

National Report: Focus Groups - Denmark

Probing the impact of integrity and integration on societal trust in science (POIESIS)

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poiesis
TRUST IN SCIENCE

National Report: Focus Groups - Denmark

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1 Introduction

1.1 Set up of the focus groups

The Danish focus group interviews were all conducted on-site on the 5th, 6th, and 8th of February 2024. The first two focus groups (FG1, FG2) were held at the IT University of Copenhagen, while the third interview (FG3) took place at the University of Southern Denmark in Odense. All interviews lasted two hours, from 1-3 pm. FG 1 was moderated by co-investigator Marianne Gauffriau, and FG 2 by co-investigator Mia Ulvgraven. Project member (TR) participated in both focus groups as a co-moderator and moderated the third focus group alone as the main moderator, as co-investigator Lone Bredahl was absent due to illness.

The three Danish co-investigators were recruited due to their key and varied expertise in research integrity, science communication, and research evaluation, respectively. They represent three different universities geographically dispersed across Denmark. The three co-investigators were invited via a formal invitation sent by email. The three co-investigators are:

- Marianne Gauffriau, research consultant at the IT university of Copenhagen and a specialist in research evaluation, peer review and bibliometrics.
- Mia Ulvgraven, press- and communication consultant at School of Business and Social Sciences at Aarhus University (AU). Specialist in research communication and dissemination.
- Lone Bredahl, senior consultant and assistant professor at the Library/University of Southern Denmark (SDU). Specialist in research ethics, research integrity and technology consumer acceptance. Lone is also responsible for courses on responsible conduct of research.

As all three co-investigators accepted the invitation, no further candidates were contacted. A first kick-off online meeting was held to discuss the focus group study and activities involved, followed by a second online meeting to discuss the moderator guide. In consultation with the co-investigators, the moderator guide was slightly adapted to better fit the Danish context. For example, the term 'social integration' was reviewed among co-investigators as it conveys a different meaning in the Danish context than originally intended. Instead, the Danish terminology for 'citizen involvement in science and technology' was applied to more accurately capture the operationalisation of the concept.

Co-investigators were provided with the information booklet and guidelines material provided by the study coordinator (CNRS). All co-investigators also participated in the online focus group training session conducted by study coordinator. Participants for each focus group were identified by each co-investigator, based on the sample criteria stipulated in the study research protocol. Formal invitation emails describing the objectives of the POIESIS study, with a particular attention towards the focus group study were sent out by the project member CLA.

Participants who accepted the invitation received a second follow-up email two weeks before the focus group session. The email included an information letter further detailing the aim of the POIESIS project and an explanation of what participation in the focus group interview involved. They also received a consent form, and an information sheet about Aarhus University's handling of personal

data. Participants received a final reminder email the day before the focus group providing practical details such as the meeting room number and parking information.

Eighteen participants took part in the three focus group interviews. For details regarding the composition of the groups, please see section 1.2. One participant was absent from the third focus group interview. For additional information regarding the focus group compositions and interactions, brief accounts are provided in the sequential descriptions in section 2. The focus group interviews adhered to the flow and themes outlined in the moderator guide, which included an introduction, debriefing and exercise designed for the study. The exercise was primarily aimed at university employees, and a few participants had to adjust their responses or omit answers to better align with the activities specified in the exercise. All participants received a small gift bag as a symbolic token of appreciation, but none received financial compensation for their participation.

All focus group interviews were recorded and subsequently transcribed (by CLA). The focus group transcriptions were then coded in the software and data facilitation programme NVivo (by TR) by using the codebook provided by the study coordinator. The codebook was slightly adapted to align with the Danish version of the moderator guide. The coding process primarily utilized a deductive coding strategy to align with the comparative study design and the structure of the codebook. Emerging sub-topics and themes were inductively coded and added to the codebook. Co-investigators moderating focus group one and two have read, commented on, and validated the within-in analyses of the focus group interviews in which they participated. They have also reviewed the final report. The analyses reported in the subsequent sections include a within and across-case analysis of the three focus group interviews, following the report template structure of the collective focus group study.

1.2 Participants in the focus group

The following tables outline the composition of participants in the three Danish focus group according to gender, position, and institution. No detailed information is provided to maintain the anonymity of participants. RPO refers to research performing organisation and RFO to research funding organisation.

Focus group 1

Participant Id.	Gender	Position	Institution
FG1_1	Female	Manager	RFO
FG1_2	Female	Research support manager	RPO

FG1_3	Male	Research administration senior consultant	RPO
FG1_4	Male	Science communication consultant and facilitator	Self-employed
FG1_5	Female	Manager	Open Access organisation
FG1_6	Male	Information and citizen science specialist	Library

Focus group 2

Participant Id.	Gender	Position	Institution
FG2_1	Female	Communication manager	RFO
FG2_2	Male	Communication manager	RPO
FG2_3	Male	Manager	RFO
FG2_4	Female	Project manager	Private organisation involved in public engagement in science
FG2_5	Female	Communication manager	RPO
FG2_6	Female	Communication manager	RPO
FG2_7	Female	Communication manager	RPO

Focus group 3

Participant Id.	Gender	Position	Institution
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FG3_1	Female	Manager	Data Management organisation
FG3_2	Female	Manager	RFO
FG3_3	Female	Research support manager	RPO
FG3_4	Female	Associate professor, Responsible conduct of research teacher	RPO
FG3_5	Female	Manager	Hospital Research Support Unit

2 Sequential description of the focus groups

The following section outlines a sequential description of each of the three Danish focus group interviews, hence presenting detailed within-case analysis aimed at describing the nature of topics, ideas, and perceptions as they were conveyed in each group. In addition to reporting on the specific content of the various interviews, a brief overview of the group composition, interactions, and moderation is included. The within-case analysis will form the basis for the subsequent sections of the report, which present thematic findings on trust in science across the three individual discussions.

2.1 Focus group 1

In the initial focus group discussion, participants represented a wide range of professional stakeholders engaged in the broad areas of research integrity and social integration, as outlined in the focus group study research protocol (Dubois 2023). The group consisted of six participants employed in managing, specialist, self-employed and senior positions in relation to research funding and research support and organisation with expertise spanning the areas of science communication, citizen science, research evaluation, research administration, open science and open access infrastructures.

