, POIESIS acknowledges that trust is a complex and multifaceted issue in which the trustor weighs potential benefits and risks of relying on a trustee[3]. Trust is relational and contextual and influenced by a range of individual and contextual factors. POIESIS applies an understanding of trust that moves beyond narrow psychological and sociological insights adopting the definition by O'Doherty [4], which emphasizes that trust should not be framed as a static object, but rather as a broader phenomenon encompassing at least three distinct dimensions: a psychological aspect (the emotional experience of trust), a normative aspect (questions of whether trust is warranted), and a relational aspect (the nature of the relationship between the trustor and the party they trust - or choose not to trust). This definition further allows for a distinction between trust in science and trust in researchers, as trust may vary depending on whether it is directed at the actor level or the system level.

POIESIS provides a set of evidence-based recommendations for addressing societal (mis)trust, strengthening public engagement and responsible research practices, and communicating science responsibly. Drawing on an extensive research program, this report presents nine recommendations, along with targeted action points for key stakeholders in the research ecosystem to align their efforts with the POIESIS recommendations.

[2] Phillips, D. (2015). Francis Bacon and the Germans: Stories from when 'science' meant 'Wissenschaft'. *History of Science*, *53*(4), 378-394. https://doi.org/10.1177/0073275315597609
[3] Blöbaum, B. (2016). Key factors in the process of trust. On the analysis of trust under digital conditions. In Trust and communication in a digitized world: Models and concepts of trust research (pp. 3-25). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-28059-2_1
[4] O'Doherty, K. C. (2023). Trust, trustworthiness, and relationships: Ontological reflections on public trust in science. Journal of Responsible Innovation, 10(1), 2091311. https://doi.org/10.1080/23299460.2022.2091311

1.1 The State of Societal Trust in Science

In recent years, concerns about societal trust in science have become widespread, driven in part by challenges such as increased disinformation, disruptive technologies, polarization, and politicization. Nevertheless, overall trust in science remains high, and research, researchers, and research institutions are perceived as highly trustworthy. POIESIS therefore aligns with the collective perspective of researchers on trust in science in asserting that concerns about a general crisis of trust remain largely unwarranted[5]. However, while a crisis of trust is clearly not upon Europe, significant challenges towards trust in science must be considered carefully and POIESIS does identify several cracks in the science-society relationship.

Among these, concerns regarding the independence and objectivity of science are widespread, as multiple actors fear that the trustworthiness of science may be compromised by outside influences and/or values seeping into to the scientific process[6]. The key concerns revolve around, first, the politization of science and, second, the influence of special interest in steering research and results. These concerns highlight areas of conflict where conditions of modern science and the expectations of society may not align and highlight the potential for conflict, perhaps particularly when science seeks to have societal impact.

Alongside this, the potential for harmful (mis)communication is a key challenge for the public debate around science. Concerns suggest that technological developments and shortcomings addressing these may endanger public understanding of science and further blur the boundaries between reliable and unreliable information[7]. This, in turn, raises concerns about the stability of societal trust in science, as information streams grow increasingly complex and the signal of science communication risks being drowned out by the noise of alternative sources.

Adding to these potential arenas for science-society conflict, POIESIS clearly demonstrates that societal trust in science is dependent on local context and culture and that the potential conflicts in the relationship between science and society rely on the character of the culture of trust in which people are embedded[8]. As such, both the degree to which science is seen as trustworthy and the potential for conflict and cooperation varies across settings. As such, while many concerns are cross-cutting and the recommendations made here are designed to be broadly applicable,

[5] Alongside POIESIS, see also its sister projects of IANUS, and Verity. These findings align with international science barometers such as the Eurobarometer, and Wellcome Global Monitor.
[6] These are particularly prominent in POIESIS deliverable D2.2.
[7] For a critical discussion see; Krause, N. M., Freiling, I., & Scheufele, D. A. (2022). The "infodemic" infodemic: Toward a more nuanced understanding of truth-claims and the need for (not) combatting misinformation. The ANNALS of the American Academy of Political and Social Science, 700(1), 112-123. https://doi.org/10.1177/00027162221086263
[8] See also; Bauer, M. W., Shukla, R., & Allum, N. (Eds.). (2012). The culture of science: How the public relates to science across the globe. Routledge. https://doi.org/10.4324/9780203813621

the specifics of the settings in which they are to be implemented must be considered if the trusting relationship between science and society is to be maintained, and the challenges to the relationship are to be overcome.

1.2 Challenging the Assumptions on Trust in Science

POIESIS takes as its starting point three widely held assumptions to explore how trust in science is impacted both by the extent to which research practices align with fundamental principles of research integrity and by the degree to which citizens and societal actors are integrated into those practices.

1. Trust in science depends on scientists' capacity to demonstrate high standards of research integrity and breaches to research integrity, i.e. research misconduct or questionable research practices, will lead to mistrust.

According to this assumption, the growing visibility of breaches of integrity could have an almost mechanical negative effect on trust in the scientific community, whereas demonstrating high levels of integrity would, by contrast, bolster trust. At the same time, greater transparency might also create opportunities for scandalising misconduct and foster a discourse of a trust crisis. However, POIESIS questions whether research integrity, as a narrow issue, attains the level of public awareness necessary to influence trust in science, or whether specific challenges to the integrity and objectivity of science, such as conflicts of interest or scandals involving research institutions, carry greater weight in shaping public trust.

2. Citizen and civil society's involvement in co-creating R&I agendas and contents makes research more relevant and responsive to society and strengthens co-ownership and trust

That is, a science that is isolated and cut off from the rest of society in the design and conduct of its research activities would inevitably lose public trust, while advances in bridging science and society would build trust through understanding and co-ownership. Moreover, it may be considered whether extensive inclusion, directly or indirectly, might contribute to mistrust by raising doubts about the quality or independence of research. Nuancing this assumption, it could be argued that there may be limitations to citizen involvement — both in terms of the public's willingness and interest in participating, and in terms of how research institutions perceive its relevance and allocate resources to support it.

3. Institutions can foster integrity and societal integration by enabling and supporting researchers to act responsibly

This assumption emphasizes the role of institutions in facilitating working conditions that enable and encourage researchers to act with integrity and inclusiveness. However, research institutions face internal and external pressures, and a lack of institutionalized support systems and incentive structures to prioritize 'third mission' activities aimed at societal impact. The multifaceted role and systems of research institutions may create tensions and misalignments between the principles and practices of research — for example,

between research quality and the evaluation of research. The latter can put pressure on the former as a matter of ambiguity, goal-conflicts and unintended consequences of good intentions, i.e. fostering integrity[9].

On this basis, it is not only relevant to understand the effects of research integrity and public inclusion on public trust but equally important to understand related and complex drivers of trust in science and technology. When exploring the three general assumptions and the relationship between research integrity, science communication and public engagement in relation to trust, it is important to recognize that fostering trust in science is only one of several objectives. It should not be regarded as the sole justification for increasing public engagement or promoting research integrity.

1.3 How Institutions Foster and Maintain Trust

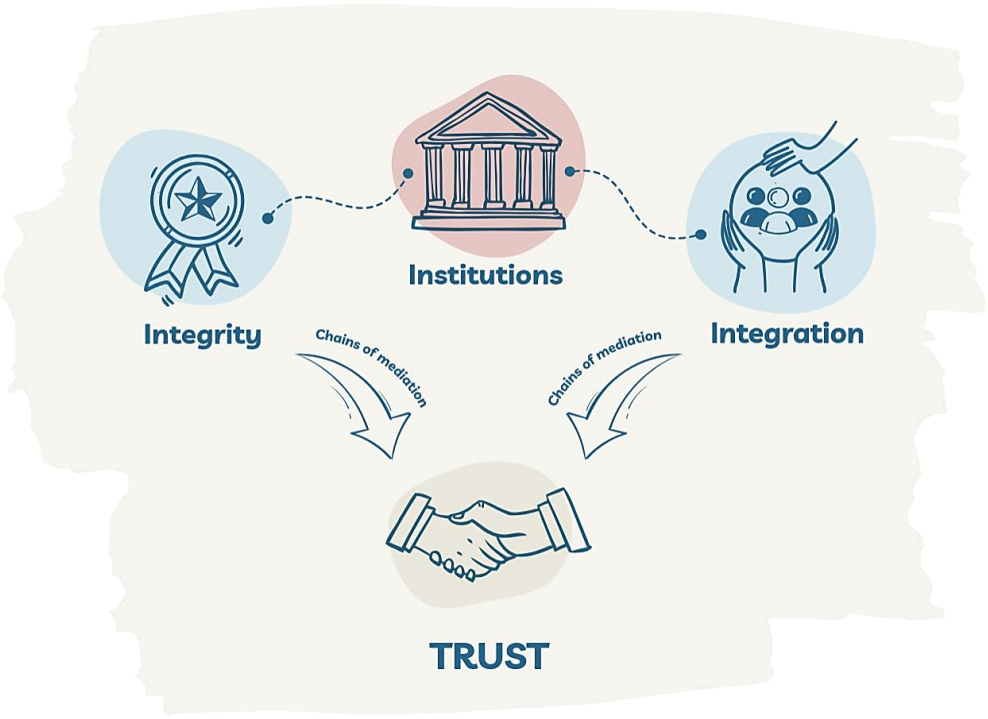
In exploring how integrity and integration shape trust, POIESIS is guided by the Integrity, Integration, and Institutions for Trust (3i4t) model. This model builds on the core assumptions described above to provide an ideal type of the way in which integrity and integration relate to societal trust in science. The model assumes that institutions are key to facilitating both integrity and integration, and that the translation of these principles into the societal conversation on science is contingent on the quality of the chains of mediation which connect science and society.

