SOPs4RI

D4.4: Report on the Co-Creation Workshops

Authors: Daniel Pizzolato, Kris Dierickx, Joeri Tijdink, Iris Lechner, Krishma Labib, Iris Lechner, Noémie Aubert Bonn, Borana Taraj, Nick Claesen, George Gaskell
Reviewer: Mads Sørensen
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Project full title

"Standard Operating Procedures for Research Integrity"

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Authors:	Daniel Pizzolato, Kris Dierickx, Joeri Tijdink, Iris Lechner, Krishma Labib, Iris Lechner, Noémie Aubert Bonn, Borana Taraj, Nick Claesen, George Gaskell
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Contents

1. INTRODUCTION

1.1 Abbreviations

RI – Research Integrity

FG – Focus group

ECoC – European Code of Conduct

SOP – Standard operating procedure

RPO – Research performing organisation

RFO – Research funding organisation

RIPP – Research Integrity Promotion Plan

CCW – Co-creation workshop

1.2 Terminology

Code: a document guiding the members of an organisation on ethical standards and how to achieve them. Ethics/integrity codes are formal documents sending a message about moral standards guiding professional behaviour by providing principles, values, standards, or rules of behaviour.

Guideline: a statement of principles or issues to consider when performing a task, aimed to guide courses of action. Guidelines give direction and help users make decisions. They are often created based on the consensus of experts after detailed evaluation and assessment of available evidence. They may include checklists.

Standard Operating Procedure (SOP): a detailed, written instruction, aimed to achieve uniform action step-by-step. SOPs prescribe specific actions; they make it easier for users to make decisions. They may come in the shape of a 'decision-tree'/flow-diagram, similar to what is referred to as an algorithm in clinical contexts.

Toolbox: a structured collection of easy-to-use tools (SOPs and guidelines) that RPOs and RFOs can use when developing their own Research Integrity Promotion Plans.

Research Integrity Promotion Plan (RIPP): a document describing how a specific institution will ensure, foster and promote responsible research practices, avoid detrimental practices, and handle

misconduct. RPOs and RFOs should form their own RIPPs and consider disciplinary, organisational and national differences.

Set of Recommendation (SoR): list of recommendations for a subtopic that has been extracted from the documents that were provided by WP3 (D4.3). The teams will make the set per subtopic by discussing the documents and formulate practical and concrete recommendations.

Inspirations: main input of the Co-creation Workshops. It is created per subtopic and represents the Set of Recommendations in a visual manner. Inspirations are necessary for the methodology of the co-creation workshops.

Skeleton Guidelines: main output of the co-creation workshop. Skeleton guidelines are preliminary guidelines for each of the six topics/21 sub-topics addressed in the co-creation workshops. There are two versions of each skeleton guideline. Version 1 is a first rough version of the guideline based on the discussion in the first set of co-creation workshops. Version 2 is a more complete version refined with the feedback gathered during the second set of workshops. These guidelines aim to be as concrete and as practical as possible, but will be further harmonized and refined with future steps of the SOPs4RI project, particularly in WP6.

1.3 About SOPs4RI

Standard Operating Procedures for Research Integrity (SOPs4RI) aims to contribute to the promotion of excellent research and a strong research integrity culture aligned with the principles and norms of the European Code of Conduct for Research Integrity. The overall objective is to create a toolbox to support and guide research performing organisations (RPOs) and research funding organisations (RFOs) in fostering research integrity and consequently preventing, detecting and handling research misconduct. The project focuses on providing Standard Operating Procedures (SOPs) and guidelines that enable RPOs and RFOs to create and implement Research Integrity Promotion Plans (RIPPs). SOPs4RI will thus stimulate European organisations involved in performing and funding research to foster responsible conduct of research by organizational measures and policies. SOPs4RI takes a mixed-method, co-creative approach to the identification, development and empirical validation of SOPs and guidelines. The expected end-users of the tools provided by SOPs4RI are decision makers within RPOs and RFOs, e.g. university senior management (vice chancellors, deans, heads of administration), university academic councils, boards and directors of funding agencies, and their extended administrations. The identification and development of SOPs and guidelines will take national, epistemic, and organisational differences into account, and the final toolbox will enable RFOs and RPOs to create Research Integrity Promotion Plans in accordance with the needs of their organisation.

1.4 About WP4

Work Package 4 (WP4) serves as the backbone of the project. WP4 creates, improves, sharpens and finalizes the content of the toolbox with SOPs and guidelines designed to support RPOs and RFOs.

WP4 builds on WP3 and uses the inputs from the literature review, expert interviews and Delphi procedure to identify the themes to be tailored to different disciplines and the needs of RPOs and RFOs. The first version of the toolbox with the SOPs and guidelines, version 1.0, was used in the focus groups (WP5). With the feedback from the focus groups (researchers, research integrity officers, policy makers, funding agency officers, etc.) WP4 created the second version of the toolbox (version 2.0) with SOPs and guidelines based on the results from the focus groups. In the co-creation workshops with stakeholders this version is further improved to version 3.0.

Version 3.0 of the toolbox with SOPs and guidelines will then be tested in an international survey (WP6) among researchers. The survey will check and evaluate the content of the toolbox and create further knowledge on national and organisational differences. The survey will identify barriers to implementation of the toolbox, and will apply cost-benefit analysis (CBA) to assess likely costs and benefits related to specific SOPs and guidelines. The implementation of version 4.0 of the toolbox will be piloted in a sample of RPOs and RFOs in WP7.

The final output of WP4 will be a ready-to-use toolbox with SOPs and guidelines for RPOs and RFOs (version 5.0).

1.5 About this deliverable

Deliverable 4.4 provides the report of the co-creation workshops (CCWs). The goal of the CCWs are to identify the main gaps in version 2.0 of the toolbox and to create a new improved version. The CCWs will also discuss issues such as the lack of standardization, country differences, and the impact that the guidelines can have, in a specific section related to the implementation issues.
Specific activities: 1) identification of participating stakeholders; 2) performing the CCWs; 3) draft the next version of the SOPs and guidelines (version 3.0); 4) flag specific issues for implementation that can be tested in the survey and account for organizational and interdisciplinary differences, and major differences between countries (WP6).
The CCWs and the deliverable 4.4 therefore set the scene for other deliverables in WP4:

- D4.5 Third version of the SOPs and guidelines (VUmc, M26)
- D4.6 Fourth version of SOPs and guidelines (VUmc, M34)
- D4.7 Final toolbox with SOPs and guidelines (version 5.0) (VUmc, M48)

1.5.1 Differences between D4.4 and D4.5

Although the final results coming from the CCWs have already been presented in D4.5, D4.4 is the background document that will present the genesis of D4.5.

D4.4 does not just provide information on how the CCWs were organized and performed, but also reports on how the recommendations changed through the different steps of the process. Furthermore, after integrating any final comments of participants of the CCWs on the previous version of the guidelines (i.e. those presented in D4.5), D4.4 presents the final version 3.0 of the toolbox.

2. CO-CREATION WORKSHOPS

2.1 Introduction to WP4

WP4 creates the new versions of the SOPs and guidelines after every empirical step (reviews, Delphi, interviews, focus groups, survey and pilot testing). Furthermore, it creates content for the SOPs and guidelines by conducting the co-creation workshops and it is interacting with the other WPs throughout the project.
WP4 will frequently seek advice from the Executive Board and the Advisory Board to steer the process of forming and testing the SOPs and guidelines.
WP4 bridges the empirical phases of the project and structures the content and form of the SOPs and guidelines that is going to be created. The aim is to identify existing, draft new, test, improve, and finalize the SOPs and guidelines that together will form SOPs4RI's toolbox.

2.2 Work package 4 objectives

The main aim:

To identify existing, draft new, test, improve, and finalize the SOPs and guidelines for the toolbox with input from the literature review, interviews, Delphi procedure (WP3), focus groups (WP5), survey (WP6) and pilot testing (WP7).

To achieve this, the following objectives have been formulated:

1. To develop a toolbox with research integrity SOPs and guidelines for RPOs and RFOs, which reflect the principles and norms of the European Code of Conduct for Research Integrity (ALLEA 2017).

2. To streamline the process of all the steps in the project (in close collaboration with WP1) within the 4 years of the project with the ultimate goal to deliver the toolbox.
3. To work with SOPs and guideline experts to construct specific SOPs and guidelines.
4. To ensure that the principles and norms of the European Code of Conduct for Research Integrity (ALLEA 2017) are translated into the drafts and final version of the toolbox.
5. To organise co-creation workshops with diverse stakeholders and incorporate their thoughts and ideas in the toolbox.
6. To help WP6 to validate and implement a procedure for a CBA (Cost Benefit Analysis) of the implementation of SOPs and guidelines.
7. To create the first, second, third, fourth and fifth version of the toolbox.

2.3 CCWs objectives

The main aim:
To create, discuss, and revise SOPs and guidelines for six specific underdeveloped topics for version 3.0 of the toolbox, as well as to explore their potential implementation. The CCWs sessions build on version 2.0 of the toolbox and on inputs from the literature review, interviews, Delphi procedure (WP3), focus groups (WP5), survey (WP6) and pilot testing (WP7).
More precisely, the CCWs have three main aims:

- Develop skeleton guidelines for 6 specific RI topics
- Explore which guideline formats stakeholders prefer
- Identify potential implementation issues and explore ways to address them

2.4 Selection of the topics for the CCWs

Within WP4 and before starting with the organization of the CCWs, the quality of existing best practice documents (e.g. guidelines, codes of conduct, SOPs) that were found in the empirical work in WP3 were assessed. Based on that work, we have created a list of topics and have mapped how far each topic has been addressed by existing resources. Based on this mapping, we showed that most topics are already highly developed and covered by good quality documents. However, there were also subtopics that were less developed. WP4 produced Sets of Recommendations (SoRs) for these underdeveloped topics (in D4.3), but since the quality of existing resources was sometimes poor, the extent to which we were able to further improve, expand, and granulate these SoRs depends on the next steps of the project.

The CCWs addressed the following six underdeveloped topics:

RPOs	Education and training in RI	a. pre-doctorate b. post-doctorate c. training of RI personnel & teachers d. RI counselling and advice
	Responsible supervision	a. PhD guidelines b. supervision requirements & guidelines c. building and leading an effective team
	Research environment	b. adequate education and skills training c. culture building d. managing competition & publication pressure f. diversity issues
RFOs	Selection and evaluation of proposals	a. RI plan b. methodological requirements d. diversity issues
	Monitoring of funded applications	a. financial monitoring b. monitoring of execution of research grant c. monitoring of compliance with RI requirements
	Independence	a. What counts as an unjustifiable interference? b. preventing unjustifiable interference by the funder c. preventing unjustifiable interference by political or other external influences d. preventing unjustifiable interference by commercial influences

Table 1: CCWs topics and sub-topics

The other underdeveloped topics will also have sets of recommendations (see D4.5). In the next phases of the project, we will further refine these subtopics and make sure that they can be a starting point for further development of high-quality guidelines.

2.5 Methodology

2.5.1 Methodology towards the organization of the CCWs

The CCWs were initially intended to be conducted in a face-to-face format. We planned to have 4 different CCWs in 2020, with the first two CCWs (first set) on October 8th and 21st (full day program) and the second two (second set) on November 24th/25th (two half-days program) and on December 9th (full day program), involving around 24 participants in each CCW (Figure 1 & Figure 2 –CCWs

timeline). The first set of CCWs would be aimed to create new content for guidelines on each of the 6 chosen topics, specific for the development of an intermediary version 3.0 of the toolbox. The second set of the workshops, while addressing the same six topics, would be aimed to revise and discuss the version coming out from the first two CCWs to have a finalized version 3.0 of the toolbox. In addition, within the second set of CCWs, we planned to address potential problems in the implementation of the SOPs and guidelines. We planned to switch between plenary and subgroup discussions during each workshop to sufficiently discuss each topic.

However, due to the COVID-19 crisis, the team had to reconsider its strategy. The CCWs have been carried out online using ZOOM and the collaborative online platform MIRO. The combination of the two platforms allowed the participants to interact as if they were in an in-person meeting. Given the online nature of the CCWs, the team had to reconsider the structure of the CCWs. Each workshop lasted around 3-3.5 hours with the involvement of 2-6 participants. The organization of the CCWs was carefully planned and the workshops were carried out on the same dates. (See timeline below) (Figure 1; Table 2).

