



poiesis
TRUST IN SCIENCE

D2.1: Protocol for the empirical case studies

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ABSTRACT:	This deliverable describes the research design, structure and organisation, sampling and recruitment strategies for the three empirical studies of the POIESIS project.
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1 Introduction

1.1 About WP2

Societal trust in science is presumed to relate to research integrity practices, yet there is little evidence for it. For example, we do not know whether scientists' integrity practices (or lack thereof) will lead to trust/mistrust in science, whether citizens' involvement in research will impact public trust in science, or whether and how chains of mediation of scientific information will lead to public trust/mistrust in science and scientists.

The overarching goal of POIESIS is to systematically develop a knowledge base about trust in science and examine how, and to what extent, societal trust in science is affected by the aligning of research practices with principles of research integrity and by the participation of citizens and stakeholders in research. This will be carried out through five Work Packages (WPs).

WP2 (jointly with WP3) is designed to **empirically** enhance knowledge of how public trust in science is affected by aspects of research integrity. WP2 is the most comprehensive in terms of empirical data collection, with an important focus on country comparison. The WP will be carried out throughout the whole course of the project. All partners will contribute to the development of the tasks and be responsible for implementing the empirical studies in their countries.

WP2 will specifically address the following **research questions**:

RQ1: 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?

RQ2: To what extent and how does the integration of citizens and societal stakeholders in research practices (or, conversely, lack of co-creation and open science practices) impact public trust in science?

These main research questions will be addressed in WP2 through answering the following sub-questions:

- How does information about (ir)responsible research practices reach the wider publics, which actors play a role in this, and how does it affect the publics' trust in science, i. e., how are 'chains of mediation' organised and how do they impact levels of public trust?
- What kinds of manifestations of integrity and integration in the research cycle are likely to affect levels of public trust in science, and how?

These sub questions will be explored through the collection of primary data in the portfolio of empirical studies (as described below), but also in WP3

(as described in Deliverable 3.1 “Protocol for the participatory research actions”). Both WPs will in turn be informed by WP1 (as described in Deliverable 1.1. “Protocol for stock-talking and synthesis”), which will scope and synthesize the existing evidence on public trust, research integrity and integration, major public scandals, and provide country reports on these issues that will be used as conceptual inputs to inform the development of the materials for the case studies described in this deliverable.

1.1.1. Goal of WP2

The overall goal of WP2 is to conduct **three sets of empirical studies** to examine how practices of integrity and integration affect public trust in science with a focus on the *chains of mediation*. The empirical studies will be on two topical areas - the Covid-19 pandemic and the science related to climate change, and each will be coordinated by a POIESIS partner as follows:

- (1) Public deliberation workshops (coordinated by ISCTE)
- (2) Expert interviews (coordinated by CSIC)
- (3) A survey experiment (coordinated by AU)

The empirical studies will examine the actors that play an important role in the *chains of mediation* that connect research practices with the reception of scientific information by citizens, including ‘mediating actors’ and ‘researchers’. These ‘**mediating actors**’ include stakeholders such as science journalists, science writers, or science communicators, who have a crucial role in choosing the channels and messages to reach publics, communicating scientific research, promoting research practices, and mobilizing citizens to participate in scientific processes and discussions that affect them. By ‘**researchers**’ we mean individuals as well as open science communities, as key producers of scientific information but also communicators. The ‘**general public**’ concerns individuals, representatives of citizen science associations, civil society organizations and NGOs, minority groups, user communities, citizens as the key end-users affected by research and innovation outputs.

1.2. About this deliverable

This deliverable/protocol focuses particularly on research design, structure and organisation as well as sampling and recruitment strategies employed for the three case studies at hand. In addition, it outlines the data collection, strategies for analysis and ethical considerations related to the empirical activities, and responsibilities of partners in this.

2 Public deliberation workshops

The following sections describe the elements of the public deliberation workshops and our design and approach to conducting the public deliberation workshops. This task will be coordinated by ISCTE.