Research integrity is defined as the extent to which research practices are in accordance with appropriate ethical, legal, and professional frameworks, obligations, and standards both in terms of the presentation/reporting of findings and the process by which they are produced (i.e. data collection, methods, analysis, interpretation). Research integrity constitutes a subfield within the framework of responsible conduct of research (RCR) to address ideal professional standards of conducting research. Contrary, irresponsible research practices address the breaches of such standards and research practices. In recent decades, not least sparked by high-profile and scandalous misconduct cases, research in the field of research integrity has increasingly focused on the irresponsible practices of science, including scientific misconduct and questionable research practices[10], which have both been argued to be detrimental to trustworthiness and trust.

[9] Schnurbus, V., & Edvardsson, I. R. (2022). The third mission among Nordic universities: A systematic literature review. Scandinavian Journal of Educational Research, 66(2), 238-260. https://doi.org/10.1080/00313831.2020.1816577

[10] Fabrication, falsification, and plagiarism of data & behaviours that violate norms around data analysis, authorship, peer review, and supervision, see Allea (2023). The European Code of Conduct for Research Integrity, https://allea.org/wp-content/uploads/2023/06/European-Code-of-Conduct-Revised-Edition-2023.pdf; Bouter, L. M., et al. (2016). Ranking major and minor research

Figure 1. The integrity, integration, and institutions for trust (3i4t) conceptual model



Societal integration in science refers to inclusion of the public and stakeholders throughout research and innovation processes, incorporating intertwined aspects of public engagement, co-creation, and open science practices. Over the past decades, ideals of deliberation, co-production, and inclusion have increasingly shaped science policy and research agendas[11]. This reinvigoration of public–science relations reflect broader discursive transformations, often described as shifts

misbehaviors: Results from a survey among participants of four World Conferences on Research Integrity. Research Integrity and Peer Review. https://doi.org/10.1186/s41073-016-0024-5; Steneck, N. H. (2006). Fostering integrity in research: Definitions, current knowledge, and future directions. Science and Engineering Ethics, 12(1), 53–74; Ravn, T., Sørensen, M.P. Exploring the Gray Area: Similarities and Differences in Questionable Research Practices (QRPs) Across Main Areas of Research. Sci Eng Ethics 27, 40 (2021). https://doi.org/10.1007/s11948-021-00310-z

[11] Particularly within the European Research Area aiming to strengthen the democratization of and public engagement in research and innovation processes, Public engagement in ERA Mutual Learning Exercise on Public Engagement in R&I. Fourth thematic report. Publications Office of the European Union, 2025, https://data.europa.eu/doi/10.2777/1627040. Relatedly, the Open Science framework aims to make scientific results and data accessible, within and beyond the scientific community, OECD (2015). Making Open Science a Reality. OECDScience, Technology and Industry Policy Papers, 2015. No. 25

from dissemination to deliberation[12], and hold the promise to bolster societal trust in science by strengthening ties between science and the rest of society.

The model further stipulates that institutions are central to facilitating both research integrity and societal integration[13], and that implementing and upholding responsible research practices matters for the trustworthiness of science and subsequently societal trust in science. Furthermore, POIESIS acknowledges that science-society relations are generally indirect and are mediated by a diverse group of actors and institutions who bridge science and society and facilitate the societal conversations on science. We place special emphasis on understanding the roles and perceptions of the mediators that make up the links in these chains of mediation, as well as the institutional actors who facilitate integrity and integration. Relatedly, we apply a broad and inclusive definition of science communication as 'the social conversation around science' [14], emphasising the interactive and participatory aspects of dialogue-oriented communication. In line with our understanding of chains of mediation, viewing science communication as a conversation underscores the many potential actors involved, including science journalists, communication officers and content creators who use scientific research, and highlights its role in mediating between science and society.

Although it is intuitive that research integrity and societal integration promote societal trust in science, the specifics of this relationship remain empirically understudied. The relationship between science and society is complex, shaped by both evolving societal needs and a research system facing internal and external pressures.

To probe the degree to which such intuitions reflect reality, POIESIS investigates four research questions:

1. How can the nature and scale of public trust and mistrust in science be characterized and which are the factors that affect the relationship?
2. To what extent and how does the alignment of research practices with principles of research integrity (or, conversely, scientific misconduct, questionable research practices, poor or absent science communication, and/or misinformation) impact public trust in science?
3. To what extent and how does the integration of citizens and societal stakeholders in research practices (or,

[12] Burgess, M. (2014). "From 'trust us' to participatory governance: Deliberative publics and science policy". *Public Understanding of Science,* 23:1, pp.48-52; Mejlgaard, N. 2009. "The Trajectory of Scientific Citizenship in Denmark: Changing Balances between Public Competence and Public Participation." *Science and Public Policy*, 36 (6): 483-496; Stilgoe, J, Lock S. J., Wilsdon, J. (2014). "Why Should We Promote Public Engagement with Science?" *Public Understanding of Science*, 23 (1): 4-15.

[13] See; Mejlgaard, N., Bouter, L. M., Gaskell, G., Kavouras, P., Allum, N., Bendtsen, A. K., ... & Veltri, G. A. (2020). Research integrity: nine ways to move from talk to walk. Nature, 586(7829), 358-360. https://doi.org/10.1038/d41586-020-02847-8

[14] Bucchi, M., & Trench, B. (2021). Introduction: Science communication as the social conversation around science. In Routledge handbook of public communication of science and technology (pp. 1-13). Routledge. https://doi.org/10.4324/9781003039242

conversely, lack of co-creation and open science practices) impact public trust in science?
4. To what extent and how can institutions provide policies and procedures that enable researchers to act in ways that are conducive to public trust in science?

These research questions seek to critically examine the key assumptions on how integrity and integration relate to trust in science, to provide a nuanced understanding of the degree to which institutions, integration, and integrity may foster and maintain trust.

1.4 From Research Findings to Policy Recommendations

POIESIS has implemented an ambitious research programme: existing survey data have been curated, (re-)analysed and synthesised; public deliberation workshops have been held; interviews have been conducted with science-society mediators and researchers; a survey experiment on institutional trustworthiness has been fielded; and a series of roundtable workshops with representatives of research institutions has been carried out. The empirical efforts are illustrated in Figure 2, and detailed research protocols and findings can be found on the POIESIS website.

Based on a synthesis of the findings from this diverse set of studies, POIESIS provides a set of evidence-based recommendations for addressing societal mistrust through responsible research practices, strengthening public engagement, and communicating science responsibly.

The report presents nine recommendations along with specific action points for key groups of stakeholders. The recommendations take as their starting point the most pressing challenges, issues, and tensions identified across the project, prioritizing the most impactful findings. They aim to address complex problems by considering enablers, barriers, and best practices, and translating them into main recommendations and operational actions tailored specifically to the following seven types of stakeholders included in POIESIS 1) science communication mediators, 2) researchers, 3) research performing organisations (RPOs) 4) Research integrity officers, 5) policymakers, 6) research funding organisations (RFO) and 7) general publics.

Figure 2. Overview of studies conducted in POIESIS

The recommendations have been developed and refined through both internal and external co-creation processes. Several recommendations on the role of research institutions were identified in relation to research integrity, organisation of science, social integration, and science communication in the focus group study and further discussed and refined in seven roundtable workshops[15]. In addition to informal and formal consortium meetings, in which research results and preliminary recommendations were discussed, the process included a dedicated two-day consortium meeting held in late March 2025 in Valencia. Prior to this, all work packages had synthesized the main recommendations from their specific studies, and all cross-cutting research reports had been systematically coded according to potential recommendations, information related to impact on trust, as well as identified barriers and enablers. Finally, the preliminary recommendations were presented and discussed at the joint sister-project final conference in May 2025 in Brussels. As part of the event, a scenario workshop with field experts was dedicated to assessing and refining the nine policy recommendations through discussions of different case scenarios regarding their policy implications and the implementation of concrete actions.