A facilitator who was responsible for the process of the workshops led each workshop. A co-facilitator was responsible for the technical aspects and for supporting the facilitator. A professional independent facilitator supported the facilitators and co-facilitators. Prior to conducting the workshops, some of the workshop exercises were piloted with SOPs4RI consortium members with the aim to test the workshop ideas and set up.

CCWs Timeline

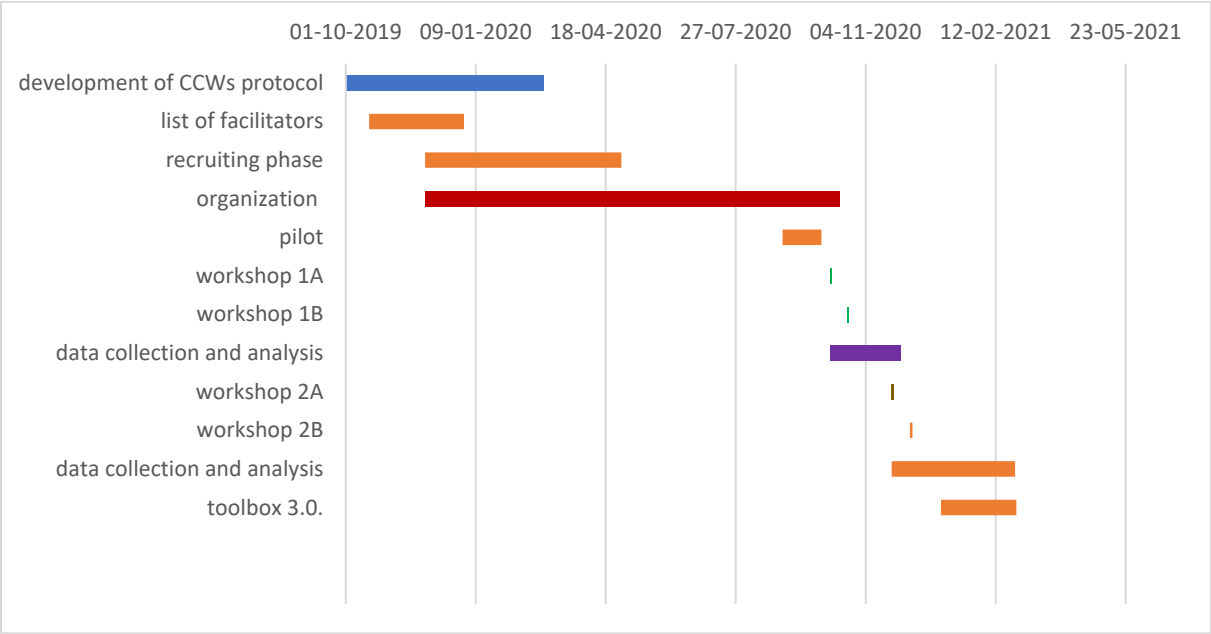


Figure 1: CCWs timelin

FIRST SET OF CCWs	- October 8th (Morning)
	  ○ Selection and Evaluation of Proposals
	  ○ Independence
	  ○ Responsible supervision and mentoring
	- October 8th (Afternoon)
	  ○ Selection and Evaluation of Proposals
	  ○ Independence
	  ○ Responsible supervision and mentoring
	- October 21st (Morning)
	  ○ Monitoring of funded projects
	  ○ Research environment
	  ○ Education and training in RI
	- October 21st (Afternoon)
	  ○ Monitoring of funded projects
	  ○ Research environment
	  ○ Education and training in RI

SECOND SET OF CCWs	- November 24th (Afternoon)
	  ○ Selection and Evaluation of Proposals
	  ○ Independence
	  ○ Responsible supervision and mentoring
	- November 25th (Morning)
	  ○ Selection and Evaluation of Proposals
	  ○ Independence
	  ○ Responsible supervision and mentoring
	- December 9th (Morning)
	  ○ Monitoring of funded projects
	  ○ Research environment
	  ○ Education and training in RI
	- December 9th (Afternoon)
	  ○ Monitoring of funded projects
	  ○ Research environment
	  ○ Education and training in RI

Table 2: CCWs SET 1 and SET 2

2.5.2 External advisors

To support the team in designing, conducting and analyzing the CCWs, we collaborated closely with three co-creation experts. Pieter Jan Stappers (https://www.tudelft.nl/io/over-io/personen/stappers-pj), a professor of industrial design engineering at Delft University of Technology, had an advisory

role and provided us with valuable insights, tips and tricks about the co-creation work at several stages of the co-creation process. Katinka Bergema (https://www.linkedin.com/in/katinkabergema/?originalSubdomain=nl), a professional facilitator and designer, provided us with support in designing the workshops and oversaw the conduct of the workshops directly. Sonja Zuijdgeest (https://www.p2.nl/mensen/sonja-zuijdgeest/), an implementation expert, also provided us with valuable advice in the early stages of the co-creation work.

2.5.3 General methodology

The process of the SOPs4RI co-creation workshops project consisted of the following steps:

1. Creating inspirations
2. Sensitizing participants
3. Conducting the first set of workshops
4. Analyzing the CCWs Set 1
5. Creating skeleton guidelines V1
6. Conducting the second set of workshops
7. Analyzing the CCWs Set 2
8. Creating skeleton guidelines V2

The main input of the co-creation workshops was a set of *inspirations* we had created for each topic (and subtopic). The inspirations can be found on the Open Science Framework: https://osf.io/e2bsj/ (CCWs folder). These inspirations were sent to the CCW participants, with other information, to prepare them for the workshop session. In the first set of workshops, the aim was to generate content for the skeleton guidelines per topic, as well as to explore which guideline formats stakeholders preferred for the respective topic. Based on the analysis of the workshop sessions about the content for each topic and the format, a first draft (Skeleton guideline V1) of the guidelines was created. The V1 of the guidelines was used as preparatory material for the second set of CCWs. The second workshop session focused on refining the guidelines and exploring implementation issues. After the analysis, the outcomes from these second workshops were used to produce the V2 of the skeleton guidelines.

2.5.4 Ethics

The protocol study for the CCWs has been approved by the Social and Societal Ethics Committee (SMEC) of KU Leuven, under the dossier n. ***G-2020 01 1945.*** When inviting participants to the CCWs, we provided them with all relevant information describing the study, its purpose, the procedure, use

and retention of data and privacy policy **(Appendix 6.1-6.2- information about the workshop)**. Participants had to sign an informed consent form before they could take part in the workshops.

2.5.5 Data Collection

All sessions were recorded on Zoom, and screenshots and recordings of the MIRO boards with the workshop outputs were also captured. The workshop recordings were transcribed using Amberscript (https://www.amberscript.com/en/). The audio recordings will be kept for up to 5 years after the end of the study on Aarhus University's Sharepoint servers. The video recordings were destroyed after the analysis of the related co-creation workshop. Informed consent forms are stored separately from the discussion transcripts, in a KU Leuven shared J-drive.

2.5.6 Overview of the analysis process

Conducting two series of CCWs led to the development of a more advanced version of the toolbox for 6 specific topics than the ones in D4.3. The data coming from the first set of CCWs was analysed using an inductive methodology to create the skeleton guidelines V1. The version V1 was used in the SET 1 of CCWs as inputs for the workshops. While the analysis of the data coming from the first set of CCWs was done using an inductive methodology, the analysis of the data coming from the second set of CCWs was done using a deductive methodology. The analysis of the implementation issues section was done using an inductive approach (Table 3).

I. Inductive analysis of first set of workshops	Create skeleton guidelines V1 as input for second set of SOPs4RI co-creation workshops and to generate information on the guideline format
II. Deductive/Inductive analysis of second set of workshops	Revise the skeleton guidelines based on the data from the second set of workshops and generate information on the implementation issues

Table 3: Methodologies used for the analysis of the CCWs

2.6 Recruitment

The participants of the co-creation workshops are one of the most important factors for its success and effectiveness. Each co-creation workshop lasted 3-3.5 hours and included the participation of 2-6 people. In general, we aimed to have around 4 people for each workshop.
The workshops' participants were selected amongst people who work for research performing organizations (RPOs), research funding organizations (RFOs), journals, university associations, industry and who are involved in RI-related topics. Ideally, to achieve the objectives of the workshop, we aimed to include participants displaying different levels of experiences, different professional roles, and different fields of expertise. Moreover, it was important to take into consideration the gender, geographical and cultural balance of each workshop. Although it was not possible to include participants from every European country, all parts of Europe (Northwestern, Northeastern, Southwestern, and Southeastern) were well represented. Moreover, within the second set of CCWs two experts from countries outside of Europe were included.
Experts were selected using already existing databases developed by other EU funded projects or EU organizations (ENERI, EnRIO, EARMA, ERION) or based on previous involvement in the project such as the DELPHI study (WP3) or in the focus groups (WP5).

Participants were selected depending on precise inclusion criteria, for RPOs and RFOs

Inclusion criteria:

- RPOs:
    - Research integrity officers
    - Ombudspeople
    - Deans/ vice-Deans/ Rectors
    - Senior researchers/ P.I.s in funded projects
    - Young researchers
- RFOs
    - Stakeholders working in funding agencies as policymakers/ head of units
    - Committee members in funding agencies
    - RE and RI officers in funding agencies
    - Stakeholders involved in research policy at RPOs
    - University administrators

In total, 75 participants took part in the CCWs. Twenty-one of them participated in more than one CCW. The majority of the participants were females (Figure 2)

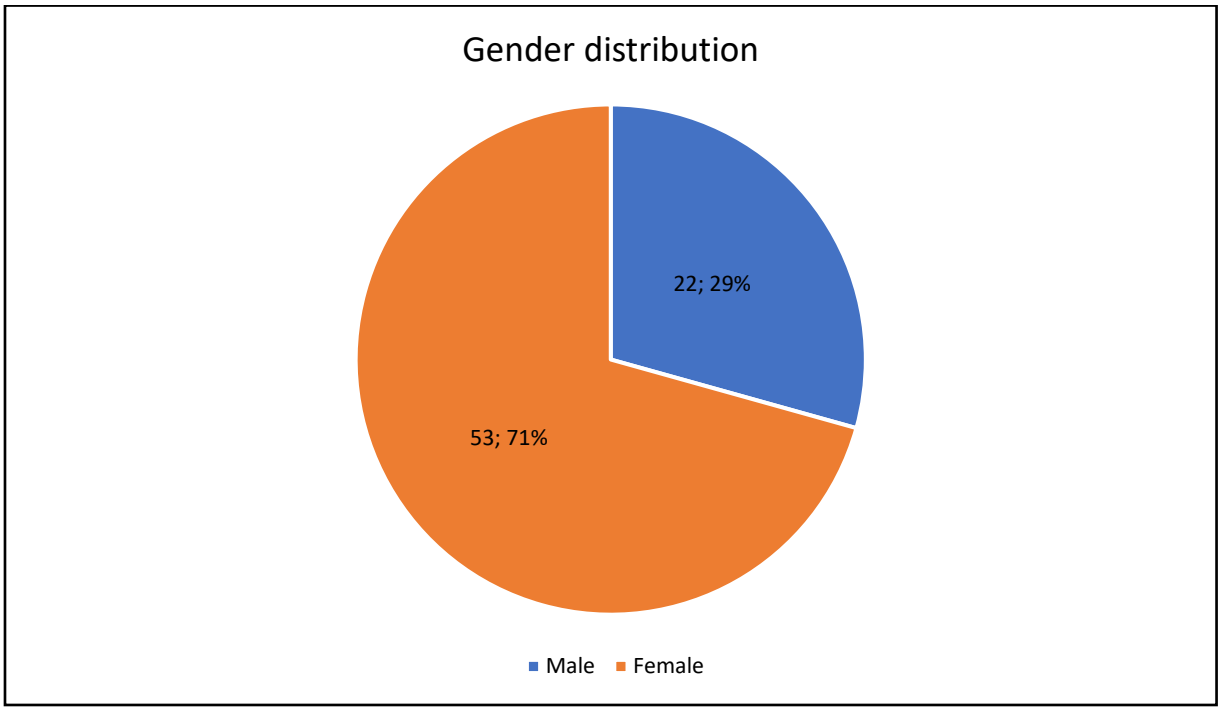


Figure 2: Gender distribution

Participants based in 22 European countries, USA and working for European institutions took part in the workshops (Figure 3). Belgium, Ireland, Italy, Spain and the Netherlands were the most represented countries.