2.1 Exploring attitudes through public deliberation workshops

There are a number of public engagement mechanisms that allow for participation and involvement of citizens in discussions about science and decision-making processes (e.g. Rowe and Frewer, 2000). These mechanisms have become even more numerous over the last years to allow for public discussions about issues that affect them, with a heightened focus on deliberation (Smith, 2005, Entradas, 2016). The engagement mechanisms have also evolved to include co-creation and co-production practices (Owen et al., 2021). Despite some lack of clarity in the use of terms – public deliberative workshops are sometimes also referred to as dialogue events/workshops or deliberative policy workshops (Rowe and Frewer, 2000) – they all share an emphasis on eliciting dialogue which provides citizens an opportunity to discuss and evaluate alternatives, as well as judge and contribute to discussions of science that affect their lives. It is assumed that dialogue can lead to better science and policy, and it helps to underpin social relevance of funded research.

As such, public deliberation is a method that allows for citizens to deliberate about an issue that matters to them, to have a better understanding of their most important points and concerns, and to determine which issues they associate with what they consider most important. Many research developments are potentially disruptive technologies and bring into question research integrity issues, which might affect opinions and trust in science and scientists' work. See for example the race for COVID-19 vaccines and people's hesitation to receiving the vaccine (e. g., Tram et al., 2021) or the 'net zero' and carbon removal (lack of) discussion about what the narrative actually means and what is or is not encapsulated in it (Frankhauser et al., 2022). It is then important that the views and concerns of society are understood as those technologies develop.

For the purposes of the POIESIS project, 'public deliberation workshops' are used as the generic term encompassing democratic practices sharing these features. It is distinguished from other forms of deliberation events, by the fact that we are not collecting opinions for policy-making processes or decisions, but rather to allow for equal and inclusive participation (Weeks, 2002). The primary aim of the deliberative workshops is then to elicit a diverse set of attitudes and perspectives where citizens can simply share their opinions and not to reach a consensus or fixed decisions.

2.2. Aims and objectives

The public deliberative workshops will aim to explore public trust in science and whether and how it is affected by research integrity values and societal integration in science. These aims can be translated into the following questions that will guide the workshops:

- what are participants' attitudes, awareness, and knowledge about research integrity practices?
- What are participants' main concerns, hopes and expectations concerning research integrity?
- Do these affect public trust in science?
- What communication channels do people use and trust to get scientific information?
- What manifestations of integrity and integration in research affect public trust in science, and how?

Specifically, the data from the workshops will allow us to investigate:

- public attitudes, awareness, knowledge about research integrity practices
- public concerns, hopes and expectations towards research integrity practices
- whether attitudes and concerns about a lack of scientific integrity and societal integration affect public trust
- how people choose media and messages concerning aspects related to science and technology
- how people use and see traditional and new media as means of scientific authority
- desirable ways to integrate citizens and other stakeholders in the research process.

2.3 Format and setting

Seven public deliberative workshops with 40 participants in each will be carried out in the POIESIS consortium member countries. Each partner will organise its own event following the guidelines presented here. The events will take place in Denmark, France, Germany, Greece, Portugal, Spain, and the United Kingdom and will involve a total number of **280 participants**.

The seven public deliberative events will take place as a **four-hour event** in a centrally located conference facility. The day of the week and timing should be chosen by each partner according to what would work best in their context. Box 1 is a tentative agenda, which can be adjusted by partners. The workshops will include a coffee break half-way through the event. Participants will be asked to arrive half an hour before the event to allow time for setting in. A professional facilitator will assist with conducting the workshops. The POIESIS project researchers and their teams will be present at the events to assist with group facilitation and discussions.

Box 1: Suggested agenda

1.30 pm: Arrival of participants

2.00 pm: Introduction by facilitator (purpose, domestic issues and timetable). Short questionnaire to survey attitudes

2.00-3.00 pm: Presentation by 'topical' experts sand Q&A session

3.00-4.30 pm: Small group discussions

4.30-5.00 pm: Coffee Break

5.00-6.00 pm: Plenary session. Short questionnaire to survey changes in attitudes

6.00-7.00 pm: Drink reception and departure

2.3.1. Before the workshops

Participants will be sent a small **information kit** one-week prior to the event. The information kit will be developed from evidence collected in WP1 and will consist of a shared set of material to be used in all countries, though translated into local languages. This will include short summaries on public (mis)trust in science-related issue, and might also consider country-specific information The information to be included in the toolkit will be finally developed upon the completion of WP1' products.