[15] See POIESIS deliverables; D3.2, D3.3, and D3.4

2 Recommendations: Research Integrity and the Organisation of Science

Research integrity is an increasing concern for researchers, research institutions, funders, and policymakers. In response, scientific communities, funding bodies, and governmental agencies have implemented measures to promote research integrity and prevent irresponsible research practices[16]. Within the broader concept of the responsible conduct of research, research integrity refers to the scientific norms and professional standards for conducting research and handling data, particularly regarding implementation, processing, results, and reporting. In contrast, research ethics concerns the moral principles governing research involving the treatment and protection of humans, animals, the environment, and data[17]. Although primarily addressed as two distinct fields with different focuses and regulations, research integrity and research ethics share common ground, particularly in areas related to the quality of scientific knowledge, safeguarding and trust in research, with mutual attention to data protection and capacity building. Different stakeholders also ascribe overlapping meanings to both ethics and integrity, which underscores the need to explore their conceptual boundaries and underlying understandings.

Despite national and international efforts to promote and harmonize research integrity standards, significant cross-country variation remains. National and institutional approaches to raising awareness, providing education, and implementing research integrity measures differ widely. Likewise, procedures for addressing and sanctioning research misconduct and questionable research practices (QRPs) vary considerably both across and within countries[18].

POIESIS stakeholders agree that institutions and oversight functions play a central role in safeguarding research integrity and that maintaining high standards cannot be assumed. Science operates on a global scale and across national borders, suggesting that research integrity could benefit from greater political harmonization, aligned infrastructures,

[16] International declarations have played a key role in guiding the area. These include the *Singapore Statement on Research Integrity* (2010); the *Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations* (2013); and the *Hong Kong Principles for Assessing Researchers: Fostering Research Integrity* (2019). The ALLEA *Code of Conduct* (2023) is arguably the most well-known, offering a comprehensive set of guidelines that promote core research integrity principles.

[17] Steneck, N. H. (2006). Fostering integrity in research: Definitions, current knowledge, and future directions. *Science and Engineering Ethics, 12*(1), 53–74

[18] Jensen, K.K. (2017). "General Introduction to Responsible Conduct of Research", in RCR – A Danish textbook for courses in Responsible Conduct of Research, Jensen K.K., Whiteley, L. and Sandøe, P. (eds.), 2nd edition April 2017; Godecharle, S., B. Nemery & K. Dierickx (2013): "Guidance on research integrity: no union in Europe. *The Lancet*. 381, pp. 1097-1098

formalized procedures, and considerable institutional support. However, stakeholders also highlight the challenges of increased standardisation and harmonisation as the contextuality of practices and perceptions of research integrity necessitates that policy be sensitive to differences in needs, experiences, and resources [19]. All stakeholders emphasize the importance of integrity principles and availability of institutional infrastructures for promoting research integrity. Particularly, promoting openness and transparency in science is considered key. However, institutional stakeholders also highlight misalignment between the principles and practices of research, largely driven by pressure and competition within academia.

While research integrity is generally described as crucial to research quality, the consensus is that it is not a direct cause of societal distrust in science. Some argue that breaches of integrity and particularly misconduct cases could influence public perceptions and erode trust over time. However, the general public perceives research integrity to be high, and violations are often attributed to individual researchers rather than systemic issues within research institutions [20]. Though research integrity in a narrow sense is seen as less impactful for trust, there is widespread concern regarding how the integrity of science may be compromised by outside influences. In particular, the politicization of science, the influence of special interests, and conflicts of interest are viewed by members of the general public as looming threats to the integrity of science. Reflecting a rising pressure on the legitimacy of both research performing organisations and individual researchers, concerns have also been raised about the protection of freedom of research[21] and the safeguarding of researchers, especially within certain areas of research. Hence, when research integrity is seen in a broader context, three main concerns clearly emerge. First, the misalignment of the principles and practices of research. Second, issues and concerns connected to conflicting interests in research. Third, the perceived politicization of research.

[19] See POIESIS deliverable D. 3.2; Dubois 2024; Dubois et al. (2025 forthcoming). The Role of Institutions in Cultivating Trust in Science: A Qualitative Approach on a European Scale. In, Iordanou, K. Ravn, T. and Zwart, H. (eds), Trust in Science. Springer Nature.
[20] See POIESIS deliverable D2.2.
[21] See for instance the Bonn Declaration on Freedom of Scientific Research adopted in 2020.

2.1 Recommendation 1: Align Principles and Practices of Research Integrity

Across countries, institutional actors, including researchers, research support officers, communication officers, and funders, identify conflicting expectations and tensions between institutional practices and the principles of research integrity. For instance, institutional processes related to research evaluation, funding, and human resources may conflict with scientific integrity, ethics, or professional conduct. Stakeholders see a clear responsibility in the role of institutions in identifying and addressing conflicts between such processes (for example evaluation and recognition) and values related to scientific integrity and ethics.

These concerns about conflicting expectations highlight the pressures that individual researchers are facing and the potential missteps that these pressures might produce. To address the challenges posed by these discrepancies, multiple stakeholders point to the need for transformations in the culture of academia and in the systems used to evaluate research and researchers. As such, a central task for institutions seems to be reacting to changing demands from both science and society which focus on the demands and goals of research, as much as it is to safeguard against detrimental research practices. Taken together these issues highlight the need to align principles and practices of research integrity through changes to research culture and evaluation.

Researchers are encouraged to be transparent and open about their data and methods to build public trust and uphold scientific integrity. However, a tension exists between the ambition to strengthen international research collaboration and the restrictive interpretation of the General Data Protection Regulation (GDPR) in terms of data sharing. Another significant tension lies between the push for open science and the need to address security concerns. Protecting sensitive information - such as data on gender and sexual orientation - is considered essential for maintaining public trust in science. Additionally, the conflict between open data practices and the protection of research subjects is identified as a main challenge.

Another key challenge identified is the current academic merit and assessment system, which relies strongly on quantitative metrics and, despite national and institutional variations, often fails to reward efforts related to research integrity, science communication, and public engagement in career advancement. The CoARA movement is cited as a positive example of efforts to implement more diverse and qualitative assessment measures[22]. It is mentioned that transitions in the assessment indicator system should be accompanied by support to implement system changes.

Stakeholders also emphasize the need for universities to take a more active role in fulfilling their 'social contract' with society by more clearly defining their institutional responsibilities and societal commitments.

[22] See https://coara.eu/

This includes a clearer prioritization of collaboration with the surrounding society. Stakeholders generally identify a need for additional - or at least adequate - research support. They emphasize that this should not be provided as added control or bureaucracy, but rather as voluntary institutional assistance.

There is a need to implement clear guidelines, codes of conduct, and promote shared research integrity standards across institutions and countries, reflecting the global and cross-border nature of science and research collaboration. At the same time, contextual differences must be taken into account. While increased harmonization is viewed as beneficial to the research system, consistently applying these guidelines across Europe is considered highly challenging due to the diverse landscape of research in general and research integrity policies in particular across countries.

Research integrity related to research conduct and procedures in a narrow sense (e.g., misconduct and replication) is generally seen as only weakly and indirectly connected to trust. Nonetheless, maintaining high integrity is a key component of trustworthy science, and science is generally perceived to uphold research integrity principles and values in this area.