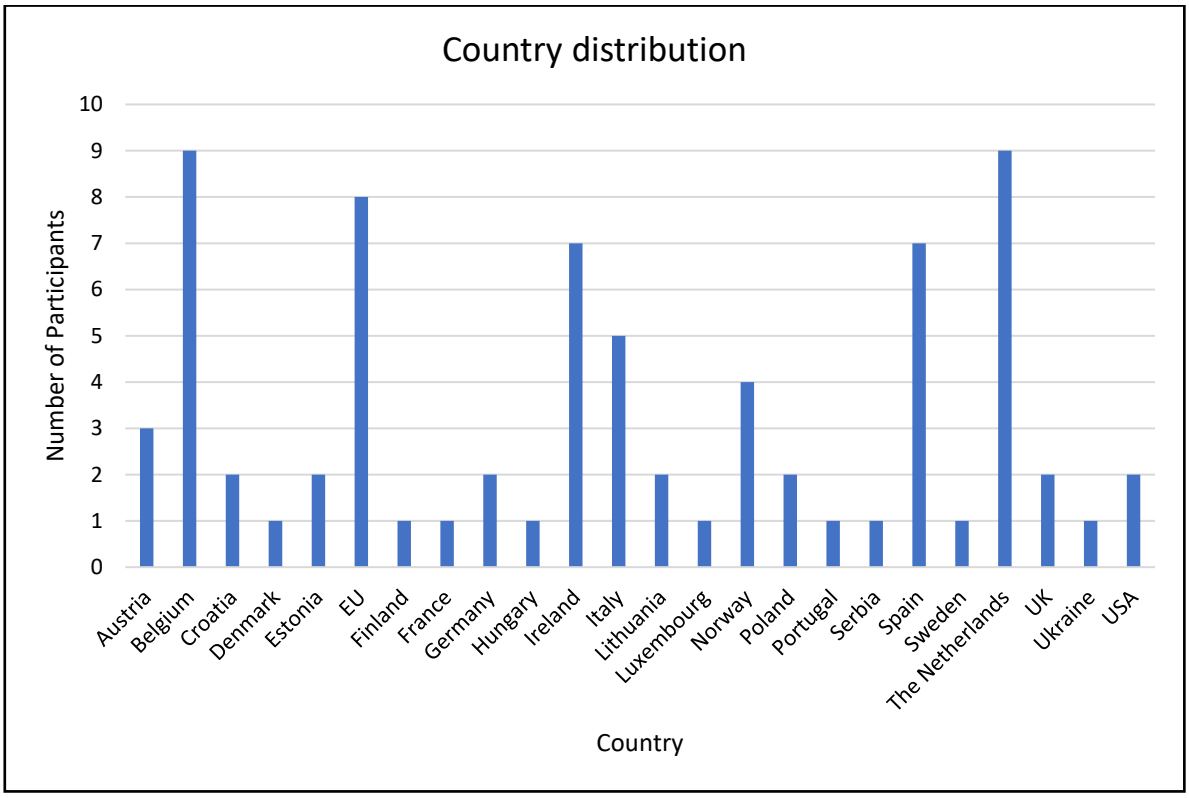


Figure 3: Country distribution (EU=stakeholders working within EU organizations)

Forty-one participants took part in RPOs-related CCWs, 32 participants in RFO-related CCWs, and two participants took part in both RPOs and RFOs CCWs, since their profiles were fitting for both CCWs (Figure 4). In counting the total number of participants, people who took part in more than one CCWs was counted as one participant.

In general, the recruitment for the RPO-related workshops was easier. A total of 34 participants worked in RPOs (33 in academia and 1 in a commercial company), 21 participants worked in RFOs (12 in National RFOs, 7 in EU RFOs and 1 in a private RFOs) and 1 participant had a role within both RPOs and RFOs. The rest of the participants worked in peer-reviewed journals, as policy advisors and in federal or governmental agencies (Figure 5).

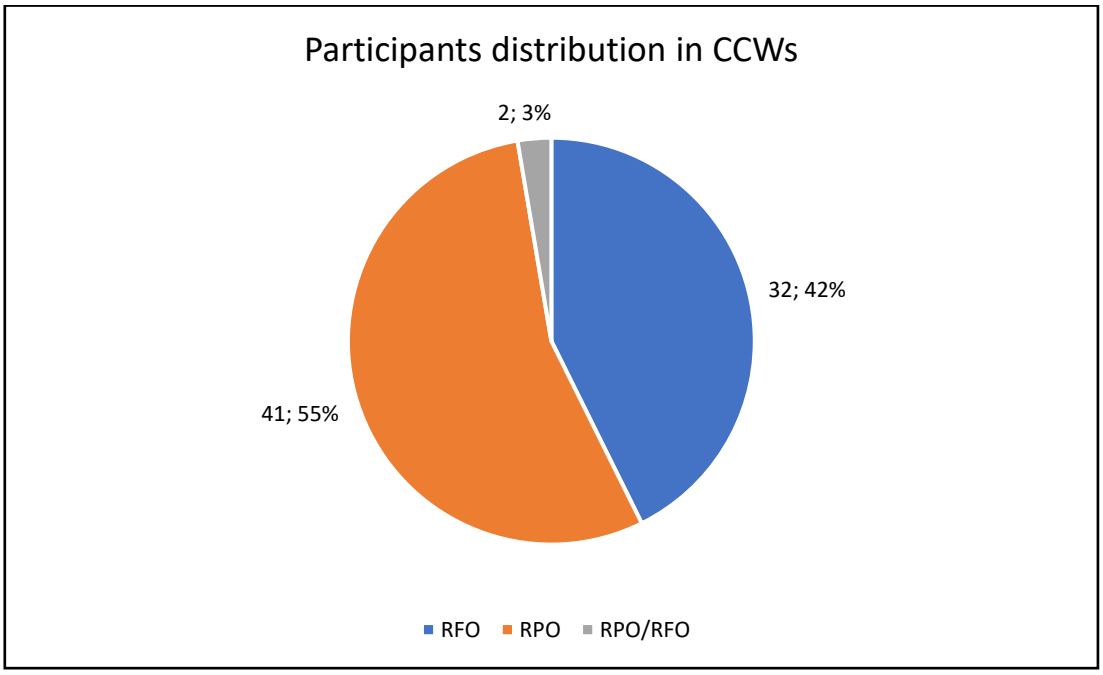


Figure 4 : Participants distribution in CCws

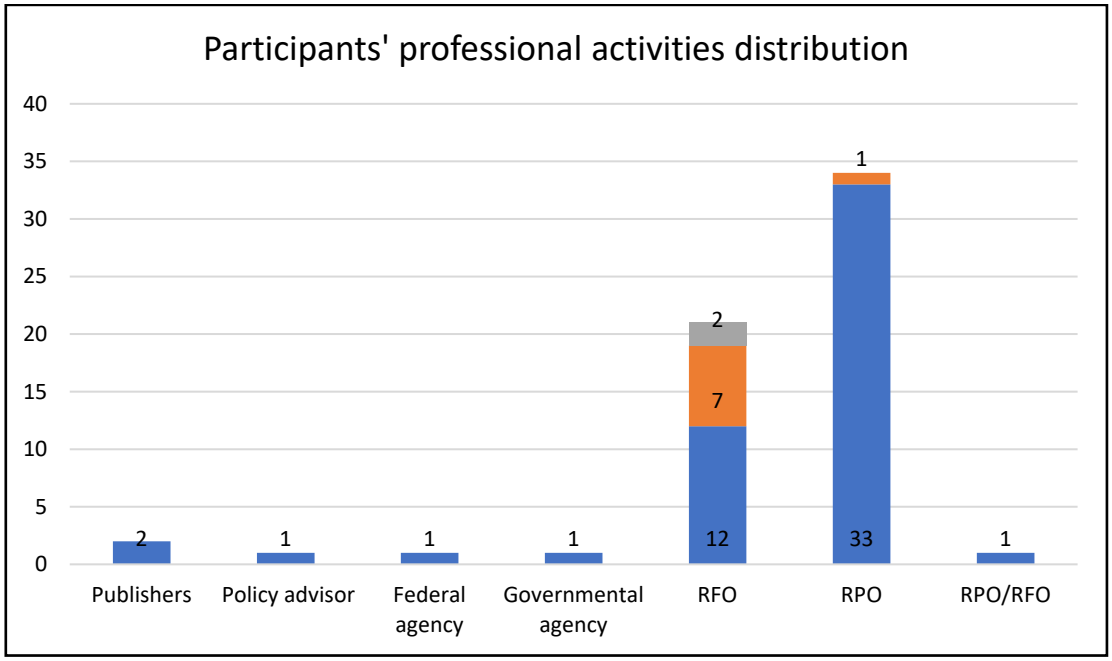


Figure 5: Participants' professional activities distribution

Regarding the participants' profiles, the majority of them worked as research administrators (22), policy makers (16), professors (12) and project officers (8) (Figure 6).

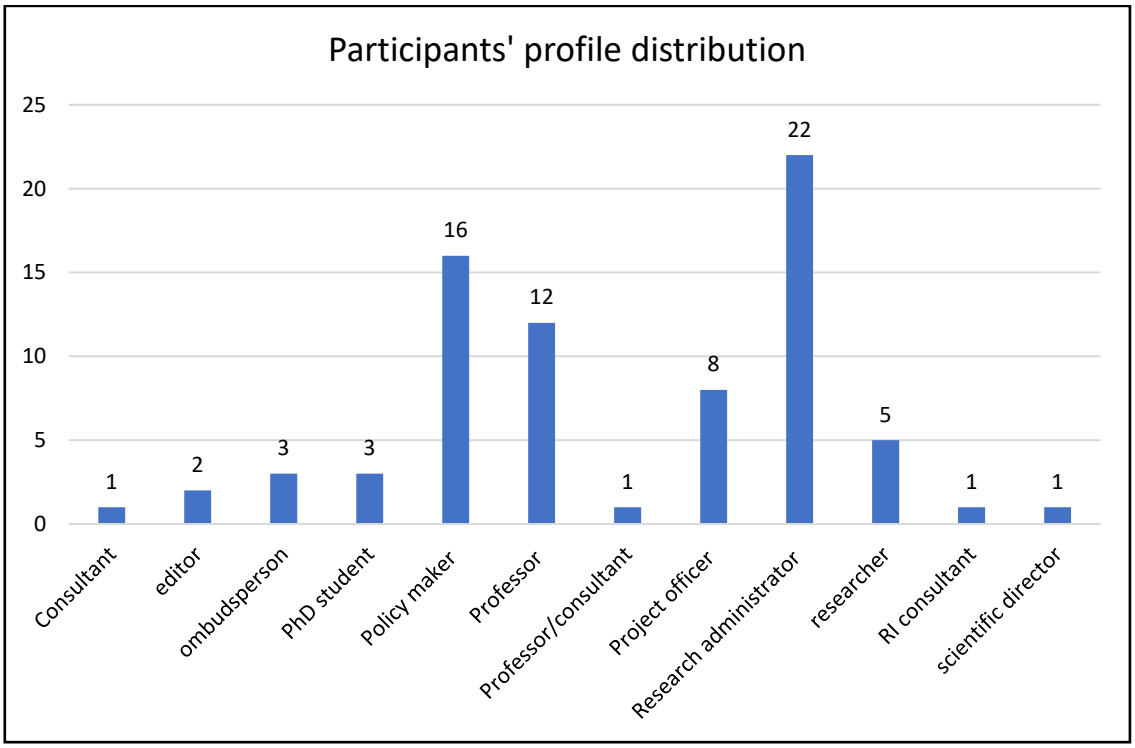


Figure 6: Participants profile distribution

3. FIRST SETS OF CCWs

The first set of CCWs was carried out on October 8th and October 21st. On both dates, 3 CCWs were carried out simultaneously in the morning and 3 in the afternoon (Figure 2), i.e. 12 workshops were included in the first set.