2.3.2. During the workshops

Four groups of about ten participants will be organised. The participants will be randomly assigned, keeping gender balance, age, and background, to one of the groups and will engage with one of the topical cases, i.e. Covid 19 or climate science. During the event, participants will engage in individual reflections and small group discussions with the supporting stimuli material.

During these discussions, groups are confronted with issues of scientific integrity, including for example, misconduct, QRP, or adherence to scientific norms, and issues of integration and public participation in research and open science practices related to the topical case under discussion.

While discussions will unfold differently depending on the stimuli and the topical case, all groups are expected to discuss and respond to the ways

that different research practices are conveyed and mediated, and share the main ideas discussed during plenary parts of the workshops.

The workshops will include a small **questionnaire at the start and at the end** to survey attitudes, and changes in attitudes, towards research integrity issues and societal integration in science.

2.3.3. Stimuli materials for the workshops

The materials that will be used for the events will be informed by the results of WP1, targeting specifically relevant aspects of integrity, integration and trust identified in the existing data streams, particularly connecting Covid-19 related research and climate change science with levels of public trust in science, as well as other materials such as national cases related to research misconduct practices. The stimuli materials for the discussions can vary among groups to allow for broader discussions and more points of view to emerge. Also, the same stimuli materials will be used in the different countries, yet, some local adaptations might be considered, if needed. The materials will be prepared and discussed by all partners, assembled by ISCTE and reviewed by all.

2.4 A three-phase event

We envisage a three-phase event with an initial debate/Q&A session, small group discussions, and a plenary session to explore opinions and attitudes towards research integrity. The specific topics to be discussed will only be clear with outcomes of the deliverable D1.2, yet we anticipate exploring for instance, different dimensions of trust (e.g. scientists vs institutions vs media vs disciplines, etc.) and understand how these relate to public trust.

First phase – Initial debate/Q&A session

At the start, all participants will listen to one expert talk by a 'topical' researcher working on one the topical areas of POIESIS, Covid-19 or climate change (approx. 15 minutes). In this plenum talk, the topical researcher will expose his/her ideas and experiences on communicating responsibly about scientific information in his/her specific topic to initiate the round of discussions. Despite different groups will discuss different topical areas, this initial talk will provide participants with concepts on research integrity and societal integration which will be needed to inform the following discussions.

The talk will be followed by a Q&A session with the same topical researcher, and each group will write views/questions they want to provide to the facilitator on the issues they considered most important. The facilitator will then read the questions loud and put them up on the wall; these

issues/questions will then be brought to the overall discussion during the plenary session. This phase is planned to take around 60 minutes.

Second phase - Small group discussions

After the initial debate, still in their groups, participants will be presented with examples of real cases of scientific controversies and/or scandals that involve misconduct (fabrication, falsification or plagiarism) and QRPs to allow for confrontation of integrity values and integration issues as discussed in the initial debate. This second phase will follow a discussion format where participants after reading the specific cases presented to them, will discuss among themselves their main impressions about the cases they were confronted with. The new questions/issues emerging from these small discussions will be written up by participants on flip chart paper or post-it notes. POIESIS researchers - one per table - will also act as a note taker creating a more detailed record of what participants discussed; these notes should then be checked with the groups and give participants the opportunity to put things into their own words. The ideas will then be put up on the wall for the final phase of the deliberation. The 'small groups discussions' will also be recorded in the four groups for posterior analysis. The second phase will take around 90 minutes, followed by a coffee break.