Actions for RPOs & Institutional support officers

✓ Implement clear guidelines, codes of conduct, and policies on research integrity and ethical standards to ensure alignment with existing national and European frameworks and to promote responsible research practices

✓ Acknowledge and address conflicting institutional imperatives and cross-pressures between research integrity (RI) principles and practices, such as tensions between open science, security concerns, and compliance with GDPR

✓ Commit to revising research assessment policies in order to adopt more inclusive, diverse, responsible, and effective measures, with greater emphasis on qualitative evaluation

✓ Commit to fostering a culture of research integrity that promotes inclusion and diversity by engaging researchers in training and actions for integrity in science

✓ Ensure that institutional infrastructures and transparent lines of responsibility are in place to address detrimental research practices while respecting the principles of confidentiality and fairness

✓ Ensure adequate administrative support for researchers throughout the research process and scientific projects, covering areas such as budget management, external collaboration and relations, and data management. Create awareness about existing resources

✓ Provide continuous responsible conduct of research (RCR) training and counselling to researchers at all career stages and to other RI professionals working in the institution

✓ Recognize and address differences in how research integrity, ethics, open science, and related concepts are understood and interpreted across national contexts and scientific communities, including broader societal perspectives

✓ Organise cross-professional training for researchers, data protection officers, and communicators

Actions for Mediators & Researchers

✓ Be committed to transparently assessing and communicating the credibility of scientific information, including instances of irresponsible practices, to help demonstrate the integrity and accountability of the scientific system

✓ Incorporate research integrity in awareness raising, capacity building and training activities of students at all levels, e.g. in science communication and methods training

✓ Ensure familiarity with established research integrity and ethics policies, principles, and codes of conduct within the relevant field, and commit to actively implementing and promoting these principles and practices

Actions for RFOs & National Policymakers

✓ Implement clear and updated guidelines, codes of conduct and promote shared research integrity standards across European countries, institutions and funding organisations while taking contextual factors into account

✓ Encourage research and funding institutions to commit to the CoARA principles. Promote the use of qualitative indicators of integrity-related contributions such as responsible mentoring, ethical leadership in collaborative projects, FAIR data production, public engagement, and responsible science communication

✓ Require statements on research integrity considerations in grant proposals and project reporting to ensure that research integrity is considered, implemented and monitored

✓ Support the sharing of best practices for fostering responsible research, with a focus on effective dissemination, meaningful collaboration, and avoiding superficial 'tick-box' approaches

✓ Support the appointment of dedicated integrity and ethics officers in research institutions

Actions for the European Commission

✓ Map existing tensions within European research systems and launch a targeted consultation with Member States, research funders, and academic institutions to document: a) researcher dilemmas in applying integrity principles (e.g., data sharing versus GDPR), b) misalignments between stated principles (e.g., transparency, rigor, and collaboration) and actual evaluation practices, and c) varying definitions and interpretations of “research integrity” and “trust” across disciplines and countries

✓ Establish an intersectoral European working group comprising representatives from research-performing organisations, funding agencies, data protection and legal experts, ethics committees, and civil society organisations. Task the group with developing scenarios to reconcile competing principles (e.g., security versus openness) across diverse research contexts

✓ Develop a contextualized and adaptive policy framework by defining a European baseline of shared integrity principles, including procedural integrity, respect for persons, transparency, and accountability

✓ Develop and implement differentiated research integrity protocols tailored to specific sectors, disciplines, and methodological contexts, such as health, climate, social sciences, and artificial intelligence (AI)

✓ Introduce proportionality clauses in open science policies to account for varying levels of data sensitivity and risk

✓ Support the reform of researcher assessment and merit systems and encourage Member States and institutions to commit to the CoARA principles

✓ Promote the use of qualitative indicators of integrity-related contributions, such as responsible mentoring, ethical leadership in collaborative projects, FAIR data production, public engagement, and responsible science communication

2.2 Recommendation 2: Ensure Transparency in Collaboration with External Interests

Modern science can neither function nor be impactful without interacting with external actors. However, such collaborations are complex, and the POIESIS studies identify pressures on the legitimacy of both research-performing organisations and individual researchers, partly driven by new challenges arising from online and social media contexts.

These findings highlight the need for research institutions to establish clearer priorities and clear guidelines for collaboration with different societal stakeholders and to better define their institutional roles. It is therefore recommended to ensure transparency in how science collaborates with external interests and manages potential conflicts of interest.

Our findings indicate that scientific collaborations involving external actors is perceived to be a real threat to research integrity. There are widespread concerns that conflicts of interest, lack of independence, and external pressure may compromise science, challenge researchers' integrity, and bias research findings. Broadly, these concerns relate to the financial and political independence of actors within the science ecosystem. They reflect familiar public worries about the commercialisation of research, with

particular concern directed at private research institutions and private funding mechanisms compared to their public counterparts. Hence, while eight out of ten Europeans view the influence of science and technology as positive and expect innovations to benefit everyone and serve the public good, European citizens also express doubts about researchers' truthfulness when dependent on industry funding and they are concerned about the influence of commercial interests[23].

The potential for external influences to negatively affect societal trust in science is broadly agreed upon, and a lack of transparency in disclosing conflicts of interest and funding sources is seen as potentially decreasing trust in science. In this regard, researcher and institutional independence, as well as impartial research, are perceived as central to trust in science. Transparency and disclosure of financial and non-financial conflicts of interest are also highlighted as crucial in science communication efforts. They are seen as a significant integrity principle among institutional and non-institutional mediators, not least in navigating a complex global media landscape marked by disinformation and conflicting messages about research findings.

Actions for RPOs & Institutional support officers

✓ Implement clear guidelines for identifying and mitigating conflicts of interest, and establish institutional support structures for managing and communicating about such conflicts

✓ Implement quality and legal advice mechanisms to support researchers navigate collaborations with external parties

✓ Establish transparent guidelines to uphold impartiality and freedom of research in the context of external collaborations. Provide clear procedures for ensuring responsible practices across different categories of external collaboration

✓ Safeguard the independence of science and promote public dialogue on the role and implications of private funding in universities and research organisations

[23] See the latest round of the Eurobarometer

Actions for Mediators & Researchers

✓ Ensure that the arm's-length principle is upheld to enable independent decisions and to avoid any doubt about individual integrity, independence, and impartiality

✓ Establish clear agreements outlining the division of responsibilities and decision-making authority within each collaboration and ensure that these agreements are aligned with the nature of the collaboration (e.g. research-based public sector consultancy, co-funded research, etc.)

✓ Transparently and responsibly disclose funding sources and any interest-driven aspects of work and research to ensure independence from external influences, including political pressures. These principles should also guide science mediation and communication practices

✓ Promote transparency and strengthen self-regulation mechanisms in science communication, ensuring that communication is guided by integrity, independence, and disclosure of conflicts of interest

Actions for RFOs, national policymakers and the European Commission

✓ Secure transparency in funding and cooperation agreements

✓ Implement quality and legal advice mechanisms to support researchers navigate collaborations with external parties

✓ Ensure funding programmes that are explicitly insulated from partisan or interest-driven agendas, supporting open-ended research outcomes that are not dominated by the policy interests of current governing bodies

✓ Support the development of a public discourse around research funding and collaboration with societal interests

2.3 Recommendation 3: Recognize and Mitigate the Politicization of Science

The politicization of science is perceived to place significant pressure on freedom of research and the protection of the independence of research, innovation, teaching, and communication from external influences. A strong recommendation to protect communicators and researchers from external attacks was emphasized by stakeholders in POIESIS. Participants agreed on the urgent need for universities to implement clear and widely shared guidelines to create protective environments for researchers and to safeguard freedom of research - particularly in highly politicized areas of research. In this regard, it was also suggested that institutions move beyond policies alone and establish dedicated communication response teams to support researchers in navigating external and politicized reactions and pressures. On this basis, we recommend recognizing and mitigating the politicization of science and clearly defining and communicating the boundaries of scientific expertise.

The cultural authority of science rests on the idea that scientific methods are the most reliable means of producing knowledge. For many actors, this contrasts with the subjective, and potentially populist, forms of knowledge often used in political discourse. However, the boundary between these two domains is increasingly blurred, and for many, the politicization of science and research poses a threat to the reliability of scientific knowledge. In this regard, stakeholder concerns include the instrumentalization of scientific knowledge for political purposes, the misrepresentation of scientific findings, and undue government interference in science. The politicization of science is widely regarded as a key driver of mistrust, potentially carrying serious consequences for both science and society if citizens lose trust in governments' ability to adopt, benefit from, and regulate innovations[24]. Trustworthiness rests on the ability to produce and communicate reliable and objective knowledge, and politicization is seen as a threat to the integrity of science. While stakeholders perceive the politicization of science as a threat to trust, they also emphasize the importance of scientific findings being considered in political decision-making processes. The key issue lies in how science and scientific results are represented and applied. This underscores the need for transparency in collaborations between research and political actors, as well as the importance of respecting the boundaries of scientific knowledge and its interaction with other forms of knowledge. Science-for-policy

[24] See POIESIS deliverable D2.2 and D2.3.., see also Wellcome Global Monitor, 2019; Nature Editorial (2024). Making the most of trust in scientists, Nature, Vol 626, 1 February 2024; Scharfbillig, M., Allegra, A., Brossard, D., Cassio, L. G., Cologna, V. et al., *Trust in science for policy Nexus*, Publications Office of the European Union, 2025, https://data.europa.eu/doi/10.2760/6212198; Edelman Trust Institute, 2024 .

processes and ecosystems carry with it their own governance challenges for fostering trust and enhancing the interaction between science and policy. Trust depends on the system's ability to maintain credibility, remain responsive to societal demands, and retain anticipatory capacity [25]. Inherent to the factor of credibility is the independence of experts in providing sound and impartial science findings and advise.