The composition of the group included three female and three male participants, in addition to the main moderator (MG) and co-moderator (TR). Along with a balance in gender and professional

subject areas, the group was equally well-balanced in terms of high-level engagement and the very constructive exchanges of perceptions and professional experiences. The discussion was effectively moderated by the main moderator (MG), with a continuous flow in the topics addressed. All themes were fully discussed and explored, however, the main topic of research integrity led to particular in-depth discussions about current research integrity cultures, barriers to promoting research integrity, and the interrelations between RI and public trust in science.

Relationship between science and society

On the topic of immediate associations to the relationship between science and society, participants discussed the societal relevance of research, noting that research might not yield immediate impact to concrete problems, with a participant from a research funding organisation providing the example of basic research. Research was also highlighted for having its own internal 'logic' and the research system was compared to a 'cloud', with another participant highlighting the intersection between lifelong learning, citizen science and science communication as important for the science-society relationship. The application of **science-based knowledge in policy-making processes** was noted to be varied, with sectors like healthcare, food, and agriculture playing a larger role in policy-making than others. Later in the discussion, the same university participant mentioned experiencing frustration among climate researchers, who do not feel that their research findings sufficiently influence policy-making in their field. Furthermore, they are advised by some politicians and research management to avoid engaging in research activism.

Addressing the complex science and society relationship, the same university participant also pointed out a concerning aspect of science communication - that an increasing number of **researchers receive threats**, making it challenging to encourage young researchers to engage in public debate.

Trust in science

A strong relationship of trust between science and society was emphasised as important. The example of Covid-19 was provided by several participants. One participant pointed out that a lack of trust could lead people to bypass scientific knowledge when seeking solutions, while another observed that the tensions witnessed during Covid-19 may have been somewhat alleviated. Conversely, another participant believed that the gap between science and society was narrowed during Covid-19, making science appear less 'unworldly' by demonstrating a rapid and direct impact of research, thereby increasing public trust in science. Nonetheless, there was a consensus among the participants that **trust in science is generally high in Denmark**. Participants exemplified this observation with 1) the overall pro-science sentiment among Danish politicians 2) the high social status and social capital connected to being involved in research 3) the strong support for science that have been constructed through the educational system 4) the extensive use of researchers as experts and commentators in the Danish media landscape, which is more prevalent compared to other countries. Nonetheless, this general view of use of researchers in the media was nuanced by two participants in the focus group; one participant, working in science communication, noted the potential negative effect of overshadowing other groups of specialists and practitioners. On the other hand, a participant from a funding organisation encouraged an even greater use of researchers to explain their research in the media.

In this regard, **participants did not identify any distinct crisis of trust**, highlighting that single incidents of misconduct are insufficient to significantly alter the overall confidence in science,

metaphorically referred to as turning over the ‘supertanker’. However, this does not preclude instances of mistrust. Participants provided several examples regarding AI innovations and health-care data related to life-expectancy or illness information that might be controversial and inadvertently instill fear among the public. A historical comparison was drawn with the birth of the first child conceived through assisted reproduction in Denmark in 1983 to illustrate the normalisation of technologies and likewise to emphasize **the need for deeper reflection on the potential impacts and adverse effects of scientific advancements.**

Research integrity

In the discussion on research integrity, participants considered the current research system, emphasising the necessity for a system in regard to research career and funding that does not encourage misconduct. A participant specialising in open science drew attention to the problem of **high retraction rates** in relation to low quality and misinformation challenges. **Responsible research was seen as a means to bolster trust in research.** The Coalition for Advancing Research Assessment (CoARA) initiative was cited as an example of establishing shared rules that can enhance trust and promote research integrity. There was a consensus that – while many RI principles and policies are in place – implementing them effectively in practice remains challenging. It was noted that various actors and stakeholders – including research administrations, funders, and supervisors – play an important part in cultivating a strong culture of RI. Furthermore, principles of open science and reproducibility, for instance, should be integrated into the curriculum starting already from the bachelor level.

A participant from a funding organisation pointed out that the issue of authorships is gaining a lot of attention from researchers. While this participant emphasised the positive aspects of discussing this topic transparently, which the participant saw as being the case among authors, another participant highlighted the negative aspects of manipulating authorships to ‘game the system’, hence undermining the peer review process and the overall integrity of research.

A primary challenge in establishing responsible research cultures was identified as **the global nature of research.** As one participant mentioned, no one owns the system, and due to its organisation, competitiveness, publication structure etc., collective standards and actions are deemed necessary to introduce sustainable transformations. The widespread use of temporary positions is also mentioned as a particular challenge that increase the pressure to publish.

In addition to **recommending shared standards across institutions and countries**, the importance of informal training and counselling from senior researchers and supervisors is highlighted as key for socialising researchers into responsible research. The specific support structure of ‘practice committees’ at universities, which handles questions related to responsible research practices, is mentioned as a tangible initiative to discuss and rule on specific cases. The participant from a research funding organisation stated that while they generally rely on RI regulations and policies set by research performing organisations, there have been internal discussions around reproducibility and retraction issues, aiming to contribute to increased awareness on these important attention points. Another issue mentioned is that of ‘hyperprolific’ authors, where the funding agency can play a role by explicitly inquiring into the reasons behind high-volume publication during grant application evaluations.

Public participation in science

Several participants noted a growing number of citizen science and public involvement initiatives across various universities. One university participant observed that many researchers have shown interest in citizen science apps for data collection that would otherwise be difficult to gather. This participant also mentioned that public involvement in identifying research topics for funding might lead to a more varied support. In this regard, a participant specializing in citizen science highlighted an initiative at a Danish university, where citizens can vote on projects, they wish to see funded. The same participant voiced most clearly a support for public involvement in science as a way to increase trust in science.

Generally, participants seemed to **support the idea of public participation in research, several however noting that some projects are more conducive to public engagement than others**. A participant employed in a university support unit pointed out that public participation is not equally relevant in all research projects. However, in some projects, public engagement can indeed introduce perspectives, diversity, and knowledge that enhance research quality and trust in science. At the same time, this participant felt that science communication efforts might generate more trust in science than public involvement in science. Echoing this sentiment, another participant working in science communication supported this viewpoint, arguing that while citizen science allows for deeper participation, science communication initiatives have the potential to influence a larger number of citizens.