3.1 Specific objectives

Generate new content for SOPs and guidelines for research integrity (RI) on topics/subtopics that were not already well covered by existing resources. In addition, explore which guideline format the participants prefer.

3.2 Methodology

The process of the CCWs SET 1 consists in the following steps:

- Creating inspirations
- Recruitment
- Sensitizing participants
- Preparing the CCWs
- Conducting the first set of workshops (October 8 and October 21)
- Participants checks and follow-up interviews
- Analysis of the workshops
- Creating the skeleton guidelines V1
- Guidelines format

3.2.1 Creating inspirations

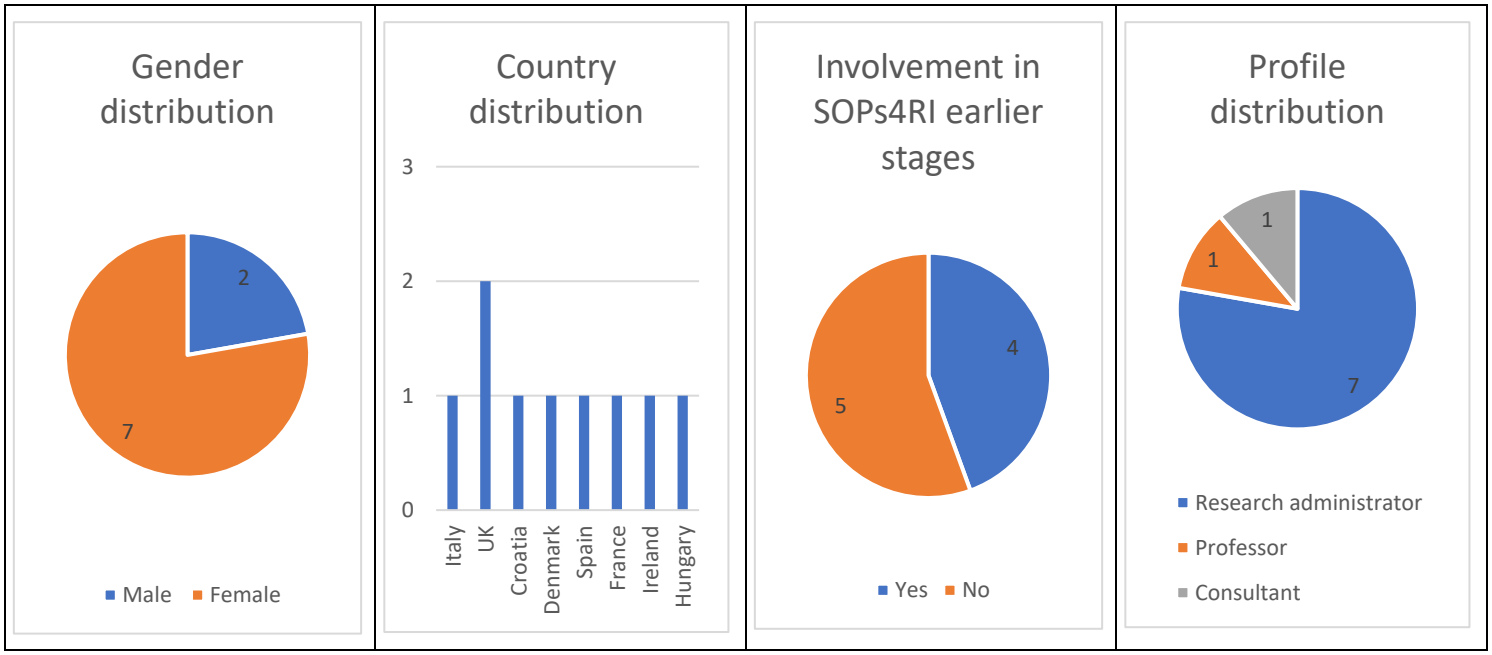
The main input of the co-creation workshops was a set of *inspirations* we had created per topic (and subtopic). In an earlier phase of the SOPs4RI project, sets of recommendations to RPOs and RFOs had been created for each topic included in the co-creation workshops, based on existing resources – which were incomplete or of low quality – and on focus groups and interviews conducted in earlier steps of the SOPs4RI project. To present the co-creation workshop participants with the recommendations in an easy to grasp manner, but still give them the freedom to create guidelines that did not necessarily align with these recommendations, we translated these recommendations into *inspirations*. We did this topic by topic by going through each of the recommendations, and highlighting the key elements (i.e. key two/three words) of the recommendation. Next, we decided whether to include or exclude specific key element in the inspirations. The main reason for exclusion was overlap between different elements, but elements could also be excluded if we deemed that we already had sufficient knowledge on that element (e.g. we excluded most elements related to the content of RI education & training, since there is already a lot of literature available on this issue). We translated the included elements into *inspirations* by either capturing them in one or two keywords shown in different formats (e.g. the recommendation to carry out more research on good supervision was translated into the key words 'more research'), or by finding open source pictures that could represent those elements (e.g. the recommendation that supervisors should acknowledge their mentees' accomplishments was captured in a picture where a cartoon figure shows a thumbs

up sign). The *inspirations* for three of the topics were created by KL, while the other three topics' *inspirations* were created by IL; KL and IL also reviewed the entire selection and translation process of the other 3 topics. Furthermore, the entire co-creation team reviewed the final *inspirations* **(Appendix 6.3 - sets of inspirations)**. Although based on concrete recommendations, the *inspirations* are ambiguous and can be interpreted in different ways. This ambiguity is important to evoke creativity in the workshop participants and to give them room to bring the elements they find most important into the workshop discussions.

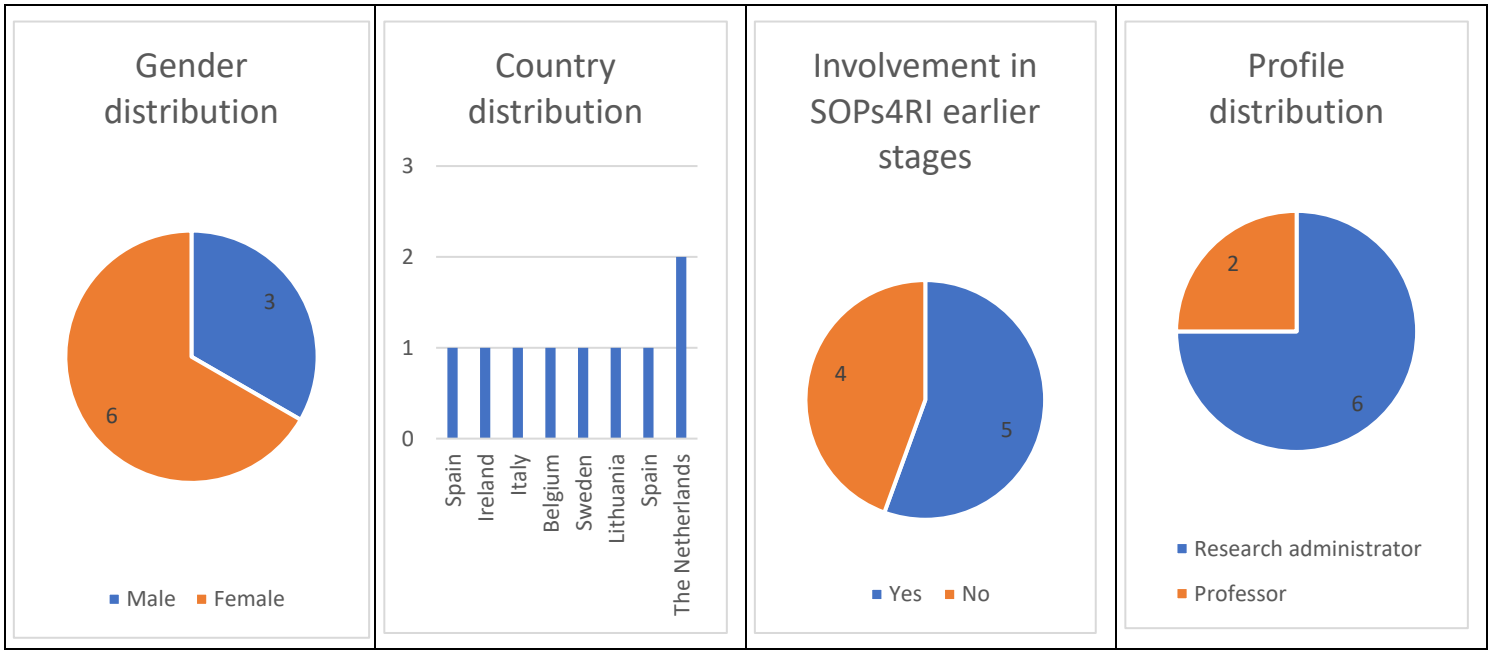
3.2.2 Recruitment (specific for the first set of workshops)