This latter aspect was raised as a concern by various stakeholders in the POIESIS studies, including both researchers and mediators [26]. Stakeholders expressed concern not only about external pressures on the production and communication of reliable knowledge, but also about the misuse of scientific authority within the scientific community when researchers provide expert opinions beyond the limits of their expertise. It is therefore recommended that researchers clearly communicate the capacity in which a viewpoint is presented, to safeguard trust in science and maintain scientific integrity.

Actions for RPOs & Institutional Support Officers

✓ Implement clear institutional guidelines to create protective environments for researchers and safeguard freedom of research, particularly in highly politicized areas of research

✓ Establish dedicated communication response teams to support researchers in navigating external and politicized reactions and pressures

✓ Commit to promoting and protecting the principles and practices of freedom of research to ensure the independence of research, innovation, teaching, and communication from external influences

✓ Implement clear guidelines and support mechanisms for researchers providing scientific expertise in science-informed policy-making

[25] European Commission: Directorate-General for Research and Innovation and Schomberg, R. v., *Trust as a governance challenge for science-for-policy ecosystems – Mutual learning exercise on bridging the gap between science and policy – Fourth thematic report*, Schomberg, R. v.(editor), Publications Office of the European Union, 2025, https://data.europa.eu/doi/10.2777/6569914

[26] See deliverable D2.3.

Actions for Mediators & Researchers

✓ Ensure close attention is given to how science is represented, and how scientific information is verified, received, and used

✓ Contribute to clarifying the distinct roles of science and politics in society to foster greater coherence in their interaction

✓ Acknowledge and display transparency regarding the limits of individual expertise, and clearly communicate the capacity in which a viewpoint is presented, for instance as a subject-matter expert, private individual, or specific advocate

Actions for RFOs

✓ Commit to promoting and protecting the principles and practices of freedom of research to ensure the independence of research, innovation, teaching, and communication from external influences

✓ Promote the adoption of shared institutional guidelines to create protective environments for researchers and safeguard freedom of research, particularly in highly politicized areas of research

✓ Launch a collaborative thematic initiative among public and private research foundations to examine their role and influence in safeguarding freedom of research and to identify potential support mechanisms

Actions for national policymakers and the European Commission

✓ Strengthen bridge-building between research communities and the political system to enhance the uptake of research-informed policymaking

✓ Implement strategies and procedures to ensure transparent, science-informed policy-making within science-for-policy ecosystems, including measures to prevent the misrepresentation of scientific findings

✓ Assess how efforts to make science more responsive and actionable may lead to public perceptions of government pressure or interference in scientific activity, which could be perceived as a risk to scientific integrity

✓ Launch a targeted consultation with Member States, research funders, and academic institutions to document the current state, challenges, and monitoring practices related to the rights and responsibilities associated with freedom of scientific research

✓ Launch a Mutual Learning Exercise (MLE) on the politicization of science and its consequences for public trust in the uptake and benefits of research and innovation

3 Recommendations: Societal Integration and Public Engagement in Science

Researchers, funders, and policymakers have advocated for further integration and inclusion of both the general public and specific stakeholders in science. The relationship between science and society is often described as having shifted from dissemination towards deliberation[27], and expanding further to include societal representatives in co-creative processes throughout the research process. Such efforts emphasize the positive effects of democratization and responsiveness through the co-creation of science with actors external to the science system. Science-society integration, however, takes many forms and has been championed under many causes, from data collection to democratization[28].

The variation in approaches and motivations within and across the many stakeholders engaged through the lifetime the POIESIS project, underscore the multifaceted nature of societal integration and public engagement. Not only is societal integration heterogenous, but these initiatives are also among the most contested among the topics under investigation in POIESIS[29]. While there is a consensus that including the public in science can be conducive to strengthening ties between science and society and subsequently be a positive influence on societal trust in science, this is a position with considerable caveats. In fact, multiple stakeholders point out that societal integration may struggle to deliver on its promises and may even have the potential to undermine trust.

These critiques and concerns target three primary concerns. First, concerns that societal integration may have the potential to negatively affect the quality, objectivity, and independence of science. Such concerns highlight potential drawbacks that societal integration may have for scientific processes and questions whether such potential drawbacks are justified by the positives of inclusion. Second, there are concerns that societal inclusion struggles to fulfil its promises regarding building a trusting science-society relationship. These concerns particularly relate to issues relating to poor management of participant expectations and instrumental or tokenistic forms of integration. Stakeholders fear that if societal integration is not competently managed or is merely performed as a box-ticking

[27] See Burgess, M. M. (2014). From 'trust us' to participatory governance: deliberative publics and science policy. Public understanding of science, 23(1), 48-52. https://doi.org/10.1177/0963662512472160

[28] See the special issue of PUS introduced in; Stilgoe, J., Lock, S. J., & Wilsdon, J. (2014). Why should we promote public engagement with science?. Public understanding of science, 23(1), 4-15. https://doi.org/10.1177/0963662513518154

[29] This is the case across stakeholder groups, see in particular deliverables D.2.2., D2.3, and D3.2

exercise this will limit or even reverse the potential positives. Finally, multiple stakeholders address concerns about the support for public engagement and the skills that are needed to ensure successful societal integration. These concerns point out that fulfilling the promises of societal integration requires skills and resources, and that it is less likely that societal integration delivers on any of its promises if the structures needed to facilitate these processes are lacking. As such, while there is broad consensus regarding the potential of societal integration for democratization, education, legitimacy, and governance of science, such hopes are accompanied by considerable concerns regarding the ability to fulfil these promises and the consequences of pursuing these goals, particularly if doing so is not done wholeheartedly. Meeting these concerns is crucial for the belief in and success of public engagement among representatives of science and society alike. Moreover, there are concerns that research into public engagement increasingly serve as an addon to other research, while receiving less direct focus. This may lead to stagnation in both research and practice and may serve to devalue and set back public engagement.

These concerns highlight multiple points of contention regarding the benefits and consequences of public engagement in science, as well as the abilities and motivation required to ensure fruitful integration of science and society. There are widespread concerns that institutional capabilities are lacking or underprioritized, that both researchers and the public lack the skills necessary to ensure fruitful interaction, and that public engagement is misaligned with the needs and wishes of both science and society. Handling these three concerns is the basis of the three recommendations presented below.

3.1 Recommendation 4: Align Public Engagement Activities with Societal and Scientific Demands

Commitment towards public engagement, involvement, and participation in research has increased in recent decades[30]. While this is generally seen to be a step forward, for both the quality and responsiveness of science and technology, multiple stakeholders consulted in POIESIS question when and where the public should be engaged by or in science. Such concerns highlight potential misalignments between the aims and practices of public engagement. Specifically, there are concerns regarding using public engagement as a purely legitimizing exercise to signify benevolence. Participants point out that such inclusion may not be fruitful and that it might have

[30] Weingart, P., Joubert, M., & Connoway, K. (2021). Public engagement with science—Origins, motives and impact in academic literature and science policy. PloS one, 16(7), e0254201. https://doi.org/10.1371/journal.pone.0254201

the potential to damage relations between science and society.

It is further discussed how much engagement can be asked of the public, and who is willing to participate as representatives of society[31]. Not all areas of research have the same public interest leading to different levels of participatory supply, and not all research subjects have identical potential for scientific or societal gains from engagement. Further complicating societal integration, scientific and public debates will often be misaligned, and the interaction between the two needs to be carefully managed. These concerns underline the need to ensure that implementation of science engagement is sensitive to concerns and needs in both science and society and the interaction between the two.

Public engagement can potentially be highly effectful in bolstering societal trust in science, particularly in areas where both science and society have clear needs or interests in improving the understanding between spheres. However, there are also concerns that unsuccessful integration of the public could backfire, further underlining the need to ensure meaningful integration in which public inputs are taken seriously while avoiding tokenistic approaches to engagement[32].

Actions for RPOs & Institutional Support officers

✓ Avoid box-ticking and instrumental exercises of legitimization in public engagement efforts. Dissemination, dialogue and engagement efforts should be justified by their relevance for research, society, and democracy.