The focus group discussion briefly touched upon recommendations to further support public engagement initiatives. The participant specialising in citizen science emphasized that we are **only utilising 'one percent' of the potential of citizen science**. The participant also suggested to develop an app that could provide citizens with an overview of all citizen science projects at Danish universities. Regarding the broader topic of increasing public trust, another participant expressed a wish for a greater breadth and diversity among the experts featured in the media. This would enable a wider identification with the relevant topics and generally increase trust.

2.2 Focus group 2

In the second focus group discussion, participants were primarily involved in the area of 'social integration' by representing managing communication and outreach positions in research performing and funding organisations as well as a private organisation involved in public engagement in science. Seven participants, five women and two men, took part in a very engaged, lively, and constructive discussion around the role of science communication and citizen involvement in building public trust in science. The relatively homogeneous composition of the group, in relation to a shared communication and outreach focus, supported in-depth discussions around the various pre-defined topics from a communicative approach to the subjects. Despite the relatively homogeneous nature of the group, (tacit) knowledge, opinions and ideas were made explicit and nuanced. The size of the group and the active participation of all members necessitated slightly more time management than in the other focus groups. Due to efficient moderation (by main moderator MU) all topics were explored and addressed.

Relationship between science and society

Participants took turns responding to the first open question about immediate science and society associations. From different viewpoints, they generally agreed on the key importance of **research as a societal institution and that research should be of relevance for the greater public good**, helping to develop and improve society at large. Consensus was also reached on the fact that research - both basic research and 'practice-related' research - should be discussed in dialogue with various part of the public and that **dialogue-based approaches can improve public trust in science**. Furthermore, it was noted that while research can and should be questioned, it plays an important role in 'democratic debates' within society.

Participants also highlighted the **complex relationship between science and society**. For instance, several participants working with science communication at research performing organisations pointed to the changed relationship between universities and the general society, emphasising that universities no longer possess a 'natural legitimacy' or authority and that there has been an increased focus on the relevance and utility of research. The participants underscored an increased awareness of maintaining legitimacy through close interactions with the surrounding society but noted that this could also pose challenges.

Another participant from a research funding organisation pointed out that the science and society relation should not be oversimplified and that researchers do not speak with one voice, but they disagree because contradictions are part of the nature of science. This participant pointed to an inherent challenge in communicating the fact that **disagreement within science does not necessarily imply that science is 'untrustworthy' to the public**. This challenge can pressure the legitimacy of science and potentially increase mistrust in it, meaning that science communicators should be very aware of this challenge when communicating scientific results. Agreeing with this point, a participant from a different funding organisation emphasized that disagreement in science might also indicate a difference in research quality and that research should not be viewed as a 'viewpoint' but a 'well-founded point of view'.

Other challenges expressed in relation to the relationship between science and society included a **pressure on researchers** – particularly researchers from humanities and social sciences -due to an increase in media outlets, an increased politization of these areas and in relation to research seen as activistic, as well as a dilution of the 'expert' label. Furthermore, several participants problematized the fact that some researchers willingly speak on issues outside of their areas of expertise, which might make it more difficult for citizens to 'navigate' a diverse research landscape. When discussing this topic in relation to research integrity issues, the general opinion was further nuanced based on the discussion (see below).

Trust in science

When discussing the topic of general trust in research within Danish society, the **politicization of science** was again brought forward as a topic of concern. While participants generally pointed to a **high degree of public trust** - albeit media debate sometimes suggest the opposite – they also observed a downward negative trend among policy decision-makers. One participant identified this as an increased strategization over the last two decades, where politicians support research that aligns with their own ideologies and likewise attack opposing research. Other participants highlighted that there must be '**cracks**' in the general trust that can be exploited politically and are maintained within 'social media bubbles' that use facts very selectively.

In this regard, it was highlighted that **mistrust has found more fertile ground**. Another participant, working with communication for a funding agency, also traced this back to the flow of media assessments – as opposed to dissemination of facts - on the part of researchers, noting that science communicators also have a role to play in this context. From the participant’s perspective, researchers often avoid engaging in accusatory discussions, leaving a void that politicians can exploit.

A participant working in communication at a Danish university also pointed to **the role of researchers in fostering public trust**, albeit from a distinct viewpoint. In the experience of the participant, researchers sometimes focus too heavily on possessing the ‘right’ and correct facts and having a precise understanding of how the world looks, which can be difficult for the broader society to relate to. In this context, another participant, involved in public participation, noted that it can be equally rewarding for researchers – as well as for citizens – to engage in on-site dialogues with citizens within specific local contexts, learning about ‘people’s everyday lives and reality’.

Research integrity

On the topic of research integrity, the conversation continued on the **role of researchers in the media**. Although there were different views on the dissemination of facts versus assessments, participants seemed to agree that researchers can, while maintaining integrity, speak on research areas outside of their own if done transparently and with substantiation. Two participants emphasised that researchers have a unique opportunity to help ‘translate’ complex research findings for the public. Another participant, involved in citizen participation, added that effective research dissemination is not necessarily an inherent skill for researchers, highlighting that institutions and science communicators have a responsibility for educating researchers in this area that is not ‘credited’ in the academic system. In relation to barriers to professional RI standards, one participant noted that the sheer explosion of research articles – mirroring the abundance in media in general – puts pressure on the peer review system, potentially compromising research integrity.

Public participation in research

Participants generally expressed a **support for involving citizens in research processes**, and several mentioned a range of public engagement activities taking place within and outside of research performing organisations. Participants involved in science communication management at universities primarily mentioned the use of more broad science communication initiatives such as democratic festivals, science festivals, social media interaction and open talks, noting that resource capacities also pose limitations on their level of ambition. Several also highlighted an increased attention and inclusion of citizen science activities within their universities more broadly, with one participant mentioning efforts to not only include citizens in data collection processes or as research subjects but also engage **citizens as ‘co-producers of science’** in scientific knowledge production processes. Two other participants, one from a funding agency and the other from a private organisation engaged in citizen engagement, most distinctly expressed the benefits of public integration in research, based on their experiences with various formats of citizen engagement with science. In this context, the funding agency participant noted that citizen participation is especially relevant when debating the perspectives of emerging technologies, understanding diverse positions as a basis for formulating new research agendas and research questions. It was also mentioned that conducting public engagement activities poses challenges due to their often cost-intensive nature, limiting participation to smaller samples if in-depth involvement is the goal.