Third phase - plenary discussion

This phase will feed back information from the group discussions into the plenum session. This is also intended to be a reflecting period where participants review the main issues discussed, whether their most important questions and/or concerns have been discussed, and whether there have been changes in the way they see and think about research integrity and societal integration and about the role of the chains of mediation as sources of scientific information. The main point of this final session deals with participants recognising and prioritising which issues are most important to them about the topics at stake. Each group will nominate a spokesperson to make a summary of the group discussion and priority questions identified. Then, the facilitator will bring these points and any questions put on the wall from the previous sessions that have not been reported by the groups, and summarize the main points brought up by participants. Participants will then fill in a second short questionnaire to ascertain whether changes in attitudes towards research integrity and societal integration have occurred and trust in science has changed. At the end, the facilitator will bring some reflective concluding remarks.

The plenary discussion will run for about one hour. After the event, all participants will enjoy a drinks reception before they depart from the venue.

Box 2 provides some notes on practicalities of the workshops, mainly for project researchers helping to facilitate the discussions.

Box 2. Note on practicalities of the workshops

- The workshops will include a short introduction by the facilitator who will introduce him/herself and anyone involved in facilitating the event; cover domestic issues (emergency exits, toilets...); and present the timetable for the event to help orientate the participants.
- In the introduction it will also be briefly explained what the purpose of the workshop is and how it will take place throughout the afternoon, what is expected from participants and the dialogue discussions, and how participants will work in groups. It should also be explained to the participants that all collected views, opinions and concerns of participants will be anonymized.
- The facilitator and the project researcher at each table will make sure that the participants are clear about both the overall process they are involved in and the specific tasks they are being asked to undertake. The facilitator should indicate how long each exercise is intended to last, indicate how the time is passing, and give clear indications to participants about what needs to be done.
- After any explanation or instructions, it is important to check that participants understand instructions and tasks by asking 'are there any questions?'. However, this does not guarantee that participants will ask for clarification, and it is therefore good practice to visit each group, once a task has begun, to check that they are 'OK with what they are doing'.

2.5 Sampling and recruitment of participants for the deliberative workshops

2.5.1 Sampling strategy

We aim for exploring diverse opinions and attitudes and how they change when aspects of integrity and societal integration in research are brought in. Our focus is on representatives of different groups of the 'general public' as the relevant actors for the deliberation. As such, we cover a broad variety of participants to allow for representing voices from those different social groups that are affected, informed about, or interested in the topical areas. This includes representatives of citizen science associations, civil society organisations and NGOs, minority groups, user communities, and citizens as the key end-users affected by research and innovation outputs. We will also consider socio-demographic characteristics

including gender, age, and educational background, and have a view to including minorities and under-represented voices in science.

For this purpose, we will use a *purposeful sample design* as selection criteria for the participants with the aim of securing some variation and representation of diverse scientific and societal stakeholders and groups of citizens. Purposive sampling refers to selecting people according to some pre-specified criteria, such that the researcher has some reason for including someone in the sample (Rubin, 2022). In our case, as stated above, we will consider balance in some socio-demographic criteria and representation of voices from different groups.

This sampling strategy allows for addressing the POIESIS objective of identifying views, opinions, and concerns about science and research integrity from a range of attitudinal groups, and how in turn this affects public trust in science.

Public participants are not required to have a predetermined level of knowledge about the topics of discussion. For the purpose of exploring a range of attitudes on research integrity and trust, a diversity of personal and non-personal experiences and levels of familiarity with science and the topics at stake are seen as valuable for exploring perceptions, hopes and concerns.

2.5.2. Recruitment strategy

The participants will be recruited through promotion and advertisement of the events. The events will be advertised through existing networks, a diverse set of media outlets, such as Facebook groups, Twitter, LinkedIn networks, as well as through student organisations, minority organisations etc. For the recruitment of topical researchers, the only criteria are that he/she works in one of the topical areas and has some experience with communicating this topic in relation to research integrity or societal integration. Also, given the small number of these actors in the events, the invitation to participate should be done by means of personal contact by the national teams, and researchers could be selected from personal contacts if partners have them. The recruitment strategy is a parallel task and will be described in detail in D.4.1. "Recruitment and engagement strategy" which will be designed by the Permanent Recruitment and Engagement Working Group (PREWG) established for this purpose and delivered in M4.