✓ Focus engagement efforts towards areas where public desire to engage is high and areas in which democratic or scientific gains are especially promising. Public engagement is a finite resource, and public and researcher interest differs across topics

✓ Prioritize both scientific and societal concerns and needs when developing public outreach and engagement activities

✓ Clearly differentiate between public engagement goals and public relation efforts, to avoid instrumentalizing engagement

[31] See related debates on participant diversity, e.g. Pateman, R. M., Dyke, A., & West, S. E. (2021). The diversity of participants in environmental citizen science. Citizen Science: Theory and Practice. https://doi.org/10.5334/cstp.369

[32] Stirling, Andy. 2008. 'Opening up' and 'Closing Down': Power, Participation, and Pluralism in the Social Appraisal of Technology. *Science, Technology, & Human Values*, 33 (2): 262-294 https://doi.org/10.1177/0162243907311265

Actions for Researchers

✓ Ensure that the aims and demands of public engagement are transparent and avoid creating expectations that cannot or will not be fulfilled

✓ Ensure that inclusion of the public is open to different perspectives and demands. Do not mistake critique for anti-scientific sentiments

✓ Be open to public concerns and priorities both when designing, performing, disseminating, and discussing research

✓ Be aware that engagement efforts are sensitive to both scientific and societal interests and respect that engagement and participation provides resources for science

✓ Be honest about the aims of engagement and the expectations of participants

Actions for RFOs

✓ Differentiate efforts and demands across areas of research to align with scientific and societal needs

✓ Dissemination, dialogue and engagement efforts should be justified by their relevance for both research, society, and democracy

✓ Work for public outreach and facilitate dissemination, discussion, and engagement with the general public, prioritizing both scientific and societal discussions

✓ Provide guidance and guidelines for researchers who apply for and receive funding for public engagement

Actions for National Policymakers

✓ When setting the research agenda, be mindful of and open to public concerns and priorities. Be careful in managing public, political, and scientific agendas, but be open to all three

✓ Work to harmonize guidelines and support activities and networks facilitating and promoting public engagement activities

✓ Work to ensure that the science-related demands and concerns of society are well-represented and facilitate discussion and understanding of these

✓ Work to harmonize guidelines and support activities and networks facilitating and promoting public engagement activities

Actions for the European Commission

✓ Continue integrating societal concerns and demands across all areas of research, while simultaneously advancing targeted research and policy in public engagement with science

✓ Work to further improve the level and responsiveness of public engagement in European research projects, being mindful of pitfalls around tokenism or box-ticking behaviour

✓ Further discussions among policymakers, researchers, and the public on the forms and extent of public engagement that they prefer, to ensure that engagement reaches its potential in the areas in which it is the most effective

3.2 Recommendation 5: Nurture Public Engagement Competences

Public engagement is a complicated endeavour which should be carefully planned rather than implemented as an afterthought. Not only does participation often require specific knowledge and skills on the part of the public but so does representing science and facilitating public engagement on the part of researchers. As such, if a robust connection between science and society is to be fostered, it is necessary to nurture public engagement skills and motivation within both science and society.

While some participants address the need to create opportunities for the public to

learn and to prioritize relevant educational developments, much of the potential for improvement in the field of public engagement is seen on the academic side of the relationship [33]. The discussion highlights issues of availability of engagement training, and perhaps even more pressingly the low level of meriting of such efforts. Both research performing and funding organisations are urged to enable further qualification of public engagement, by providing both opportunities for public engagement and by valuing such efforts in evaluating research and researchers. Adding to this, longstanding discussions about the relationship between different forms of knowledge and their relationship should be kept in mind when designing public engagement, particularly if the aim of engagement is two-way learning and understanding[34].

Ensuring that public engagement skills are nurtured is central if public engagement is to be fruitful. A key concern around public engagement is that if it fails to deliver on its promises, it might be as likely to damage trust as to build it. As such, it is key that public engagement is assisted and steered through development and maintenance of expertise. It should further be noted that public engagement is not always very wide-reaching[35], and as such focusing efforts towards making engagement relevant for key stakeholders should be prioritized if the trust-building potentials of public engagement are to be reached.

Actions for RPOs & Institutional Support officers

✓ Ensure that engagement is encouraged and merited, providing opportunities for learning and understanding across groups. If public engagement is to be prioritised, meriting of public engagement in hiring and advancement decisions is necessary

✓ Allow certain researchers to prioritize and engage in public engagement more than others and facilitate and encourage specialization within this field as within other aspects of research

[33] See POIESIS deliverable D3.2
[34] Following discussions on the interaction and authority of forms of knowledge. See; Wynne, B. (1992). Misunderstood misunderstanding: social identities and public uptake of science. Public understanding of science, 1(3), 281. https://doi.org/10.1088/0963-6625/1/3/004
[35] See Losi, L. (2023). Who engages with science, and how? An empirical typology of Europeans' science engagement. Public Understanding of Science, 32(6), 798-814. https://doi.org/10.1177/09636625231164340

✓ Provide training and resources for researchers in all positions and fields to facilitate self-efficacy and skills for science-society interactions

✓ Commit to open science practices and making research openly available, while also being open to having scientific expertise critiqued and supplemented by societal actors

Actions for Mediators and Researchers

✓ Have accessibility and mutual understanding in mind when engaging society and continually work to improve mutual understanding

✓ Work to improve the reach of public engagement beyond groups already proximate to science

Actions for RFOs

✓ Encourage public involvement in early stages of research, to facilitate mutual learning and effective public engagement

✓ Provide funding for building competence within public engagement and other forms of societal integration within research projects

Actions for National Policymakers and the European Commission

✓ Commit to continued investment in making science available for society at large, in both deliberation and dissemination and through open science practices

✓ Ensure that public engagement research is established and funded as an independent field, and not merely an addition to other research fields

✓ Facilitate cross-national networks to ensure that lessons learned in public engagement are shared and transferred across national contexts

3.3 Recommendation 6: Prioritize Infrastructure for Effective Science-society Interaction

Even if the will and knowledge necessary for interaction between science and society exists, infrastructure is required to facilitate such interaction. Ensuring that knowledge on existing resources is continually updated increases the likelihood of successful science-society interaction and helps alleviating the burden of undertaking such interaction from individual actors. Furthermore, prioritising engagement infrastructure ensures that organisations and the research system as such are prepared when engagement is necessary.

Such commitments can, and do, happen in different institutions and with different levels of formalization, but stakeholders point out that organisations and the science system as such have a tendency for ad hoc approaches to public engagement. This, in turn can limit the impact of interactions between science and society [36]. This is particularly problematic given that public engagement is often prioritized on pressing and/or controversial issues. Particularly in societal crises where the role of science becomes more visible, having the infrastructure to help provide high quality engagement is key to ensure effectiveness and ensure that outcomes are positive.

While the establishment of networks, organisations, and resources for public engagement is not in itself crucial for trust, ensuring that infrastructure for public engagement exists, is updated, and is of high quality is crucial for ensuring the impact of public engagement on trust in science. Particularly in societal crises where conversation between science and society is necessary, having the appropriate knowledge and instruments for facilitating such engagement is key.

Actions for RPOs & Institutional Support officers

✓ Implement and/or maintain guidelines and provide capacity for securing meaningful and effective engagement

✓ Ensure organisational capacity to support researchers that employ public engagement and work to ensure that public engagement lives up to the highest standards of research integrity and ethics

✓ Stimulate the development of new and novel forms of public engagement. Ensure that lessons learned are kept alive in and between organisations

[36] See deliverable D2.3.

✓ Create designated infrastructure for including and engaging society and ensure administrative support for engagement activities. These should be able to serve as collaborative spaces as well as avenues of dissemination, deliberation, and co-creation

✓ Facilitate events, courses, and resources that provide opportunities for broad societal access to science and provide venues for lifelong learning and participatory capacities

✓ Create structures and networks that assist researchers and institutional communicators in connecting to each other and local stakeholders

Actions for RFOs, National Policymakers, and the European Commission

✓ Prioritize and incentivise public engagement research and public engagement activities in and outside research institutions

✓ Ensure support for implementing and developing public engagement, to continually develop practice and ensure that engagement does not become a mere biproduct

✓ Work to establish and maintain networks in and across institutions to facilitate the development, sharing, and maintenance of expertise on engagement

✓ Provide resources for implementing public engagement initiatives and infrastructure through cross-contextual cooperation and learning

✓ Ensure that lessons learned are channelled between national and institutional contexts in networks and research collaboration

4 Recommendations: Science Communication and Chains of Mediation

Science communication has the potential to shape and guide public debate on science. Since most interaction between science and society is mediated, actors such as journalists, science writers, and science educators, who form the chains of mediation between scientific work and public audiences, play a crucial role in the relationship between science and society.