3.2.2.1 RPO-related CCWs

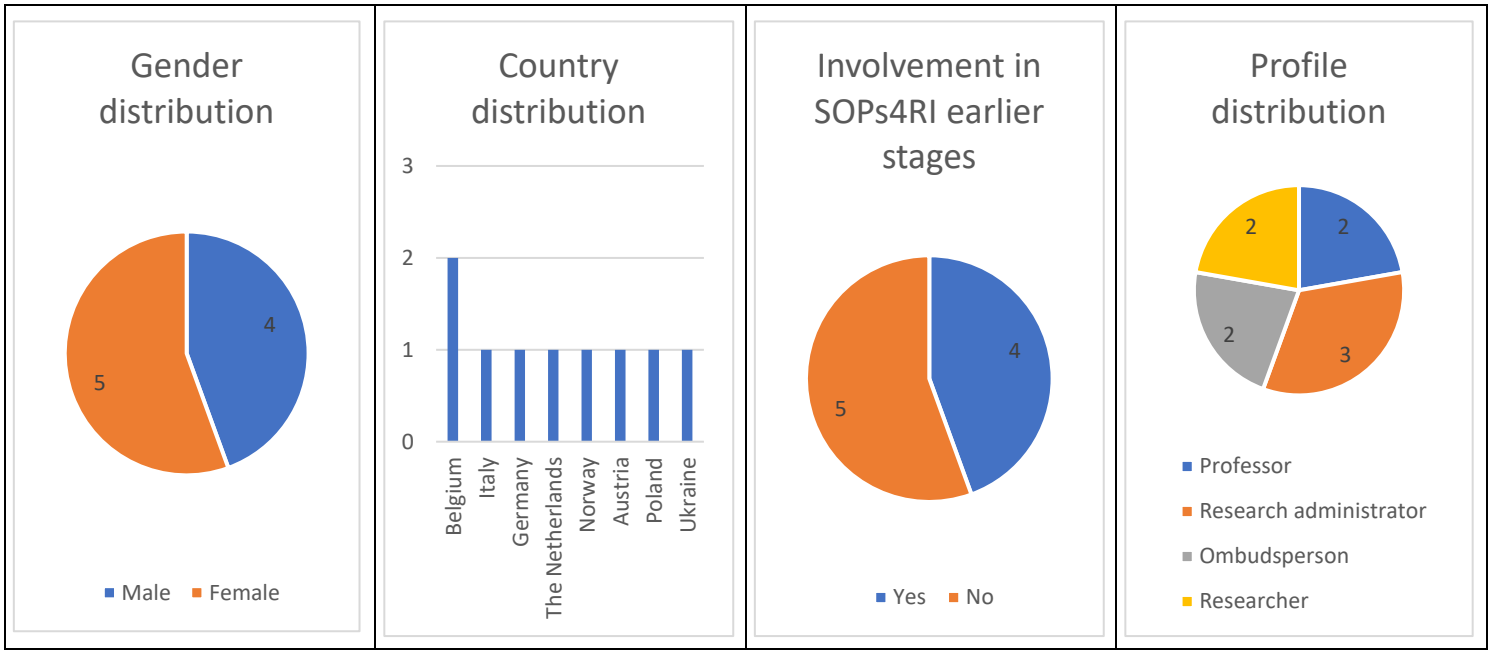
3.2.2.1.1 Research environment



3.2.2.1.2 Education and training in RI

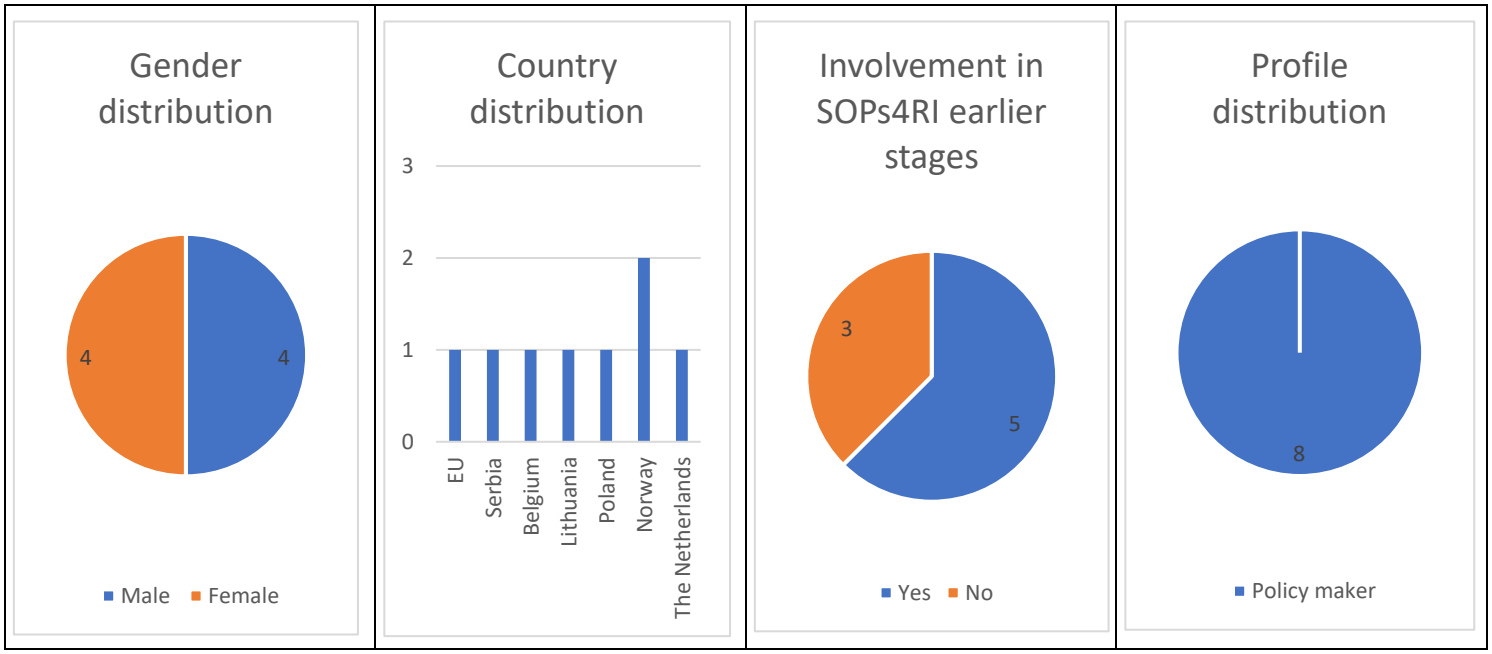


3.2.2.1.3 Responsible supervision and mentoring

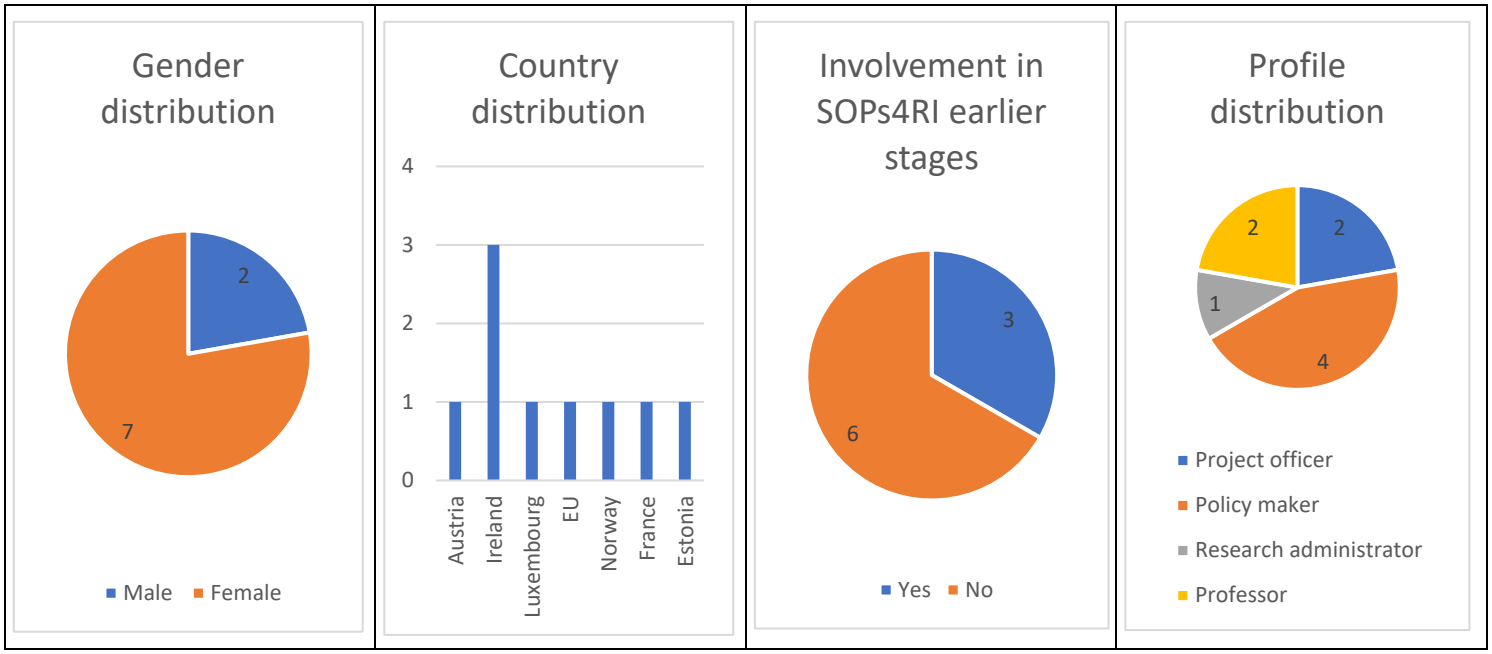


3.2.2.2 RFOs-related workshops

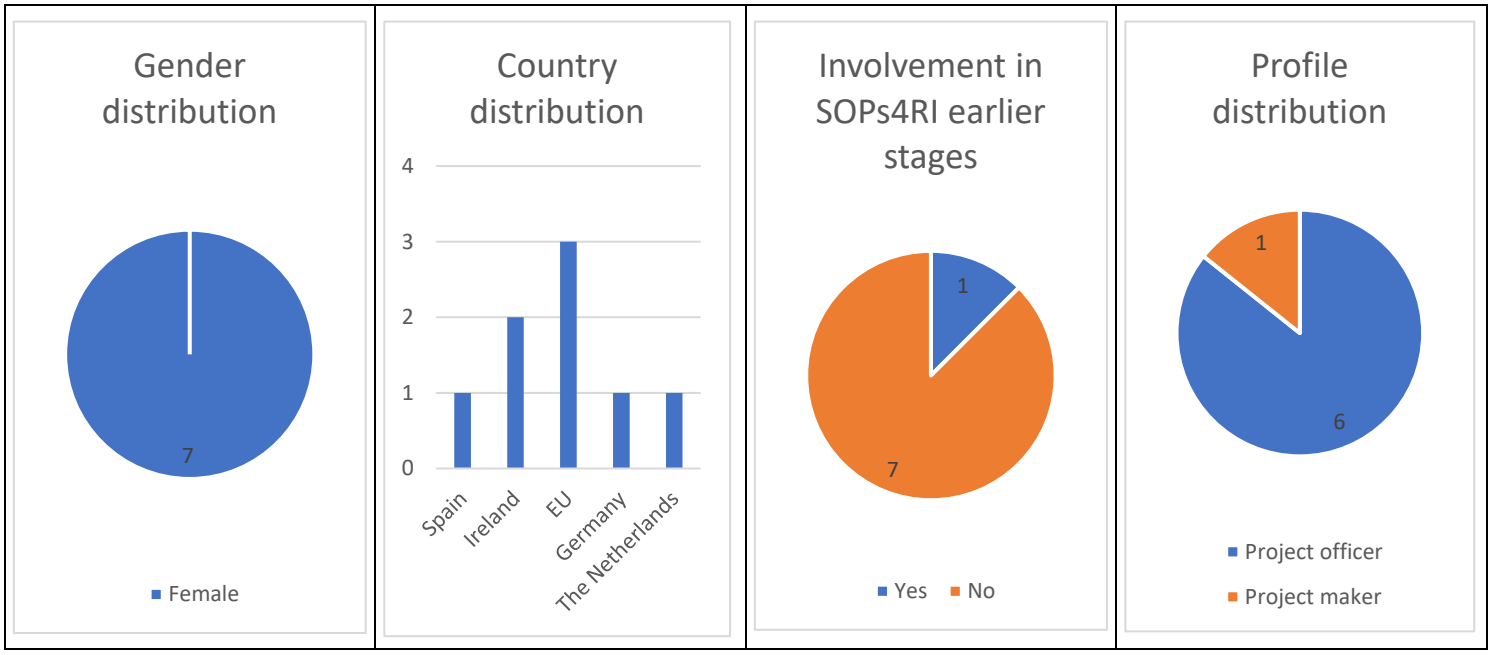
3.2.2.2.1 Independence



3.2.2.2.2 Selection and evaluation of proposals



3.2.2.2.3 Monitoring of funded projects



3.2.3 Sensitizing participants

To prepare the participants for the workshops, we sent them a sensitization package including the *inspirations* and information about the co-creation workshops and SOPs4RI project. The package was sent via email and – when participants consented – also via live mail. Furthermore, each participant took part in a short 15-30 minutes one-on-one call with one of the researchers to get familiarized with the Zoom and MIRO software programs. During these short calls, we (DP and BT) invited participants to consider the perspective of research institutions/funders by writing down, on the MIRO boards, some thoughts about research institutions'/funders' responsibilities, interests, and pressures faced. This helped us to ensure that participants would be ready to think of guidelines targeted at the level of RPOs and RFOs during the workshops, rather than at the level of individual researchers. Finally, before the workshops, we asked the participants to have a look at the *inspirations,* select three that they found particularly striking and write down why on the MIRO board. This ensured that participants became familiarized with the *inspirations* and were ready to actively take part in the workshop from the beginning.

3.2.4 Preparing the CCWs

A facilitator who was responsible for the process of the workshops (JT, NE, KL) led each workshop. A co-facilitator was responsible for the technical aspects of the workshop and for supporting the facilitator (DP, IL, BT). A set of instructions for the facilitators and co-facilitators was drafted by KL, in order to have clear directives on how to lead and co-lead the workshop sessions **(Appendix 6.4- instructions for facilitators and co-facilitators).** Before conducting the first set of CCWs, the CCW team piloted a few of the exercises with a few members of the SOPs4RI consortium. The piloting was only used to test the workshop plans and conduct some troubleshooting, not to generate data.

3.2.5 Conducting the first set of CCWs (SET 1 October 8th and 21st)

In the first set of workshops, the aim was to generate content for the skeleton guidelines per topic, as well as to explore which guideline formats stakeholders prefer for the respective topic. Each one of the workshop sessions was carried out using ZOOM and a specific MIRO board specifically created by KL for the CCWs.