2.6 Data Analysis

All discussions in the public deliberation events will be recorded through different materials to capture the main points of the discussions. The analysis will then take into consideration the participants' and POIESIS researchers' notes on the flip chart and post-it notes, and the audio-records of the 'small group discussions'. The audio records will be transcribed and translated into English by the national teams. Translation will be assisted by translation software and checked by the responsible

researcher for errors/sense. The translation into English will allow for country comparison, which is one of the goals of the POIESIS project. Data coding will be done by each partner and reported in the form of short reports summarising main ideas from the discussions on how participants get information about (ir)responsible research and how that influences public trust in science.

Concerning the coding strategy, there will be a common coding provided by the coordinator of the deliberative events. This will be based on thematic analysis for themes to emerge. With this coding, each partner will then conduct the analysis of their national data - this involves coding text with the coding provided - and write a detailed report on the main findings. The qualitative analysis should allow for other themes to emerge as there might be specificities of national contexts. This will allow for understanding what aspects of integrity and integration participants talked about more frequently or in depth, and the ways those aspects connect to their trust in science, which may require a deeper, latent analysis.

National codes will be discussed among the team to look for similarities/differences, and defining, if possible, a common coding, i.e., a hierarchical structure of code into themes and subthemes, that is informed by the research questions, and that can then be used also for comparative analysis.

In addition, the national report stories will be complemented by the analysis of other materials from the event including the results of the short survey questionnaires filled by participants before and after the events, and any other materials such as for example, the questions summarised by participants (put up on the walls). The summaries of the national conversations will be reported in D.2.2 Results from public deliberation (M14).

Importantly, the results from the deliberative workshops will be brought to the expert interviews which will take place after the public deliberation workshops, and a report of results will also be sent to all participants.

2.7 Ethical considerations

We do not expect any potentially critical ethical implications of the research results with regard to human dignity and integrity, or privacy of the participants.

2.7.1 Ethical approval

An ethics approval will be obtained by the Research Ethics Committee at ISCTE prior to conducting the deliberative workshops.

2.7.2 Risk and inconveniences

There is a small risk of discovering sensitive information related to institutional handling and management of particular ethical matters

concerning the POIESIS topical areas – Covid-19 and climate change. In the consent form, participants will agree to maintain the confidentiality of the information discussed by signing the consent form.

2.7.3 Informed consent

The informed consent form follows the guidelines of ISCTE (as the main coordinator of the deliberation events), where it is clearly stated that the participants give their consent to participate by signing the form. Prior to the workshops, participants will receive an invitation and information letter detailing the objectives of the project and information regarding methodologies, voluntariness, processing of personal data etc. Participants will also receive a link to ISCTE's privacy policy.

2.8 Remuneration and/or other study participant compensation

The participants will be reimbursed for any travel costs associated with taking part in the deliberative workshops. All workshop expenses, including catering etc. will be covered by the project. The coffee break includes coffee, fruit and cake, and the drink reception will include some refreshments. Participants will receive a small gift as a thank you for their participation.

2.9. Division of responsibilities of the national partners

ISCTE as the responsible partner for the deliberative workshops will coordinate with the other POIESIS partners to deliver the events in M12. Box 3 shows the materials needed for this empirical case study and the POIESIS partners responsible for providing it.

Box 3: Information to be provided to partners

1. **Protocol for the empirical studies (ISCTE)**
 - a. Step-by-step guide for the events
2. **Stimuli materials to use in the deliberations (All partners)**
 - a. survey questionnaires
 - b. stimuli materials and activities/case studies
3. **Recruitment strategy (NTUA) (M4)**
4. **Information kit for participants (ISCTE)**
 - a. Information letter to participants in the deliberative workshops
 - b. Personal data processing policies
 - c. Consent form

All documents are written in English, and documents for participants will be translated into Danish, French, German, Greek, Portuguese, and Spanish by the local project partners.

3 Expert interviews

The following section describes the process for conducting the expert interviews and the recruitment strategy. This task will be coordinated by partner CSIC.

A total of **112 interviews** with experts will be conducted in the seven countries. This corresponds to **sixteen interviews per country**.