Given this central role, science communication and communicators are perceived to be of critical importance in shaping societal trust in science. However, many actors' express concerns that science communication may not live up to its potential for connecting science and society. As a reason for these shortcomings, participants point to decreasing resources alongside the struggle for audience attention which may force science communication to focus narrowly on spectacular findings, at the expense of enhancing mutual understanding[37].

Moreover, there is widespread concern that the proliferation of alternatives to established and trustworthy forms of science communication from less credible sources may pose a threat to the impact and credibility of science communication [38]. Such concerns are connected to the (particularly online) spread of misinformation and disinformation and the associated difficulties in assessing the authenticity and quality of science communication in a rapidly changing information landscape. However, the POIESIS research programme affirmed that the public is by no means blind to the difference in the quality of information and differences related to specific communication platforms, though variation in such vigilance is likely. As such, while the bulk of science-related information, particularly the more controversial, seems to be received through social networks and platforms, there is a widespread perception that science communication in established communication channels delivered by specialised professionals remains most trustworthy.

While science communication is a powerful force in strengthening the science-society relationship, POIESIS identified three key challenges to achieve this potential. First, science communicators, including public institutions, should not abandon interactive spaces despite the undoubted emotional and professional challenges it can present. Rather, science communication should maintain its broad scope and strive to engage society on its own terms. Second,

[37] See; Safavi, B. (2015). Science journalism Prospects in the Digital Age. Popularization of Science, 5(2), 39-62. https://doi.org/10.4324/9780203483794

[38] Particularly prominent in deliverable D2.2. See also; Scheufele, D. A., & Krause, N. M. (2019). Science audiences, misinformation, and fake news. Proceedings of the National Academy of Sciences, 116(16), 7662-7669. https://doi.org/10.1073/pnas.1805871115

science communication must work to better highlight the uncertainty of the scientific process when promoting discoveries of new findings, helping to qualify and nuance the public debate about science. Third, science communication must continually adapt to the changing communication landscape by building and multiplying innovative chains of mediation that integrate actors from different spheres and reacts to both challenges and opportunities posed by developing communication landscapes, ensuring the robustness of the information that reaches public audiences.

4.1 Recommendation 7: Foster Context-sensitive Science Communication

Not only can science communication work to bolster public understanding and appreciation of science, but it also has the promise of stimulating the societal discussion on science. However, for these goals to be reached science communication needs to be context-sensitive and engage society on its own terms. This requires not only wide presence of science communication but also that the contents of science communication need to be delivered in a form that is useful and appropriate for the public debate[39]. For science communication to reach audiences, it must be willing to go to where audiences are and where debate take place. It is further vital that science communication is willing to address issues on the societal agenda alongside setting its own agenda.

To ensure that science communication is useful for the public, it should be delivered in an appropriate format. Not relying on field specific jargon but adapting communication to be relevant and approachable for target groups is a necessary though not simple process. Moreover, not all science communication should be addressed to a general audience. Many scientific findings address specific stakeholders, and it should be a core task of the scientific community to ensure that science and technology are fit for purpose and sufficiently understood by those affected by research. Finally, from a much broader perspective, researchers and science institutions will be more likely to bridge gaps between itself and society when the make-up of the scientific community more closely reflects and represents the diversity of society. Moreover, a wider range of science communicators, particularly those specialising in curating scientific information on other social media platforms, could be more deeply included as a part of the science communication debate. Such communicators have enormous reach and specialized knowledge which could be harnessed for

[39] See further discussion in; Humm, C., & Schrögel, P. (2020). Science for all? Practical recommendations on reaching underserved audiences. Frontiers in Communication, 5, 42. https://doi.org/10.3389/fcomm.2020.00042

the development and reach of science communication.

Effective science communication, or the lack thereof, is seen as a key determinant of societal trust. Science communication is a central avenue of interaction, and the qualities of communication are core to ensuring that science communication is effectful. As such, this is an area in which the potential for shaping the relationship between science and society is high, and consequently it could be a potential avenue for maintaining and ensuring a trusting relationship between science and society.

Actions for RPOs & Institutional Support officers

✓ Facilitate science communication in diverse spaces and invite society into the spaces of science, ensuring the inclusion of communities and groups across both social and geographical contexts

✓ Increase the breadth and diversity of science communication and communicators, to be representative of the diversity of society.

✓ Insist on broad communication of science and facilitate the availability and discoverability of science

Actions for Mediators

✓ Work to enhance the communicative value and reach of communication by curating research without relying on jargon

✓ Be mindful that individual attitudes and perceptions of science are key for the reception of and interaction with science communication and work to bridge divides based on values and attitudes

✓ Tailor efforts to specific audiences and take care to target communities both proximate and distant to science using their preferred information channels

Actions for Researchers

✓ Be aware that the aspects of research that are most salient for science and society are not necessarily the same and be willing to engage with questions and concerns that arise from public debate.

✓ Engage with the public in their preferred spaces, to learn, understand and frame communication in ways that will be accessible and attractive to audiences

Actions for RFOs, National Policymakers, and the European Commission

✓ Be attentive to science communication as a societally impactful outcome of research and facilitate and incentivise these activities

✓ Support the establishment and maintenance of science communication spaces and organisations and emphasise the importance of both deliberation and dissemination

✓ Push to increase diversity in science communication and science communication audiences in terms of individuals, venues, and formats

✓ Ensure that the results of research are available to broader society and relevant stakeholders in a format they find useful

✓ Work cross-institutionally to facilitate cooperation of science communication, education, and science debates

4.2 Recommendation 8: Enhance Awareness of the Nature and Principles of Science

A key concern among stakeholders consulted in POIESIS is the degree to which the nature, principles, and processes of science are being sufficiently conveyed in science communication. There are concerns that lack of public understanding of the nature and principles of science can produce rifts between science and society through misalignment and misunderstandings. Such concerns are particularly connected to issues around disagreements and uncertainty in science, and the potential for these to undermine trust.

Science communication is believed to have considerable potential in easing these issues, by underlining that uncertainty and disagreement are core to the processes in science. Furthering the weight that science communication places on these aspects may increase the impact of science communication. Further, it may also serve to bolster against science-society conflicts in times of crises as uncertainty and disagreement inevitably become a part of the societal conversation on science.

While the direct relation to societal trust may be limited, and some express concern that highlighting disagreements rather than consensus may have negative effects on societal trust, there is considerable potential for enhancing the societal trust in science by enhancing the scope of science communication from results to the process of producing scientific information. Particularly in situations where science plays a prominent role in the public debate, such as societal crisis, a more nuanced

representation of science might bolster against backlash connected to internal disagreement, mistakes, and updated understandings[40].

Actions for Mediators

✓ Make the principles and processes of science explicit in science communication to ensure transparency and understanding. Communicate the scientific process, its challenges and iterative learning

✓ Highlight remaining questions, uncertainties, and avenues of future inquiry when communicating science to the public

✓ Ensure that sources of information are made explicit, to facilitate openness and transparency of research

✓ Ensure that science communication is aligned with the highest ethical and integrity standards

Actions for Researchers

✓ Demand the same rigour of communication aimed at the public and stakeholders as towards the scientific community

✓ When communicating science, ensure that limitations and uncertainties are included as a routine part of science communication

✓ Be aware that the concept of science is understood differently within and between science and society. Do not assume shared understandings when communicating

[40] The role of consensus for the receptions of science communication has been broadly investigated and discussed, see Chinn, S., Lane, D. S., & Hart, P. S. (2018). In consensus we trust? Persuasive effects of scientific consensus communication. Public Understanding of Science, 27(7), 807-823. https://doi.org/10.1177/0963662518791094

Actions for RPOs & Institutional Support officers

✓ Include information about research ethics and integrity assessments in press releases as a consistent practice

✓ Be transparent on cases where principles of good scientific practice are breached and take steps to communicate the steps taken to reinforce the integrity of science

✓ Train researchers to include ethical and integrity considerations when communicating to the public both directly and indirectly

Actions for RFOs, National Policymakers, and the European Commission

✓ Produce and maintain codes of conduct for science communication to ensure that these follow best practices and align with societal and scientific needs

✓ Prioritize understanding of not only the results but also the methods and nature of science in science education and science communication efforts

4.3 Recommendation 9: Adapt to Changing Communication Landscapes

Science is not immune to the changes to the world that it produces. Recent decades have seen rapid development in communication technologies and consequently change in the platforms through which mediation between science and society takes place[41]. Not all platforms have similar potential, nor are they assessed as equally trustworthy by users. Yet mediators need to use these platforms, and success in doing so can be crucial to the reach of reliable science communication. Furthermore, new kinds of science communication enabled by technological developments present new opportunities, but also potentially challenges, for the mediation between science and society.