The workshop consisted of 4 parts:

- **Introduction** – In this part, workshop facilitator and co-facilitator introduced the workshop plan and goals. To break the ice and get participants familiarized with each other, the facilitator asked the participants to share which *inspirations* they selected as part of the sensitization process and why.
- **Idea generation exercises** – The main part of the workshop consisted of exercises aimed at creating ideas for skeleton guidelines per subtopic of each topic. The exercises for each subtopic (and, hence, topic) were unique. The general approach for each exercise was to ask participants to individually write down on MIRO what should be in the guidelines on the subtopic at hand, based on their own experiences and knowledge of the topic. Here, participants were encouraged to get inspiration from the *inspirations*, available on the MIRO board. Following this, the participants were encouraged to discuss what they wrote down with each other, in order to build on each other's ideas. At the end of each exercise, each participant was asked to mention what the most important takeaway message for them had been from this exercise.
- **Guideline format** – After discussing the content of the guidelines, the participants were asked to think about what kind of format is suitable for the guidelines. They were provided

with three example RI guidelines[2,3,4], which were not specific to the topic of the workshop and were asked to comment on the format of these guidelines individually on the MIRO board. Following this, they could discuss the appropriateness of these formats for the topic of the workshop.

- **Conclusion & evaluation** – At the end of the workshop, participants were provided with a set of 20 ambiguous pictures not related to RI (e.g. a picture of a closed door). They were asked to select one or two of these pictures, or find an alternative picture themselves, which they could use to discuss what their main take-away from the workshop was, as well as how they experienced the workshop. Furthermore, participants were informed of the next steps of the co-creative process.

During each session, participants created a rich board full of new content concerning the development of SOPs and guidelines for the six topics **(APPENDIX 6.5 - Example of final MIRO boards SET 1 CCWs sessions)**.

3.2.6 Participants' checks and follow-up interviews

After having summarized the outcomes highlighted for the participants on the MIRO boards, the facilitator and/or the co-facilitator of the session asked the participants to check the summary to verify the conclusions of the workshop.

Additionally, at the end of each workshop session, participants were asked to volunteer for participating in a 30-minute follow-up interview. The follow-up interviews were carried out by KL. The aim of these interviews was to evaluate the CCW methodology, but some extra content related information was also gathered. During this interview, we asked participants to share their general impression of the workshop, including what they appreciated and what can be improved about the workshop. Furthermore, we asked them to provide their input on specific workshop exercises, as well as to reflect on the output generated from the workshops. The interviews were not recorded; notes of participants' input were made instead.

Follow up interviews with one participant from each workshop were conducted by KL and JT to evaluate the workshop methodology. For each topic, the interviewees raised the following content-

[2] Deserti A, Rizzo F, Smallman M. Experimenting with co-design in STI policy making. Policy Design and Practice. 2020:1-15.

[3] Rees M, Hoke T. A short guide to ethical editing for new editors. Committee on Publication Ethics. ; 2011.

[4] The Office of Research Integrity. Tips for avoiding plagiarism.

related inputs. The scope of this follow-up interviews is to evaluate the CCWs methodology and the way in which the CCWs were carry out.

(some of the comments are reported in first person)

Research environment

- I'm struggling to remember specific outputs. We were mostly focused on clustering things. There was debate and discussion trying to do that. I think a lot of this had to do with differences in use of language, rather than actual material differences in opinion. It seemed more like trying to find a common grouping or theme and the right word for it. It was rendered more challenging because of differences in the use of language and limited time in kind of discussing these.
- We need to focus a bit more on making the outputs of the workshop more user-centric, so ensuring that actually the outputs can be taken up and implemented in a variety of settings. Obviously research institutions across Europe and the world have different structures, but obviously the project is trying to come up with broad practices and resources; it's important that they are taken up and embedded and are actionable. Focusing on barriers, what is specific in participants' institutions that might hinder and help embedding these principles, would be helpful.

Education and training in RI

- There was one thing I remarked at the end, that of course all of us we know that RI is extremely important, but if you think in terms of setting up courses for people who are new to this topic, it's extremely important to explain why RI is important. Of course, it comes partly down to if you want to do science you have to be able to trust the science. It also has to do with having trust in organizations. If people in your organizations are actually badly manipulating data and that is discovered by a journalist, that is a very negative image of your organization and that will last for a long time. The first, the science part people realize, but the second point they don't realize (that they might harm their employing organizations).
- We were told explicitly to not be realistic. We didn't stick to that fully, but it was part of the instructions. We discussed things out of a real context, which may result in the outcomes of the discussions and things having some limited use when it comes to creating guidelines. There you have to be careful with taking into account the reality. That might be something. I can see why you are doing this since you want an open discussion and it's important to dream. As a basis for guidelines, there is an important middle step there to go to the real world. That might be the most challenging part. The question of the ideal training program: it would be comprehensive, and everyone would participate voluntarily, that's the dream, but it will not happen. You need tools and guidelines that make the best out of the real situation,

such as that people will not participate unless forced to but then they will not get much out of it.

Responsible supervision and mentoring

Nothing specific was mentioned.

Independence

- Some definitions are needed in the manual about the working definition of independence. How do you want to frame it?

Selection and evaluation of proposals

- Some clarity about what we are covering under research integrity would be good, as there were different perspectives on this during the workshop. Also good to cover would be: which aspects of diversity should be in a plan and what should a plan cover? Another important thing is the remit of funders. The level of oversight varies between funders, so there should be caution when discussing things such as how do we evaluate methodology? For some funders, there is a dependency on the community and other external parties. It might be that funders need to ensure processes rather than actually monitoring themselves. It's important to be clear about who is responsible for what. This does not necessarily need to be covered in a guideline but should be taken into account. Research organizations will implement processes around research integrity. Funders have the role to have things in place. For instance, we won't be looking at ethics approval. We find the confirmation through systems that are in place. Ethics is just an example, there are other things like data management. Responsibilities can be muddled up in guidelines sometimes. To create alignment in guidelines for different topics, it might be helpful to use similar headings for funders and keep roles clear. It might be helpful to have the same headings but different guidelines depending on the stakeholders

Monitoring of funded projects

- Many funders do not look at RI explicitly, but rather at related concepts such as research relevance and impact. RI is an element of research quality. You can explain this when you are educating researchers, but it's framed differently for funders. It's important to keep this big picture in mind.
- At a certain point, we stopped when we were talking about RI, when asked about what funders should not monitor when it comes to the subtopic of compliance with RI requirements. It was kind of a surprising question. Maybe if we can have some inspirations here, if it's possible to have them. I think we were totally blocked here. I had the feeling that

we were less constructive, less active, we had less ideas in this part, which is a key part for the guide. We have maybe more general knowledge.

During the interviews, **general inputs** on the development of RI-related guidelines were also collected:

- It has been a while since I last made guidelines myself and other similar documents, but there are guidelines on how to write guidelines. I think it might be useful for you to use that in thinking for the next steps. It's a pity if you create guidelines in a way that is, based on guideline research, not the optimal way to write guideline. In the workshop, I provided some thoughts: who is your target group, what forms of communication platforms are you using? I will mail it to you, and it's worthwhile to look this up yourself. Guidelines are used in many settings from very strict settings, to for other domains. It's good to have some thinking around that.
- Minority views are as important as majority views. It will be a difficult exercise, because co-creation is not only meant to see what is mainstream but what are possibly dissenting views. The dissenting views are the ones that are more problematic, more novel and innovative.
- One thing I dislike in the idea is the title of the project, SOPs. I'm all for SOPs for lab work, since it should be standardized to obtain good quality research. But having said that, it's an illusion to think that SOPs will present or are a guarantee for integrity. And so, the message that is given by the title is to me almost an oxymoron. But I understand why it's there. We need something that's standardized but scientific integrity to me is not only guidelines, let alone SOPs. I'm critical and would advise to be critical about this. You risk being pushed into a direction that will give an illusion of scientific integrity, whereas it's broader than that. To be blunt, I don't think culture and ethics can be reduced to observance of SOPs. They are necessary, I've tried to work in as reasonably standard way when it comes to doing lab analysis, but I don't think that that is enough. Certainly not when you talk about guidelines. These things can be discussed, and maybe so at the next workshops.
- Content wise, I think at times I was a little bit confused about what perspective I was providing content for: from the perspective of a funder or reviewer or from the perspective of the researchers? Which hat was I wearing? Sometimes I didn't have that clarity.

3.2.7 Analysis of the workshops

Two working groups analyzed all data collected independently. The RPO-related CCWs were analyzed by the Amsterdam team (JT, KL, IL, NAB, NS) while the RFO-related CCWs were analyzed by the KU Leuven and EARMA (KD, DP, BT, NK). The full analysis was carried out using a dedicated MIRO board (created by KL) specific for each topic.
The analysis was carried out as follow:

- **Reading the transcripts and selection of the quotes**

The CCWs transcripts, the notes from the follow-up interviews were read individually within the working groups. Important quotes related to each sub-topic were highlighted.

- **MIRO board**

Each team member had a look at the MIRO board sessions to extrapolate all-important inputs related and/or not to each sub-topic.

- **Clustering**

All important quotes and all important inputs coming from the sessions related to the same topics were analyzed in a CCW within the two working groups. Similar quotes and the CCWs inputs were clustered together and labeled, in order to identify specific themes.

- **Creating visual results**

After having clustered and labeled, visual representations of the results of the first set of CCWs were created. Analysis posters for the following topics, **namely research environment, education and training in RI, responsible supervision and mentoring and monitoring of funded project** were created and used as sensitization material for the second set of workshops **(Appendix 6.6 - analysis posters SET 1 CCWs sessions)**.

3.2.8 Creating the skeleton guidelines V1

After the creation of the visual representations of the outcomes of the CCWs, each working group drafted a skeleton guideline for each of the six topics addressed during the first set of CCWs. The development of the skeleton guidelines V1 served as starting point in preparation of the second set of CCWs and the development of the skeleton guidelines V2.

3.2.8.1 Skeleton guidelines V1 for RPO-related topic and sub-topics

3.2.8.1.1 Research Environment

Items written in black are based on the empirical work from the first round of co-creation workshops
Items written in blue are based on other insights from the SOPs4RI project and included in the skeleton guidelines from the initial SoRs.

Community building for a positive research culture

Title of skeleton guidelines:

Guideline for community building for a positive research culture in research institutions

Guidelines:

1. Ensure that researchers can work in a safe, inclusive and open environment where they feel responsible and accountable, can share concerns about dilemmas and can discuss errors made without fearing the consequences ('blame-free reporting').

    a. Create opportunities for community building activities
    b. Create fora, open discussions and dialogues for sharing research activities, viewpoints and ideas

2. Ensure transparent cooperation and responsible leadership

    a. Ensure leaders positively influence the research environment of their team
    b. Implement an open-door policy with research leaders
    c. Facilitate regular meetings between leaders, research staff, managers and support staff

3. Ensure responsible performance management, assessment and evaluation

    a. Revise evaluation processes and criteria and ensure implementation by committees
    b. Assess research on aspects such as versatility, quality and actual impact of research
    c. Assess researchers on non-research related tasks, such as supervision, leadership, peer review
    d. Do not assess research on standard metrics such as bibliometrics and impact factors
    e. Appreciate all research outputs, including those that are not published in high impact factor journals

4. Provide training

    a. Provide research integrity training for all within institutions
    b. Provide diversity and inclusion training
    c. Apply direct training on how to effectively recognize and produce transparent and reproducible research (from experimental design through to publication) to help alleviate researchers' stress and improve their mental well-being.

5. Implement an institutional framework for diversity, equality and inclusion

a. Implement a policy and action plan for diversity, equality and inclusion
b. Facilitate opportunities for researchers to get acquainted with each other's research projects from different disciplines
c. Provide diversity and inclusion training
d. Embrace cultural intelligence, i.e. that all cultural backgrounds should be considered

6. Implement an institutional framework for support mechanisms, documents and infrastructure

a. Implement an institutional framework for good scientific practice which provide support mechanisms, documents and the appropriate infrastructures
b. Ensure existing support services are reachable and findable. Examples of support systems are:
    i. RI services
    ii. Library services
    iii. Data management services
    iv. Information services and package for new employees
    v. Gender equality support
c. Ensure guidelines and documents are findable and practical. Examples of support documents are:
    i. Capturing and implementing feedback
    ii. Collaborating with industry
    iii. Data management plans
    iv. Open access policy
    v. Promotion processes
    vi. Gender equality assessments
    vii. Whistleblowing guidance

7. Provide guidance and incentives for good mentorship

a. Ensure guidance and incentives for good mentorship
b. Foster an inclusive research environment and best practices by setting an example of good mentorship culture
c. Implement training and other institutional tools to promote good mentorship
d. Reward good mentorship
e. Support mentors to work with students

8. Appoint support persons within institutions to foster and support research integrity, including:

a. Research integrity officers,
b. Library services,
c. Gender equality support,
d. RI information services

9. Appoint an RI champion per faculty or department to support the research environment.

10. Pay sufficient attention to the psychological health and well-being of research group members and the people who lead them.

a. Provide team leaders the tools necessary to assess the health of the researchers working in a group.
b. Set standards for avoiding the mistreatment of people.
c. Ensure prevention and when necessary, appropriate response to harassment in the field, lab, office and at conferences

Managing competition and publication pressure

Title of skeleton guidelines:

Guidelines for managing competition and publication pressure in research institutions

Guidelines:

Related to the research environment

1. Provide researchers with the freedom of setting their own research agenda

a. Allow more creativity in setting up and performing research
b. Allow for more time to work on publications truly reflecting the interests of the researcher
c. Incentivize researchers to only write grant proposals for calls fitting their research
d. Ensure the research setting reflects societal needs, and recognizes future problems which require sustainable solutions through scientific research
e. Increase academic freedom to also research areas which are not always considered a prioritized area of research
f. Avoid monetary incentives.