Recommendations concerning research integrity

When discussing **efforts to promote institutional RI**, participants highlighted a number of existing and future awareness- raising points and set of initiatives to be considered.

Several participants in communication management positions highlighted their increased focus on providing **research support** throughout the research process, covering areas such as budget management, external collaboration and relations, and data management, among others. Additionally, it was noted that large grant projects are increasingly receiving public publicity, thereby prompting a greater need for administrative and communicative research support to help researchers to maintain high standards of research integrity and navigate a complex media landscape. One participant also highlighted that while researchers intensely focus on the core aspects of science, ‘the engine room’, they sometimes pay less attention to other areas. For instance, data may not be managed properly, and while the science itself might be of a very high quality, overall research integrity will suffer. It was also mentioned that some unfortunate incidents have led to the development and updating of university policies, along with an increased emphasis on implementing these measures through training and governance structures, among other strategies.

As part of the discussion, a participant from a funding agency noted that their trust as a fund has not been disappointed, emphasising that breaches of research integrity should be addressed in alignment with their relatively low frequency. A participant from a university echoed this sentiment, suggesting that such **breaches are more likely due to a lack of attention and awareness of their importance rather than outright ‘cheating’**.

In this context, it was observed that academia operates on a high degree of trust, and it was noted by several participants that there may be occasions when **universities are somewhat ‘starry-eyed’** and not necessarily fully prepared to address issues like research espionage and potential consequences of AI innovations.

For funding organisations, it was highlighted that codes of conduct are adhered to, but that they rely on institutional RI legislation and policies. It was suggested by one funding representative that as funders, they would like to enhance their support for the **‘science of science communication’** to encourage cross-cutting research that could yield more empirical knowledge about the diversity of research debates and dissemination methods.

2.3 Focus group 3

The third focus group discussion involved five participants professionally engaged in the fields of research integrity and social integration. For the latter, several participants specialized in areas related to support and ethics in open science and data management. One participant joined the focus group 30 minutes late due to an already planned meeting, while a sixth participant was absent. Unlike the other two focus group interviews, this one had an all-female composition, resulting in a skewed gender balance.

The discussion was engaging, with all participants actively and equally involved in the discussion. It was characterised by a very pleasant, constructive, and somewhat calm atmosphere, with

participants being very conscientious about the joint interaction and exchanges of opinions in terms of providing space for each other's responses. Perhaps attributable to this attentiveness, the size of the group and the fact that only one moderator was present, the moderator (TR) employed a few more probes to facilitate the discussion compared to the moderation in the remaining focus groups. Despite this, participants engaged in dedicated conversation among themselves, and the discussion was easily kept on track in alignment with the moderator guide.

In general, the discussion primarily revolved around the main topic of science and society in relation to trust and open science from the perspectives of research integrity and research security issues. Several enablers and barriers for fostering a robust research integrity culture was discussed, including current trends and initiatives to support institutional RI and data ethics infrastructures. The topic of how and when to involve citizens in research was debated to a lesser extent, yielding diverse opinions on the contexts in which public engagement in science and technology is beneficial.

Relationship between science and society

In response to the initial open question concerning immediate associations regarding the relationship between science and society, participants explored the role of research in the Danish society like in the other two focus groups. They discussed the **balance between strategic and basic funding** as well as between public and private funding in terms of 'agenda-setting' power. In relation to the latter, two participants emphasised the need to be wary of a potential 'distortion' of focus areas that could affect the 'growth layer' with one participant pointing out that growth and innovation also often stem from basic research.

Representing various research support units in their professional capacities, several participants highlighted their organisations' roles as mediators between science and society. They mentioned the provision of resources on both local, regional, and national levels aimed at enhancing the quality of research, assist with ensuring a proper use of research data and deliver equal access to support infrastructures.

As part of the initial open question, participants also discussed the **advantages and challenges of open science**, particular in terms of data sharing and international cooperation. Participants – representing research support structures within and outside of universities as well as a research funding organisation – all draw attention to an increased institutional awareness on actions to promote **research security**. After years dedicated to an open research agenda that emphasized data sharing and the development of international research partnerships, the participants considered the heightened focus on security and the trend towards 'closing down' as unfortunate. While participants mentioned continuous efforts to promote international research collaborations for its benefits to research and research quality, a majority of participants listed a number of protective measures and policies being initiated to manage risks of foreign interference and dual use concerns. Such actions include conducting university risk assessments, appointing a security manager and implementing specific guidelines within the funding organisation in question. Furthermore, a representative from a university support unit also specifically pointed out a current campaign from the Danish Security and Intelligence Service designed to caution against research espionage. This campaign, however, was noted by the participant as having the potential drawback of casting undue suspicion on existing university employees from countries such as China, Iran, and Russia.

Trust in science

On the topic of general perceptions of trust in science, participants continued to discuss openness and data sharing, focusing specifically on the effect of introducing the GDPR legislation in 2018. Despite examples of **GDPR** making data sharing more difficult, a representative from a university support unit also spoke to a positive shift in the discourse towards increased legitimacy internally among researchers – ensuring data are managed correctly - and externally - assuring the public that data security is in place in the case of research involving controversial technologies, for instance. Overall, participants expressed the view that there is a **high level of public trust in science in Denmark, which correlates with a general trust in key public institutions**. They acknowledged the presence and impact of several detrimental single cases but noted that such cases have not eroded a general trust in science. Instead, these cases typically prompt the establishment of new ‘supervisory bodies’ and policies to prevent future misconduct.