Each project partner will conduct its own interviews following the guidelines presented here and an interview guide prepared for the purpose. The interviews will take place in Denmark, France, Germany, Greece, Portugal, Spain, and the United Kingdom, and will involve a total of 112 experts. These are researchers and mediators that have been actively involved in studying and communicating about the content of our topical areas and who could talk about how they take public trust in science into account when conducting their work, experiences they have with their work leading to public (dis)trust, and whether and how they try to promote public trust through their work. These experts could also include, some visible and influential actors in the debate on Covid-19 and climate change, in the national context or even international in cases where national experts are not available, to explore those and other potential issues related to research integrity and/or societal integration.

3.1 Aims and objectives

Expert interviews will be conducted after the deliberative workshops with a sample of mediators and researchers who have expert knowledge about or significant experience in relation to the communication of scientific practices in the two topical areas. The main goal of these interviews will be to examine deeper the views of those who engage in such communication on how responsible research practices can be communicated and how that might affect public trust in science. Importantly, we will bring the results of the public deliberations, together with the outputs of the analyses in WP1, to the attention of interviewees to confront them with public views.

The interviews will contribute to addressing one of POIESIS' main questions:

- Which mechanisms connecting (ir)responsible research practices and levels of public trust in science are identified by experts?

The interviews will be carried out as **semi-structured interviews** to allow for flexibility while exploring the topics. The goal is to understand attitudes of experts and mediators concerning integrity in research, and their practices, as well as the meaning they attribute to such practices (Ghiglione and Matalon, 1992).

In particular, the interviews will seek to understand, among other things, experts' views on the mechanisms that connect research practices and levels of public trust in science, and their perceptions of the role of the chains

of mediation in building public trust/distrust in science and how that affects the way publics relate/want to relate to science.

3.2 Format

Per country, **three interviews** with researchers and **five interviews** with a sample of mediators working on each of the POIESIS-related topics (Covid-19 and climate change) will be conducted. Interviews will be one-to-one (online or face-to-face interviews) and last between 30 and 60 minutes. All interviews will be conducted in the mother language of the interviewee, transcribed and translated into English by the national teams to allow for country comparison.

3.3 Interview guide

An interview guide will be developed by CSIC and provided to all partners. The exact questions to explore will emerge from discussions between POIESIS partners and outcomes from WP1 and WP2. The final guide will be translated into national languages by each partner.

3.4 Sampling and recruitment of experts

A purposeful sampling design will be applied, as the aim is to identify and select experts who “are especially knowledgeable about or experienced with a phenomenon of interest” in a way that yields in-depth understandings, while securing and maximising validity and efficiency (Palinkas et. al. 2015).

As described above, mediating actors include science journalists, science writers, science communicators, and researchers are individuals and open science communities, as key producers of scientific information but also communicators.

Both the researchers and the mediators will be recruited from the wide established networks of the national partners’ institutions, as well as other relevant networks (e.g. Horizon Magazine, EPTA, Global TA, Digital Europe, etc). This recruitment strategy will be supported by the POIESIS group PREWG and described in detail in D.4.1 “Recruitment and engagement strategy”.

3.5 Data analysis

The interviews will be audio-recorded, transcribed, and translated into English by the national teams to allow for comparison of

differences/similarities between countries. Translation might be assisted by translation software and checked by the responsible researcher for errors/sense. Data coding will be done using MXQDA or NVivo software. The sixteen national interviews will be analyzed by each partner following a thematic analysis approach. The goal is to identify patterns, themes and sub-themes that emerge from scientists and mediators' conversations about public trust. Each partner will then produce a short report summarising the main findings. The whole corpus will then serve for comparative analysis across the involved countries, coordinated by CSIC under D.2.3 "Results from expert interviews".

3.6 Ethical considerations

We do not expect any potentially critical ethical implications of the research results with regard to human dignity and integrity, or privacy of persons. Participants are recruited based on their professional merits and positions and there are no foreseen high risks involved in the recruitment of professional stakeholders for this particular study.

3.6.1 Ethical approval

An ethics approval for the study will be obtained from the Research Ethics Committee at ISCTE in due course.