2. Foster a culture of coordination and collaboration

a. Foster collaboration
   i. Incentivize internal collaboration to avoid researchers apply for the same grants
   ii. Incentivize internal collaboration to apply for joint collaborative projects
b. Remove barriers between fields
c. Reward, promote and incentivize interdisciplinary research
   i. Allow the possibility to publish interdisciplinary work in journals of the specific disciplines for community endorsement and engagement
   ii. Incentivize collaboration between various institutions to prepare joint publications to reduce publication pressure of early career researcher
   iii. Maintain integrity and best practices between fields

Related to rewarding and valuing researchers

3. Incentivize rewards and incentives for research and research-related activities

a. Reward and evaluate non-publication activity
   i. Teaching
   ii. Peer review
   iii. Editorship
   iv. Supervision
   v. Dissemination
   vi. Impact in society

4. Adopt responsible evaluation practices

a. Have a holistic approach to evaluation
b. In evaluations and promotions ask for a selected list of publications and ask the researcher to reflect on their work to move from quantity to quality.
c. Set and clarify the diversity of criteria used in evaluation, including mandatory criteria for all those receiving evaluation and role-specific evaluation criteria
d. Endorse and implement DORA, the Hong Kong Principles, the Leiden Manifesto

5. Create and implement a research career roadmap

a. Ensure stability and opportunities of career paths
b. Create shared responsibility between the institution and those with short-term contracts/early career researchers to strengthen the position of the early career researchers to remain within the institution

c. Allocate part of funding to junior researchers when senior researchers receive grants
d. Older investigators should be encouraged to move into alternative stages of their career — working in teaching, mentoring and science advocacy — that don't require research funds. This could help a shift of resources to the younger people.
e. Develop a research career roadmap which includes:
    i. Long term prospects for within academia
    ii. Possibility to develop the relevant skills and requirements to transition to industry

Related to publications and workload

6. Ensure that publications are qualified

a. Provide training on good publication practices
b. Prevent bad publication practices by:
    i. Not asking for long publication lists
    ii. Focus on the overall output of the researcher, rather than only their publication
    iii. Recognize the quality, not only the quantity of publications
    iv. Find ways to make clear the importance of publishing negative and null results.

7. Ensure a balance in researchers' workload

a. Ensure researchers have dedicated research time
b. Ensure researchers have equal opportunities to publish
c. Ensure researchers can balance teaching and research activities
d. Implement strategic selection of funding calls within institutions. Send one strong funding call to decrease competition in a certain field
e. Ensure well-being of researchers
    i. Implement surveys to investigate the well-being of staff members and act upon the findings to improve perceived pressure and stress

Adequate education and skills training

Title of skeleton guidelines:

Guidelines for providing adequate education and skills training in research institutions

Guidelines:

1. Foster cooperation, communication and discussion among researchers to ensure that they can learn from each others' skills

a. Ensure established researchers have a background in collaboration and openness
    i. Foster cooperation with management, researchers and support staff
b. Have an open door policy and open communication practices
    i. Create fora for discussions and plan internal meetings
c. Ensure good peer review practices at all levels of research

2. Create support offices

a. Have support offices to support in open science and best practices
b. Reward and recognize the cooperation with and the dependence on the support staff

3. Develop a relationship with industry to ensure researchers have transferable skills for future employment

a. Transferable skills include
    i. Organization management
    ii. Negotiation skills
    iii. Communication skills
b. Clarify to researchers and research leaders under which circumstances new industry collaborations are allowed (e.g. collaboration with the tobacco industry is prohibited)
c. Tackle negative attitudes towards those leaving academia

4. Provide adequate guidance about good research practices, in which the responsibility of research leaders and institutions is also clarified (e.g. related to grants, conflict management, research practices, etc.)

5. Provide sufficient training to researchers on various hard skills required for their work:

a. Create a large course at the beginning of academic career, and smaller, tailored courses throughout careers
b. Embed history and status of science in educational programs to teach general understanding of science
c. Education and regular updates on research methods
d. Leadership skills for principal investigators

6. Ensure strong mentorship during degree phases to teach young researchers the right research methods

7. Provide sufficient support for data management practices

a. Ensure there are sufficient data support structures, including human resources (e.g. data stewards, data offices) and those are accessible
b. Have control and understanding about data: storage, meta-data, data management, etc.
c. Create good and easy to use data repositories
d. Have clear structures for data management plans
e. Research leaders should support group members in adequate data management
f. Ensure researchers transferring data between institutions do this properly

8. Implement strategies to also train and support researchers' soft skills (curiosity, empathy, listening skills), organizational, project management, and reproducibility expertise

9. Implement audits and feedback structures focusing on researchers' skills

a. Allow possibility for giving constructive feedback as a team to each other, and specifically to supervisors and research leaders
b. Implement audits on open access compliance
c. Auditors should be qualified to conduct audits.

Diversity and inclusion

Title of skeleton guidelines:

Guidelines for diversity and inclusion in research institutions

Guidelines:

1. Implement a structure of data collection and metrics for diversity and inclusion

a. At the center of any diversity and inclusion guideline or policy should be data collection and metrics on diversity and inclusion to evaluate the status of the institution which will aid in improving the D&I policy
b. All aspects of diversity should be included in the data collection: including gender, ethnicity, disabilities, socio-economic background, etc.

2. Adopt institutional policies on diversity and inclusion

a. Create action plans on diversity and inclusion with clear deliverables, timeline, resources and responsibilities

b. Implement a holistic institutional framework on increasing diversity and inclusion where various issues are addressed including recruitment, promotions, mentorship, research performance assessment, training, etc.

3. Have high level institutional awareness and commitment

a. Institutions should commit to and prioritize diversity at the highest level
b. Create a holistic diversity policy that not just consists of different components but connects all aspects
c. Create a diversity policy within institutions from the highest levels to ensure complete embedment within the entire institution
d. Clearly communicate the diversity and inclusion policy
e. Include cultural awareness, tolerance and openness, acceptance of different ideas and viewpoints, raising awareness and celebrating diversity policies and practices that promote diversity and inclusive environment
f. Sign up to the principles of the Athena SWAN Charter and adopt other employment practices that support diversity and inclusion

4. Building a supportive community for diversity and inclusion

a. Create a supportive and safe space for people to express their thoughts and feelings, speak of the racism they experience inside science as well as outside.
b. Involve researchers bottom up to increase community engagement and to make diversity and inclusion an institutional priority

5. Adopt models, examples and representations

a. Have role models and success stories of individuals or teams to set an example for others
b. Establish diverse top-management teams
c. Have open discussions about research at all levels

6. Create support systems

a. Have safe and transparent mechanisms in place for reporting diversity and inclusion issues
b. Have procedures for whistleblowers in place
c. Have support structures in place to allow mediation and discussion

7. Ensure a safe space for all

a. Ensure that researchers can work in a safe, inclusive and open environment where they feel responsible and accountable, can share concerns about diversity and inclusion issues, racism, sexual harassment and discrimination.

8. Provide diversity and inclusion training program and practices, such as:

a. Have diversity and inclusion as a part of standard training
b. Have separate diversity and inclusion training
c. Provide diversity and inclusion workshops
d. Build diversity and inclusion into research induction
e. Offer courses related to diversity and inclusion, such as:
    i. unconscious bias
    ii. sex/gender dimension in research

9. Reward diversity and inclusion by giving 'gold medal' for the diversity status of the institution

10. Implement recruitment sensitive to diversity and inclusion

a. Create a shared and transparent plan of recruitment procedures
b. Remove physical barriers for people with mental or physical disabilities
c. Introduce specific training on unconscious bias, focusing on managers who are part of interview board

11. Ensure diversity in research samples (e.g. include minorities)

3.2.8.1.2 Education and training in RI

Items written in black are based on the empirical work from the first round of co-creation workshops
Items written in blue are based on other insights from the SOPs4RI project

Pre-doctorate research integrity training

Title of skeleton guidelines:

Guidelines on pre-doctorate research integrity training for research institutions

Guidelines:

At the Bachelor/Master level:

1. Provide training to students who do research
2. Integrate research integrity training into the curriculum (e.g. as part of thesis process), making it mandatory

At the PhD level:

1. Offer a mandatory course about the basics of research integrity at the start of the PhD
   a. Employ trainers with general expertise in research integrity
   b. Empower trainees to speak up in their teams, by teaching them about institutional policies.
   c. Provide RI trainings as complete courses rather than one-off workshops
   d. Provide multidisciplinary trainings, but ensure that trainings sufficiently address the specific challenges faced in the disciplines of the trainees.
2. Follow up with optional specialized courses throughout the PhD
   a. Employ trainers with specialized expertise
3. Supplement formal training with regular informal discussions at departments
   a. Mix junior and senior researchers in some of these sessions.

At all pre-doctorate levels:

1. Employ suitable trainers
   a. Employ young and enthusiastic trainers whom the trainees can relate to
   b. Involve faculty in the delivery of trainings
2. Ensure that training is continuous
3. Provide substantive contact hours for trainings
4. Emphasize practice over theory in trainings
   a. Teach students the basic values of research integrity
   b. Focus on the daily practice of research, rather than emphasizing ethical theory
   c. Integrate relevant practical elements of research ethics issues into research integrity trainings
   d. Address cultural differences in the understanding of research integrity during training
   e. Discuss case studies and real-life examples during trainings
   f. Update research integrity courses based on trainees' needs

5. Use blended-learning formats, combining online and off-line training approaches
6. Provide tangible rewards, such as digital badges, to make trainees enthusiastic.
7. Ask students to reflect on research integrity in their theses, to evaluate the training effectiveness
8. Foster a positive research culture
    a. As a prerequisite for training, to allow trainees to speak freely and engage in open discussions
    b. Through training.

Research integrity training for post-doctorate and senior researchers

Title of skeleton guidelines:

Guidelines on post-doctorate research integrity training for research institutions

Guidelines:

1. Offer mandatory courses about research integrity basics for post-doctorate researchers starting a new position.
    a. Employ trainers with general expertise in research integrity
    b. Supplement the mandatory trainings with follow-up peer support meetings.

2. Follow up with optional specialized trainings every 2-3 years at all post-doctorate levels.
    a. Provide easily accessible online modules with specialized content.
    b. Employ trainers with specialized expertise

3. Organize informal events to raise awareness and discuss research integrity.

4. Teach post-doctorate researchers about research integrity by asking them to teach about the topic at the pre-doctorate level

5. Incentivize trainings:
    a. Label trainings as 'Masterclass' rather than ‘training’ to make them sound more attractive.
    b. Do not label trainings with normative titles such as ‘research integrity’, but rather use more relatable and neutral terms
    c. Integrate research integrity trainings into existing courses

   d. Link research integrity and research integrity training to funding, promotions, ethics review, etc.
   e. Highlight the importance of research integrity training in preventing reputational damage.

6. Employ suitable trainers
   a. Involve senior peers in the training delivery
   b. Employ young trainers who can communicate clearly

7. Pay sufficient attention to disciplinary differences in trainings:
   a. Provide training programs where different disciplines can come together.
   b. Provide disciplinary specific training at the department level.