The view that there is generally a high level of trust in the Danish society does **not preclude mistrust or scepticism towards certain technological innovations**, for instance, in the fields of health and climate technologies. It is suggested that such mistrust might partly be driven by fear. As one participant mentioned, based on professional experience within the area of health – it is difficult to predict a correlation between negative reactions and specific groups or parts of society.

Research integrity

Addressing the aspect of trust in relation to research integrity, participants expressed that they generally find the **professional standards to be high** and that this is also to be expected from researchers, research performing institutions and funding organisations alike. One participant from a regional support unit noted that her expectations extend beyond mere compliance with the law – for instance the GDPR – to include aspects of conducting responsible research. This encompasses adhering to high standards of research ethics and integrity. Several participants noted that the establishment of social science ethical committees have come late compared to other countries but that they are necessary to comply with high and international standards. **The global nature of research and data sharing** have also increased the risks of misuse according to several participants. Barriers to sound RI research cultures include current systems of merit and incentives, including ‘pressure to publish’ and the extent of non-permanent positions. The participant from a funding agency explicitly mentioned the ‘Reforming Research Assessment’ initiative as a very positive trend towards more qualitative assessments which is regarded to influence positively on RI standards and trust in science as well.

Public participation in science

On the topic of citizen involvement, participants generally **recognize the benefits but have varying opinions on when and how to engage the public in research-related processes**. One participant - engaged within the area of health care – has noted an increased awareness of systematically engaging citizens, patients and next of kin. She is also the one most ‘on the champion side’ of public engagement, advocating for the numerous benefits of participation in enhancing the quality of research. Conversely, other participants pointed out that citizen science may be better suited for certain types of research than to others, such as those related to basic research.

3 Building trust in science: from perception to institutional engagement

The following sections present the main findings across the three Danish focus group discussions, detailing participant perceptions of trust in science, cultures of research integrity, and public engagement in science within institutional and national contexts.

3.1 About science and society

When reflecting upon the **complex relationship** between science and society, participants generally seemed to agree that science is **one of the most important institutions** in our society and serves as a foundation for continuous societal development. Furthermore, participants emphasised the importance of research engaging in dialogue with its surroundings and the greater societal context.

“Research should be relevant, and research should be accessible, and research is, after all, one of the most recognised ways to understand something. That is, presumably, the main argument for research to be of value to society; it is a recognised way to possess knowledge or to document knowledge. So, it is. It should be given that research must be something for society, and society should trust research to some extent” (P2, male, RPO, FG2).

In addition, one main theme emerged as a cross-cutting topic in the discussions of all three focus groups: **the relevance of science**. While participants agreed on the societal importance of science, their opinions varied on when and how science is relevant, reflecting a divide between fundamental/basic research and problem-oriented research.

Two participants, in particular, each from different research funding organisations, highlighted the importance of **research being ‘curiosity-driven**. They noted, in particular, that basic research might not set out to explore or solve any current societal issues but could end up ‘solving problems that do not exist’ (P1, female, RFO, FG1) or that are ‘not yet highly topical’ and that may lead to important discoveries (P2, female, RFO, FG3). The latter participant mentioned that, as a research funding agency, they still prioritize communicating the practical value of research. The first participant noted that, as a research organisation, they experience pressure on researchers to focus on the societal relevance of science. The **relevance of science in terms of impact and application** were evident in statements from a majority of participants. Overall, this stance can be summarised according to the following quotation:

“I know that I sometimes end up discussing things with basic researchers, but the idea that research should be used or created in relation with the surrounding society, or choosing one’s research questions because they are relevant for the society to explore, because it’s something we want to understand better, improve, develop, or whatever. And then afterwards – perhaps along the way – also collaborate with someone, and at least in the end, creating something with the goal of it going out to help develop our society and make it better” (P5, female, RPO, FG2).

The statements generally reflect a greater debate concerning strategic vs. ‘blue skies research’ as well as a current focus on societal challenges and the impact of science on society, not least promoted by the European Framework Programmes.

In response to the opening question regarding the relationship between science and society, the discussions closely intertwined with varying perceptions of trust in science. These perceptions are detailed in the following section.

3.2 Perceptions of trust in science

Participants across the focus groups generally agreed on a **high level of trust in science within the Danish society**. This consensus was supported by professional insights from trust surveys and general observations of supporting factors. These factors include significant public funding for research and innovation; the country’s small size, high status and social capital associated with research, a general pro-science stance among political parties, and an educational system that emphasises science. Several participants compared the level of trust with their own experiences from other countries, highlighting a close intertwinement of science and society in Denmark. Furthermore, participants seemed to agree that this high level in trust in science is correlated with a relatively high level of confidence in key Danish national institutions.

While participants generally put emphasis on the importance of a high level of trust, several participants also stated that **we as a society should not trust researchers and research blindly**.

“We do not have a trust issue with research in Denmark, that is, if you look at the actual situation (...). I think you should have trust in research, but I don’t know if you should have blind trust in researchers (...). You should trust what is being presented more than the one presenting it” (P3, male, RFO, FG 2).

Furthermore, disagreements are inherent in science, and participants expressed the view that research should be discussed and criticised – without necessarily reducing its trustworthiness. Additionally, researchers should be able to defend their findings in a transparent fashion.

“We talk about research and society, but perhaps it’s actually a somewhat oversimplified setup, because researchers do not agree, and there are really many disagreements among researchers. And how do we catalyse this disagreement out into society? Not us, but how is the population made to understand that research is not unreliable because researchers do not agree. Research is a process, it is a method, it is always two steps forward and one step back, different research designs will yield different results. It is the very essence of science to disagree with itself. Otherwise, we get nowhere.” (P1, female, RFO, FG 2).

This statement speaks to a broader theme of **contradictions vs. consensus in science** in relation to public understandings of science and their relation to fostering or reducing trust in science. This theme was primarily discussed from the perspective of researchers and their roles and responsibilities in term of fostering trust.

In this context, participants – primarily in the second group discussion – engaged in a nuanced debate on how researchers could contribute to decreasing trust by either offering personal assessments

rather than evidence-based recommendations in the media or being overly intransigent in focusing on precise measures and isolated facts, which creates barriers to broader scientific and societal debates (see section 2.2).