3.6.2 Risk and inconveniences

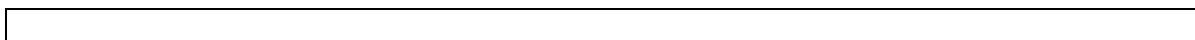
There is a small risk of discovering sensitive information related to institutional handling and management of particular ethical matters concerning the POIESIS topical areas - Covid-19 and climate change.

3.6.3 Informed consent

The informed consent form follows the guidelines of CSIC (as the main coordinator of this empirical study), where is clearly stated that the participants give their consent to participate by signing the form.

3.7 Division of responsibilities of the national partners

CSIC as the responsible partner for the expert interviews will coordinate with the other POIESIS partners to carry out the interviews in M22. Box 4 shows the information to be provided to partners.



Box 4: Information to be provided to partners

1. Protocol for the interviews (developed by ISCTE as part of this delivery D2.1)
2. Interview guide for semi-structured interviews (CSIC)
3. Recruitment strategy (NTUA) (M4)
4. Information for interviewees (CSIC)
 - a. Information letter to participants in the interviews
 - b. Personal data processing policies
 - c. Consent form

All documents are written in English, and documents for participants will be translated into Danish, French, German, Greek, Portuguese, and Spanish by the local project partners.

4 Survey experiment

The survey experiment sets out to test the causal effect of institutional efforts towards integration and integrity on public trust in science. This builds on previous insights from prior elements of WP1 and WP2 as well as knowledge on research integrity and outreach from prior research. The aim is to clearly assess to which degree such efforts affect public opinion, and how they might interact in shaping public trust in science.

This study, headed by Aarhus University, will address whether members of the general public exhibit greater levels of trust in science when primed with information on integrity and integration in science. This will emulate real world outreach from institutions (or through the chains of mediation), to investigate whether such outreach has the potential to improve public trust in science, and to which degree.

Prior studies have investigated the assumption that research integrity matters for public opinion of science (e.g., Anvari & Lakens, 2018; Critchley et al., 2015; Fernandez, 2020; Hendriks et al., 2020). However, studies are primarily done among students, have small samples, and the treatments are seldom based on how members of the public and the institutions of science interact. This study attempts to remedy these issues, by having a larger non-student sample, and directly modelling treatment on actual practice.

4.1 Methods and implementation

Survey experiments employ the experimental method, which eliminates the influence of unobserved confounders by randomly assigning participants to treatment groups (e.g., high or low integrity). In survey experiments, participants are randomly assigned to one of two or more conditions. This eliminates issues of self-selection on the independent variable, and the groups will then be functionally equivalent on their (unobserved) background variables (Gaines et al., 2007). By employing this method, we will be able to assess the causal effect of our main independent variables (research integrity, public integration) on individual levels of trust in science.

The treatments will take the form of within-survey vignettes, which provide participants with a piece of text, which includes information on research integrity and/or public integration in science. The vignettes will vary information on the two dimensions integrity and inclusion. The resulting design will be a 3 by 3 experimental design, combining both dimensions (high / low / neutral) per each vignette. The exact character of the vignettes will depend on findings from prior steps of the work package and input from work package 1. In particular, findings from the deliberation workshops will inform vignettes with regard to relevant integrity and integration aspects, as well as ways in which publics interact with science. The latter will allow vignettes to model real-world interactions between the target audience and research institutions. If the most common platform of engagement among citizens is social media, for example, the treatment will attempt to emulate this. Moreover, reference to either of the two cases (climate or covid 19) will be based on insights from prior steps in WP1 and WP2.

The survey experiment will be fielded as a series of studies across all consortium member countries. Data collection will be headed by Aarhus University. Data collection aims to recruit 50 participants per condition per country, amounting to 450 participants per country.

All surveys will be translated into local languages by the local partner organisation (excluding the UK). The study will be implemented as a series of identical studies in each of the consortium countries, sampling will be done through a third party panel provider. Sampling will prioritise members of the general public (non-researchers, non-students). Efforts will be made to ensure similar representation with regard to several sociodemographic variables, including gender, age and education as well as factors identified as important predictors of public trust in science in work package 1.