It is clear in the findings of POIESIS that newer, particularly social, media is trusted to a lower degree than legacy media is. While this is the case, new media have in many regards overtaken the role of legacy

[41] For further discussion see; Brossard, D., & Scheufele, D. A. (2022). The chronic growing pains of communicating science online. Science, 375(6581), 613-614. https://doi.org/10.1126/science.abo0668

media as the primary source of news and information for large groups of people. It is also seemingly inevitable that the continual development in communication technologies will further transform the science communication landscape[42]. While technology can enable access and broaden the scope of science communication, such developments are not without challenges. Institutions should work to enable researchers, mediators, and the public to further the public debate on science in these new avenues and continually follow the conversation where it goes.

Trustworthiness of communication is seen as highly related to the platform on which it is delivered. However, if established scientific authorities are to be active in the public debate (on science), this requires presence where the actual debate takes place. Broadening the reach and method of delivery of science communication might not directly affect trust but could play a pivotal role in ensuring that the links between science and society remain intact or are even strengthened. Doing so is key to upholding a trusting science-society relationship where science is both present and reachable.

Actions for RPOs & Institutional Support officers

✓ As the communication landscape changes, ensure that training adapts and that the resources available for researchers are fit for purpose

✓ Commit to being present across platforms, providing access to research where public debate takes place

✓ Ensure support and protection from abuse for those researchers and mediators who represent science in new communication formats

✓ Provide institutional support for involving all different types of science communicators, professional media specialists, and researchers

[42] E.g. generative AI as a communication tool; Schäfer, M. S. (2023). The Notorious GPT: science communication in the age of artificial intelligence. JCOM: Journal of Science Communication, 22(2), Y02. https://doi.org/10.22323/2.22020402

Actions for Mediators and Researchers

✓ Ensure that emerging forms of science communication and communicators are involved in the debate on science communication

✓ Include public perspectives in communicating science, broadening ownership over scientific knowledge and the public debate and interactions about science

✓ Harness new communication channels to improve and diversify public outreach when possible and meaningful

Actions for National and European Policymakers

✓ Be proactive in steering adaptation to changing communication landscapes, through guidelines providing support for developing science communication practices

✓ Ensure that legislation is regularly updated to protect researchers from harassment in online and other less regulated science communication environments

✓ As modes of communication evolve, maintain and adapt codes of conduct for science communication that support not only established institutional actors but also emerging science communication practitioners

5 Maintaining Trust in Science and Addressing Mistrust

While societal trust in science remains high and claims of a European trust crisis are unwarranted, concerns about the relationship between science and society persist across stakeholder groups engaged in POIESIS. It is evident that a culture of trust cannot be taken for granted but requires continuous effort and collaboration from all actors within the research ecosystem. It is also evident that the drivers of trust in science are complex and interrelated. Research integrity, public engagement, and science communication are only components of societal trust in science, and understanding how they connect to each other and to related drivers of trust is key. In particular, POIESIS points towards the financial and political independence of actors within the science ecosystem; the organisation of research systems in relation to quality and evaluation mechanisms; general levels of trust in societal institutions and authorities; and the degree of politicization — shaped by political, historical, economic, and research-related contexts and developments.

As one of its objectives, POIESIS investigates the relationship between research integrity, public engagement in research, and trust in research. While difficult to implement, there is broad agreement that research integrity policies and practices could benefit from greater policy harmonization, formalized procedures, and stronger support, given the global nature of research. However, a key issue identified—one that both directly and indirectly influences trust in science—concerns the conflicting expectations, directives, and misalignments between principles and practices in research, for example in relation to mechanisms of research quality and the evaluation of research.

The relationship between public engagement in research and trust in science has proven to be complex and fairly contested. While there is consensus on the democratic benefits and value of public involvement, differing opinions persist regarding its effects — partly due to scepticism about the quality of the data produced and concerns over public participation in decision-making processes given a lack of expertise. Nonetheless, there is agreement that participatory processes that fail to deliver on their promises can generate public mistrust.

As a second objective, POIESIS has examined how scientific misconduct, questionable research practices, poor or absent communication, and misinformation affect public trust. It is clear that cases of misconduct can undermine trust, but that the presumed prevalence and scope of detrimental research practices overall have less impact on trust in research. Generally, scientific misconduct is primarily seen as involving individual researchers, highlighting a distinction between trust in science and trust in researchers, and showing that trust can be directed at either an actor or system level. In terms of the mediation of science, science

communication is perceived to be a crucial factor for trust, but it is often seen as characterized by a reactive and uncoordinated approach.

As a driver of mistrust, irresponsible science communication poses a major challenge and requires careful navigation of a complex, digitalized media landscape, partly characterized by disinformation and conflicting representations of science. Increased digitalization and AI-generated content, combined with social media generally perceived as untrustworthy by POIESIS stakeholders —reconfigure trust relationships and create demands for increased transparency, tailored communication, and information integrity. Furthermore, promoting a culture of social integration requires the mobilization of all actors in the chain of mediation and digital ecosystem, as well as the establishment of new partnerships between, for example, mediators and researchers.

In addressing trust in science, it is important to stress that such trust should not be equated with blind trust in researchers or research. On the one hand, the sheer complexity and acceleration of scientific and abstract knowledge along with the general navigation of complex expert systems requires trust in the cultural authority of science to help balance trust versus risks and connects societal and global influences with personal choices and actions. Concurrently, scientific authority and scientific knowledge are inherently conditional and contextual, requiring critical engagement and a certain degree of skepticism or distrust in the same way as both trust and distrust are an integrated part of democratic governance and 'institutionalized distrust' which serves to help monitor governmental accountability and ensure that decisions are made with the public interest in mind[43].

A key issue, then, concerns the institutional frameworks and conditions that may strengthen trust in science. As its third objective, POIESIS examines the various roles that institutions involved in research, communication, and funding play in promoting a research climate conducive to society's trust in science. Institutions, in general, carry key responsibilities for fostering trust in science —not necessarily with trust as the sole objective, but through a) the implementation and facilitation of support, training and reward/incentive structures [44]; b) clear prioritization of collaborations with the surrounding society and well-defined roles in driving the 'social conversation around science' [45], and c) commitment to knowledge co-production

[43] O'Doherty, K. C. (2022). Trust, trustworthiness, and relationships: ontological reflections on public trust in science. Journal of Responsible Innovation, 10(1). https://doi.org/10.1080/23299460.2022.2091311; Uttenthal 2024; Uttenthal, M. (2024). A conceptual analysis of trust. *Social Science Information*, *63*(3), 392-410. https://doi.org/10.1177/05390184241270835

[44] Dubois et al. (2025 forthcoming). The Role of Institutions in Cultivating Trust in Science: A Qualitative Approach on a European Scale. In, Iordanou, K. Ravn, T. and Zwart, H. (eds), Trust in Science. Springer Nature.

[45] Bucchi, M., & Trench, B. (2021). Introduction: Science communication as the social conversation around science. In Routledge handbook of public communication of science and technology (pp. 1-13). Routledge. https://doi.org/10.4324/9781003039242

through science-for-policy processes[46] and participatory formats that involve citizens and other stakeholders in research and innovation processes.

For research institutions, promoting and ensuring compliance with research ethics and research integrity policies and procedures remains important, including having clear and transparent institutional mechanisms for addressing scientific misconduct. In addition, research institutions could benefit from implementing a clear and transparent prioritization and distribution of social 'third mission' activities as part of innovation strategies and policies aimed at strengthening the relationship between science and society and enhancing societal impact. In consideration of public concerns around independent research, governmental interference in research and conflicts of interest, research and policy institutions should clearly reflect on, communicate about, and alleviate potential tensions between societal mission-oriented research and impact and the influence of external actors.

POIESIS examines how research integrity and public engagement shape trust in science, focusing on the roles of institutions and mediating actors in communicating these practices and fostering public trust. This report highlights nine key recommendations and a wide range of actor-specific, evidence-based actions for maintaining and strengthening trust in science. Since trust in science is a complex, multi-faceted, and relational issue that depends on numerous factors, it is important to remain attentive to specific contexts, trustor–trustee relationships, and the distribution of responsibilities when adapting recommendations and actions to local and institutional settings.

[46] European Commission: Directorate-General for Research and Innovation and Schomberg, R. v., *Trust as a governance challenge for science-for-policy ecosystems – Mutual learning exercise on bridging the gap between science and policy – Fourth thematic report*, Schomberg, R. v.(editor), Publications Office of the European Union, 2025, https://data.europa.eu/doi/10.2777/6569914