“I believe that the trust relationship between society and researchers is on a journey. And I think you have a point in saying ‘research has high credibility’, but I also believe that enough researchers have been questioned so that the media is not shy – and should not be – to question whether the research is good enough, for the individual researcher” (P7, female, RPO, FG 2).

While participants generally agreed to the fact that research should be questioned, they also pointed to an **increasing pressure on the legitimacy of both researchers and universities**. This pressure relates to a loss of pre-given authority and increasing demands to demonstrate and communicate ongoing relevance. In the discussions in focus group 1 and 2, participants highlighted the negative aspects of political pressure on the legitimacy of science, particularly in relation to certain areas of research within the humanities and social sciences. Although opinions varied on whether the politicization of research can be contributed to reduced trust in science among politicians, participants seemed to agree on the increased **politicization and ideological instrumentalization of science** by politicians. In this context, participants’ concern about potential manipulation of the public opinion reflects a more global trend of citizens worrying about the interference of governments in research (Gallup, 2019; Editorial, Nature, 2024).

Crisis of Trust?

While participants **could not recognise signs of a trust crisis in the Danish society**, they did identify **‘cracks’ in public trust** that may be exploited for manipulative purposes. They also noted that conditions for fostering distrust have improved. In relation to the political landscape, several participants highlighted the complex relationship between science and governance, particularly in terms of diverse use of evidence-based policy decision-making and the significant involvement of researchers in reform committees:

“(…) Politically, one relies on reform work that is actually done by researchers. So, sometimes research is given a lot of weight, and other times, we are kept at arm’s length, so that’s also an interesting dynamic with our decision-makers, one might say. But I believe that mistrust – at least has gotten better conditions than it has had before, and that is also part of the media conversation” (P7, female, RPO, FG 2).

Overall, participants across the three focus groups were of the perceptions that **single instances of detrimental research practices** might create ripples that may impact on reputations and trust to some extent. However, they believed these instances are not capable of overturning the ‘supertanker’ as a whole (see section 2.1.). The following quotation from a participant working in a research funding organisation, seems to capture the general perception of whether there is a crisis of trust in science:

“I experience it as somewhat isolated to individual cases or incidents that suddenly get a media run, more or less justified. But for some reason, my perception is certainly not that there is general mistrust, not at all, quite the contrary actually. But then there are those cases where it either becomes

a media issue, or where there's a really messy case. Which is truly bad, isn't it, and had long lasting implications (P2, female, RFO, FG3).

Relatedly, another participant in the same focus group highlighted a development in the factors potentially challenging trust in science:

"The worries have become different over the last 20-30 years because technology has changed so much, hasn't it? So maybe. I mean, I don't know, I am not sure if trust is challenged, but of course, there are different discussions, and that's true. I find that it's difficult for people to understand and get to grips with what it means when they share their data, what it means when something is anonymized or synchronized, right? And you can explain it as many times as you want, but it's just abstract" (P5, female, research support, FG3).

This perception is closely related to the issue of research integrity, as discussed in section 3.0, as well as it addresses public reactions to emerging technologies and scientific advancements.

Reactions to scientific advancements

While several participants mentioned varying levels of scepticism as a response to technological innovations, **none identified larger movements of opposition or mobilization against specific scientific advancement**. The case of Covid-19 is cited as an example that elicited diverse reactions in the Danish society. Across focus groups, participants also mentioned several technologies that may have sparked reactions of scepticism, for instance AI, healthcare algorithms, environmental issues, and healthcare robots. Participants did not attribute specific reactions of uncertainty, fear, or scepticism to particular groups. One participant has experienced that particular instances of mistrust, opposition or scepticism, for instance towards health care research and treatments, sometimes evolved from particular '**echo chambers**'. However, at the same time, the participant also noted the **difficulty of pinpointing certain groups or clear patterns** regarding different positionings among the public and that it – speaking from experience – it very challenging to predict specific responses to scientific advancements.

Another participant highlighted a similar observation:

"Sometimes I think, it can turn out that it's not necessarily those who are impacted by the research who are against it. In some cases, it can be surprising, for example, with health-care robots, it might not be the users or their relatives who are opposed, but rather someone far removed from ever needing any of this, who has some kind of resistance, right. So, it can be difficult to define. What exactly causes this resistance. What is it in the individual that stirs?" (P3, female, RPO, FG3).

3.3. Attitudes towards research integrity

Participants are engaged with the issue of research integrity through their professions and areas of expertise, demonstrating **high awareness and attentiveness towards identifying both enablers and barriers that support a research culture of integrity**, focusing on a range of topics related to research practices from data management, publication/communication and ethics structures. Based on the

focus group discussions, it seemed that participants perceived a general research culture characterised by a relatively high level of research integrity. Furthermore, they did not identify a widespread problematic culture marred by integrity breaches and detrimental research practices. They primarily talked about intentional **scientific misconduct cases as relatively rare**, with two participants explicitly noting that research integrity breaches and more questionable research practices (QRPs) often stem from a lack of awareness rather than intentional cheating. In relation to individual cases, participants across focus groups mentioned a number of detrimental research practice cases at different universities that have gained public attention. These examples were used to discuss current policies, practices, and issues of attention.

In general, participants highlighted the importance of fostering high standards of integrity practices to ensure high-quality research, transparency, credibility, and trust in science. The issue of **researcher independence** was also brought forward as a subject of importance. One participant working with research support spoke to the interrelationship between independence and credibility:

“But I mean - I also continue to think while we talk about - some of the things we have touched upon, the idea that - when I also - what's it called - listen to some researchers in the news or read some articles or watch a YouTube channel of a researcher. The importance of being able to trust what the person is saying is based on methods that are reliable. This is, well, a huge - what's it called - a huge counter to fake news, for example. The fact that I hear a researcher who is independent of politicians means a LOT to me and my impression of research. If I believe that someone is in the pockets of others, then that person loses their credibility. As long as I can believe that research is independent, then I can actually trust that - it's again a counterbalance against political currents and so on, but this places very large - what's it called - or high demands on research ethics, that it's in order” (P2, female, RPO, FG1).