4.2 Design

The treatment will build on knowledge of forms of inclusion and integrity obtained through the public dialogue workshops and expert interviews as well as insights from prior studies and European projects on research integrity, such as Standard Operating Procedures for Research Integrity (SOPs4RI, <https://sops4ri.eu/>) and SUPER MoRRI (<https://super-morri.eu/>). The vignettes will be produced in a manner that matches the information that citizens meet in their everyday lives as closely as possible, as well as taking care to include insights from the public consultations on what communication and conduct members of the public find most important when making up their minds with regard to trust in science.

Outcome variable(s), trust in science, will be based on finding from scoping reviews as well as indicator development from work package 1. Additionally, the survey will record data on sociodemographic variables for participants. This will be done after the experimental study to avoid potential priming effects.

To ensure that the surveys are efficient in emulating real-world influences, surveys will be tested using cognitive interviews, prioritizing non-academic participants. Such interviews will be performed first in the master questionnaire (English), and then repeated post-translation in local languages. Each project partner will conduct three such interviews, results of which will be used by the Aarhus University team to update and finalise the survey and its vignettes.

4.3 Preregistration and analysis

Analysis plans for the survey experiment will be preregistered at OSF (<https://osf.io/registries/osf/new>) prior to fielding. The preregistration will include detailed descriptions of treatments, the method for randomization, as well as characteristics of additional variables. Furthermore, the preregistration will clearly describe the analysis strategy, including how the main effects of the treatments will be analyzed, as well as how moderations with country and other potentially relevant

moderators will be handled. In case of any deviations from the preregistration, this will be clearly stated in all deliverables and publications.

The Aarhus team, employing state of the art quantitative methods for investigating experimental and multilevel data, will perform all statistical analyses. The data for all countries will be investigated in the same manner, though considerations of language specificities will be taken seriously, and potential exploratory analyses may be performed, with emphasis on the culture of science observed in prior parts of this work package.

4.4 Ethical considerations

As the format of the vignettes is based on the knowledge produced by prior activities in WP2, the exact content is not yet known. However, the data collection will follow regulations regarding ethical approval and informed consent as outlined by Aarhus University, and will not produce any harm for participants.

4.4.1 Ethical approval

Ethics approval will be obtained from the Ethics committee at Aarhus University.

4.4.2 Risk and inconveniences

Though treatments are based on (perceptions) of institutional outreach, the information given to participants will be edited versions of reality. To avoid deception, this will be made clear to participants prior to treatment.

4.4.3 Informed consent

Informed consent forms for all participants will be collected. These forms will outline objectives for the research, as well as clarify that the study presents information that has been edited for the sake of the research objectives.

4.5. Division of responsibilities of the national partners

As the responsible partner for the survey experiment, AU will coordinate with the other POIESIS partners to carry out the experiment from M20. The initial design phase will produce the vignettes and decide on outcome(s) as well as sociodemographic variables, producing a draft version of the survey by the end of M20. During M21 the survey will be translated and tested by

the partner organizations. M22 will see the survey edited based on testing, the survey will be submitted for ethical approval, and the survey will be preregistered. The survey will be fielded in months 23-25.

A first draft of deliverable D2.4 "Results from the survey experiment" will be produced by the end of M26, and submitted for internal review start of M27. After review and revisions, the deliverable will be submitted by M28. In the final months, M29-M34, the main publication on the survey experiment will be finalized, headed by AU and including all partner organizations.

Box 4 shows the information to be provided to partners.

Box 4. Information to be provided to partners

- 1. Protocol for the survey experiment (developed by AU as part of D2.1)**
- 2. Survey questionnaire (AU)***
 - a. Draft questionnaire (M20)
 - b. Translation and cognitive interviews (all partners, M21)
 - c. Finalized questionnaire (M22)
- 3. Recruitment strategy (NTUA) (M22)**
- 4. Information for participants (AU)***
 - a. Information letter to participants in the survey (M22)
 - b. Personal data processing policies (M22)
 - c. Consent form (M22)
- 5. Draft of D2.4 (AU, M26)**

*** All documents are written in English, and documents for participants will be translated into Danish, French, German, Greek, Portuguese, and Spanish by the local project partners.**

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