In relation to a culture of research integrity, several participants mentioned a **shift towards open science** – including its principles of transparency, data sharing, fairness, and accessibility – as a positive development. The implementation and increased legitimacy associated with the EU general data protection regulation (GDPR) was also mentioned as a beneficial change, alongside the introduction of research ethics committees within the social sciences. While participants did not identify a general detrimental culture of research, they did identify a number of **barriers and factors posing challenges to research integrity**. Precarious employment in academia, a ‘pressure-to-publish’ mentality, a reproducibility crisis, lack of integrity training, gift authorships, insufficient time to open up and make data available, and potential conflicts of interests in term of private funding were some of the factors mentioned. Furthermore, challenges related to the current publication and peer-review system were also identified as problematic. Issues such as expensive publishing, a high number of article retractions, and the difficulties of finding qualified reviewers were mentioned as important concerns:

“But one of the threats to credibility and integrity, I believe it's not just AI - there's also a huge peer-review crisis, because so much research is being produced, and then this – excuse me – open access monster has been created. Everyone talked about this 'open access.' 'We just need open access,' and now it's just – if you ask, many researchers think it's a nightmare. Because there are far too many journals and far too lax control over data, with the presentations (...)”. Many of them [researchers] share this story. That they often say no to peer review or to reviewing, right? Because they don't get anything out of it. And the same happens when they themselves submit something, so it's extremely

difficult for journals to actually find reviewers. And this just means that much, or some, will more likely get through without the proper quality stamp and without the proper processing before being published. And I just think we've seen the beginning of this. It's going to become a bigger problem moving forward" (P1, female, RFO, FG2).

From various perspectives, participants pointed to **the global nature of research as a challenge and facilitator of research integrity**. As to the latter, one participant mentioned the fact that worldwide research into the same topics help ensure consensus and quality. Another highlighted the need to maintain a high degree of integrity to maintain a strong international reputation and attract international collaborators:

"... But as a university, one also has an interest in ensuring that the research that is published is also well-regarded, if one wants to collaborate with others, right? Because when we sit down and start up projects and want to find partners, there are some universities we rule out, right? There are some where we think, 'Ah, we could probably find something better,' right? And I mean this on a global scale. That there are differences, and we as a university would also like, when they look at us and say, 'We need to find a partner, well, we can confidently collaborate with university [name of own university], because we know everything is in order" (P3, female, RPO, FG3).

In relation to challenges, the global nature of research also poses risks in terms of what it being shared and published. As the same participants also noted in the interview:

But there's also a greater risk today because it's just much easier to suddenly publish to the whole world on the internet and everything, isn't it, in ways that perhaps weren't possible before (P3, female, RPO, FG3).

In the first focus group interview, participants particularly identified the global nature of science as a barrier to implementing research integrity procedures and policies at national and institutional levels. **International standards** were perceived as essential to support greater research integrity transformations. Various initiatives were provided as examples, with the Coalition for Advancing Research Assessment (CoARA) seen as an example of an exemplary international initiative capable of altering the current research integrity landscape.

"I think the publication or incentive structure in recent years has really had a huge influence on how research has been conducted and merited, and yes, it has been - what should I say - it has bitten its own tail, you could say. In several respects. (...) This thing about seeing very one-dimensionally what has been meritorious for the individual researcher in terms of funding, and also in terms of employment, how it has, well, yes. So, I think this confrontation with it, which also has - really received a huge amount of support. I mean, it has really come at the right time. There have been some attempts at it earlier, but which haven't really received the support that it suddenly has now. I think that's mega positive. So, it's something we are working on, among other things. I believe a majority of all Danish universities have joined in as well and several of the private foundations" (P2, female, RFO, FG3).

In addition, the research participant highlighted likely and associated impacts of the initiative in terms of greater transparency, increased trust, and enhanced quality and research integrity.

3.4. Attitudes towards social integration

Participants across the three focus groups are involved in public engagement in science and technology to varying degrees. As specified in the method section (please see section 1.1.), the issue of social integration in science was addressed in the focus groups as ‘citizen involvement in science and technology’ as this terminology better aligns with the Danish conceptualisation of the term. Public involvement in science was framed as citizen-science interrelations, emphasising two-way dialogue and interaction over more traditional one-way science communication formats, reflecting the movement ‘from communication to deliberation’ or ‘from understanding to engagement’ (Burgess, 2014; Stilgoe, Lock, and Wilsdon, 2014). A few participants were actively engaged in projects applying participatory methods, whereas others were more indirectly involved through different research support functions (see section 1.2). Several participants, particular in the second focus group, worked with science communication in relation to research performing organisations.

Participants commonly perceived a **growing number of initiatives being launched** to support the involvement of citizens into scientific knowledge production processes. This trend was observable both in universities, at large, and within individually funded research projects. Beyond traditional science communication formats, several participants referred to the use of participatory formats within their own organisations. These approaches include citizen science apps and initiatives, public consultations, user involvement in technological service innovations, and dialogue formats that emphasise deliberation and co-production of knowledge.

Citizens were seen as willing to participate in science dissemination events and lectures, and while it was acknowledged that it may primarily involve **specific segments of society**, it was emphasised that it indicates an interest in science and a general trust in scientific endeavours. At the same time, it was also mentioned by two participants that citizens are more likely to support research and researchers if they agree with the findings.

While participants generally agreed on the benefits of citizen involvement in research, it was evident that **those directly engaged in citizen science and public engagement generally held a more favourable view of the advantages**. For instance, they highlighted the educational potential of sparking an interest in science from a young age, improving data and research outcomes, and enhancing trust in science, at large:

“How do we ensure an informed basis for a qualified conversation, which also to a large degree involves mutual listening, and that the research becomes proficient at listening to those whom it also tries to communicate the research. So, I believe. At least, that’s the starting point I come from, that trust often arises in the dialogue between researchers and citizens” (P4, female, private org., FG2).

“When you have citizens in the room, who are the ones to receive the service we actually produce, then you also make an extra effort. And I’m not saying that people don’t make an effort already, but perhaps you make just a BIT more of an effort, and you’re also more rigorously tested on whether you can defend and explain all parts of it” (P5, female, RPO, FG3).

“When you mentioned that thing about ‘why are we actually doing this’. Well, it might be to get more funding, and we see that too. In my unit, we support researchers in writing good applications. And one of the mantras – there can be many good mantras from Brussels – and a less good one, is that

about citizen involvement. Apparently, it's – what's it called – the key to everything, that research improves by involving citizens. Where we sometimes struggle to convince these peer-reviewers that it doesn't really make much sense to involve citizens in this particular type of project, because what are those poor citizens supposed to think? On the other hand, citizen involvement is insanely good where it's about uncovering bias, uncovering researchers' biases, bringing some diversity and variety into this, making researchers say 'okay, I have some assumptions and hypotheses, but how do other people actually see this, and people who aren't so steeped in this research world, how do they perceive things and so on and so forth'. So for me, I see citizen involvement very much as something that can improve research. Create more trust." (P2, female, RPO, FG1).

The latter quotation in the textbox above also underscores that **citizen involvement are not equally relevant across all research projects** and cannot be seen as a universal solution for enhancing research quality. While participants may concur that some research projects – or specific aspects of research processes - could benefit more from public engagement than others, they offer diverse viewpoints on how and when to include citizens. Two participants pointed out that allowing citizens to influence the funding prioritization of research projects might be driven more by personal interests than by data. Conversely, two other participants noted concrete initiatives at a university and a funding organisation, where citizens have actively participated in the prioritization of research funding. Some participants also mentioned that very abstract research projects within basic research, such as research in 'nanotechnology' or 'dark matter', may not be as suited for citizen research compared to practice-oriented research.

On the issue on whether citizen involvement can positively impact the dissemination of scientific knowledge, two participants explicitly stated that science communication efforts have the potential to reach a broader public audience, whereas public engagement activities primarily address a smaller sample within the public population. In this context, it was also mentioned that implementing public engagement initiatives are often cost- intensive in terms of time, money, and personnel, which may limit the actual deployment of such engagement initiatives.

3.5. Institutional contributions to trust in science

While several participants highlighted the need for international standards and initiatives, many also mentioned institutional efforts initiated to promote research integrity such as increased research support throughout the entire research process, encompassing assistance with research dissemination, external collaborations, and data management, for example. In this context, it was also noted that negative cases frequently prompt institutional self-examination and lead to increased efforts to up-date or employ new policies and measures. While not posed as a direct recommendation, one participant from a university explicitly emphasized the **difficulty of translating from policy to practice**, stressing that it is challenging to assess best practices and compare efforts.

In general, the discussions on promoting professional standards of integrity indicate an attention towards collective actions and a shared research culture of integrity, reflecting a shift within research communities from individual to collective actions (Mejlgaard et al. 2020).

Participants from research funding organisations generally expressed an adherence to the Code of Conduct for Research Integrity and emphasised their **reliance on research integrity policies and procedures at research performing organisations**. Several also explicitly mentioned an attention towards research integrity issues during research application evaluation processes, for instance, and while research funding agencies rely on university procedures. While research funding organisations depend on university procedures, two participants mentioned that topics of research integrity can be further addressed through courses or workshops, for example.

Given the significant variation in types of research projects, one participant from a funding organisation pointed to the difficulty of implementing uniform assessment criteria for citizen involvement in science at funding organisations.

Overall, participants highlighted an increased awareness and diversity of initiatives for public engagement in science, which could positively impact on social integration in science. However, the discussions on initiatives to promote public engagement in science were generally less extensive than those on actions to enhance research integrity at organisational levels. One participant suggested a need for **more systematics approaches to how and when citizens are involved in science**, noting that it currently appears to depend largely on individual and project-level efforts. Additionally, two other participants recommended greater **transparency in the supply of existing initiatives and options for involvement**. A fourth participant further emphasised the recommendation to create **organisational infrastructures and incentive structures** that enhance both research integrity efforts and public participation in research. The implementation of citizen councils was cited as one example of how to increase citizen engagement.

“One can do that by creating incentives in their organization, or by developing some infrastructure, right? I mean, I think [name of own organisation] is an example of wanting to create an infrastructure that provided secure frameworks for how to support research projects, and as a research leader, you could feel reasonably safe, right? And so on, right? So, one can do a lot at the organizational level, in addition to cultural work and value work, and so forth, right? And those frameworks can also be created in relation to citizen involvement if one wanted to do so”. (P5, female, RPO, FG3)

Similar to recommendations to support research integrity actions, participants highlighted systematic efforts at both macro and meso levels in order to improve citizen inclusion in science.

4. Conclusion

Across three focus group interviews, 18 professional stakeholders working in areas of research support, public engagement with science, research evaluation, research funding, science communication and open science discussed the current state of trust in science in relation to research integrity and citizen involvement within institutional and national contexts.

Overall, participants highlighted a complex relationship between science and society, emphasizing, among other things, a rising pressure on the legitimacy of both research performing organisations (RPOs) and researchers. While noting a general high level of trust in Denmark, and without identifying

a distinct crisis of trust, several participants mentioned the emergence of ‘cracks’ in public trust, which they viewed as negatively influencing an increased politicization and ideological instrumentalization of science. Participants did not recognize any large movements of opposition or mobilization against specific scientific advancement but identified examples of mistrust and skepticism towards certain technological innovations.

Participants regarded research as one of the most important societal institutions, agreeing that research should help develop societies and be relevant for the greater public good. Different opinions were brought forward regarding the relevance of science, reflecting a division between fundamental/basic research and problem-oriented research.

Responsible research was perceived as a means to increase trust in research, with professional standards related to research integrity generally considered high. Based on the discussions, the global nature of research was found to offer both enablers and barriers to promoting a culture of research integrity. Participants recommended shared research integrity standards across institutions and countries and highlighted a set of principles and practices conducive to research integrity.

Participants generally supported the idea of citizen involvement in science and noted the potential of dialogue-based approaches to improve public trust in science. While taking a positive stance towards the advantages of citizen involvement in science, opinions varied on when and how to engage citizens, with several noting that not all research projects are equally conducive to such involvement. Participants identified a heightened awareness to engaging the public in research, particularly at research performing institutions. Some participants recommended more systematic approaches at national and institutional levels to increase participation and enhance transparency in the availability of existing engagement initiatives.

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