8. Tailor the trainings to the needs of the trainees:
   a. Use a bottom up approach to training, where training focuses on the needs and questions of the trainees.
   b. Address cultural differences in the understanding of RI in training.
   c. Tailor the training approach based on the exact target group, as senior post-doctorate researchers will need a different strategy than more junior ones.
   d. Give researchers the space to share stories and challenges.
   e. Focus not only on the role of the researcher, but also that of the reviewer
   f. Update research integrity courses based on trainees' needs

9. Evaluate training effectiveness using appropriate measures such as
   a. Performance (such as decision making in ethics cases)
   b. Knowledge (such as knowledge of human subjects regulation)
   c. Climate (such as the extent to which individuals endorse ethical behaviors)
   d. Products (such as self-reflection exercises)
   e. Organizational outcomes (such as a drop in the incidence of ethical violations)

10. Foster a positive research culture
   a. As a prerequisite for training, to allow trainees to speak freely and engage in open discussions
   b. Through training

Training of research integrity personnel & teachers

Title of skeleton guidelines:

Guidelines on training of research integrity personnel & teachers for research institutions

Guidelines:

1. Provide trainings, where personnel from various departments at the institution are brought together to share roles, experiences, and discuss how to work together.
    a. Include: research integrity committee members, data management personnel, legal staff, library staff, research integrity trainers, researchers, policy and management staff, confidential counselors, etc.
    b. Teach staff the relevant skills needed for their role.
        i. Research integrity officers/committee members should address skills relevant for responsibly investigating allegations of misconduct.
        ii. Confidential advisors/counselors/ombudspersons should address facilitation, mediation and interpersonal skills.
    c. Discuss case studies, relevant for the institution, to learn from each other.
        i. Less experienced staff should be presented with possible cases they might face.
        ii. More experienced staff can present their own cases and discuss how they have dealt with them.
    d. Help staff understand researchers better
    e. Face-to-face trainings are more suitable here, but online sessions can be used to supplement the face-to-face components.

2. Provide train-the-trainer trainings to research integrity trainers
    a. Ensure that trainees learn about the foundations of research integrity and ethical theory
    b. Teach training methods to trainees

3. Provide multidisciplinary trainings where disciplinary considerations can be discussed

4. Provide trainings regularly, with new trainings offered at least when policies/regulations/infrastructures change.

5. Include researchers in the trainings

6. Facilitate the formation of European level support groups about research integrity to support peer-to-peer learning.
    a. Facilitate the sharing of institutional resources with others.

7. Hire enthusiastic trainers with research experience.

8. Commit strongly to research integrity training, also for staff
    a. Evaluate the training programs to assess how helpful they are

9. Reward RI teachers and support personnel for their work
    a. Reward support staff with good career opportunities and appreciate their work.
    b. Reward researchers who also take on support roles.

RI counseling and advice

Title of skeleton guidelines:

Guidelines on research integrity counseling & advice for research institutions

Guidelines:

1. Appoint trustworthy trained official confidential counselors, familiar with research, whom researchers can turn to in case of doubts or questions per department.
    a. Clearly communicate to researchers that counselling is confidential.
    b. In case of misconduct queries, the counselor should have some power and the tools to help the researcher that has approached them, in case that is desired by the researcher
    c. The official confidential counselors' contact details should be published on the institutional website
    d. A clarification should be given on what researchers can and cannot expect from this contact person.
    e. The official confidential counselors could also be the first contact point for any researcher who is considering filing an allegation of misconduct.

2. Research institutions should provide researchers with contact persons for advice on specialized/domain specific RI issues

3. Recruit volunteers to be research integrity stewards and to act as informal 'first aid responders' to researchers with research integrity questions, in order to guarantee that researchers have access to low-threshold counseling.

a. The RI stewards do not have to have undergone official counsellor training, but should be knowledgeable about and experienced with RI issues.
b. The name and contact details of RI stewards should be made available to all staff at the faculty/department

4. Ensure that the counselors and research integrity stewards are visible, approachable and easy to find.

5. Provide an online help desk where researchers can pose simple questions about RI and obtain answers either directly and/or in the form of FAQs.

6. Have a strong institutional commitment towards providing RI support.
   a. Allocate sufficient resources and time to counselors, both reactively and proactively.

7. Include counselors & support staff in policy and education, so that counseling can improve policy and education and vice versa.

8. Offer people in support roles the possibility to climb the career ladder by offering higher positions.

3.2.8.1.3 Responsible supervision and mentoring

Items written in black are based on the empirical work from the first round of co-creation workshops
Items written in blue are based on other insights from the SOPs4RI project

PhD guidelines

Title of skeleton guidelines:

Guideline for PhD mentoring and supervision in research institutions

Guidelines:

1. Inform PhD students about their responsibilities clearly in a guideline
   a. Communicate information of rights and responsibilities, rules and deadline policies
      i. Stress that PhD students should inform their supervisor in case of problems or challenges.
   b. Communicate the expected workload of a PhD.

c. Ensure students are aware of ethical considerations and practicalities pertaining to their projects.
d. Maintain a communication policy that allocates time specifically for addressing needs of PhDs.
e. Ensure that students know contacts of institutes' ombudspersons.

2. Require supervisors and PhD students to sign binding written agreements regarding supervision about:

    a. Discussing differences in expectations early on in the process and maintaining transparent communication.
    b. Clear rules for roles and responsibilities.
    c. How to address and incentivize not only practical issues, but also social relationships

3. Set requirements for responsible supervision/mentoring and communicate them to PhD students.

    a. Limit the number of mentees per supervisor.
    b. Require supervisors to be available to students
    c. Require clear communication between supervisors and PhD students.
    d. Ensure that superiors address specific needs of the PhD student.

4. Provide adequate support and training for PhD students.

    a. Host supervision seminars and obligatory training of research integrity and academic writing.
    b. Train PhDs to become aware of good supervision through supervising MA students themselves.
    c. Use trainings as an opportunity to increase students' awareness of their own needs

5. Facilitate peer support groups for PhD students: PhDs for/to PhDs

    a. Foster an interactive PhD community.
    b. Facilitate formal and informal sharing and support for difficulties from past and present PhDs.
    c. Facilitate interdisciplinary discussions in small groups
    d. Organize events where former PhD students can share practical advice and tips with current students.

6. Create a space for the exchange of ideas between supervisors and PhDs.
    a. Provide opportunities for feedback, ideas and experiences.
    b. Organize peer groups with students and senior researchers.
    c. Facilitate discussions between individuals from different disciplines.
    d. Encourage PhDs to ask for guidance in complying with policies and procedures and facilitate this process.
    e. Provide constructive feedback sessions oriented towards supervisors.
    f. Integrate the above into annual review meetings.

7. Provide an independent body PhDs and supervisors can turn to in case of problems.

8. Foster students' self-care and well-being.
    a. Ensure students know where to go when they face problems.
    b. Assist PhD students in understanding and respecting their own needs.
    c. Facilitate interdisciplinary student discussion groups.
    d. Provide both formal and informal settings for communication between students.
    e. Provide peer support possibilities out of one's own social group.

Supervision requirements and guidelines

Title of skeleton guidelines:

Guideline for supervision requirements and guidance in research institutions

Guidelines*:*

1. Ensure that supervisors have sufficient time for supervising research
    a. Allocate official research time to all doing research, including e.g. clinical researchers
    b. Allocate official supervision time to all supervisors of research
    c. Limit the number of PhD students per supervisor

2. Provide supervisors with the necessary support structures needed to supervise
    a. Provide and disseminate clear rules and procedure about supervision
    b. Set-up an independent body to periodically evaluate supervision and provide feedback
    c. Provide training and supervision seminars
    d. Facilitate supervisor commitment to their supervisees

e. Provide structures and policies which place a stronger focus on negative results and replication studies
f. Set-up supervisor peer-support systems to ensure that supervisors also have someone to turn to for advice and support regarding supervision.
g. Support and engage in research on supervision

3. Provide obligatory training on supervision to all supervisors
    a. Train supervisors directly
    b. Involve more experienced supervisors in the training of less experienced supervisors

4. Promote a positive research environment which fosters good supervision
    a. Promote a positive error culture
    b. Value supervision as an important part of the research endeavor
    c. Use trainings as a tool of fostering culture change

5. Facilitate a positive interaction between students and supervisors
    a. Prevent PhD students from becoming lonely
    b. Facilitate open and direct communication
    c. Facilitate discussion between supervisors and supervisees
    d. Ensure easy access to the supervisor for the supervisee
    e. Ensure regular meet-ups between the supervisor and supervisee and provide supervisors with guidance on what to discuss with supervisees, e.g.
        i. Teaching students rules
        ii. Providing students with constructive feedback
        iii. Supporting students, also when they obtain disappointing results
        iv. Acknowledge the accomplishments of supervisees
        v. Engage in open and responsive communication with the PhD student about questionable research practices
        vi. Establishing standards for research

6. Set requirements for supervision
    a. Provide supervisors with golden standards and examples
    b. Require supervisors to meet with their supervisee at least twice a month
    c. Provide supervisors with a list of requirements to meet as supervisors, such as:
        i. Familiarity with PhD procedures
        ii. Ensure that supervisees are aware of PhD procedures

iii. Provide support and personal guidance to supervisee
iv. Know whom to turn to and when, when there is a need to refer the supervisee to other personnel (e.g. for psycho-social support).
v. Act as exemplars.
vi. The skills necessary to communicate effectively with supervisees from different cultures
vii. Be able to balance between supporting supervisees and allowing them to grow as independent researchers.

7. Ensure that only suitable people take on the role of supervisor
    a. Train supervisors to become competent
    b. Ensure that supervisors are sufficiently qualified in the specific research field of their supervisee
    c. Allow good researchers who are not suitable supervisors to progress in their career without the need to supervise.

8. Require supervisors and PhD students to sign written agreements regarding supervision about
    a. Who is responsible for what and when
    b. What the differences in expectations between the supervisor and supervisee are and how they will be tackled.

9. Reward and recognize good supervision
    a. Reward supervision through soft measures
    b. Give supervision more acknowledgement as an important task in the research process.

Building and leading an effective team

Title of skeleton guidelines:

Guideline for building and leading an effective team in research institutions

Guidelines:

1. Organisational structures related to leadership need to be in place
    a. Invest and improve in support services for research leaders concerning
        i. Finances
        ii. Grant writing and publications
    b. Invest and improve in protecting against research leadership concerning
        i. Research misconduct
        ii. Leadership failure
        iii. Ensuring there are no cover-ups when it comes to (failing) leadership

2. Facilitate training for leaders
    a. The content of the training should include
        i. Improving knowledge and communication on research integrity
        ii. Learning soft skills, such as management skills
        iii. Being a good and effective leader
    b. Training should become part of the employment package

3. Provide means for leaders to build a community
    a. Create 'leaders for leaders groups' for leaders to learn, support, exchange, discuss, engage and share
    b. For leaders to be able to create a positive environment
    c. For leaders to build their own team with own knowledge base

4. Ensure the well-being of the research leader
    a. Provide guidance to leaders on balancing their time between their own needs and those of their team members
    b. Provide support services for well-being

5. Ensure that only suitable people take on the role of research leader
    a. Important skills and personality traits of research leaders are
        i. To have the same skills as the research team
        ii. To have good communication skills - institutions should require research leaders to develop clear policies and procedures on collecting, maintaining and communicating data with the research group/team
        iii. To have a positive attitude
        iv. To have interpersonal skills and empathy
    b. Ensure that research leaders are sufficiently qualified in the specific research field

c. Allow good researchers who are not suitable research leaders to progress in their career without the need to take on research leader tasks

6. Promote incentives for good leadership
    a. Create the right research environment which sees good leadership as important
    b. Recognize supervision as an important task of a research leader
    c. Recognize different ambitions and talents

7. Introduce good criteria for promotions and assessment
    a. The focus should not lie with only publications and grants
    b. Have periodic reviews of leaders

8. The institution shows a responsibility towards the system of science - the institutions should ensure a positive environment to change the system of science
    a. To slow down science
    b. Take responsibility to keep up with global developments of science
    c. Allow error culture

9. Provide the opportunity for research leaders to have freedom to set the directions of research
    a. Freedom to change the research plan when necessary
    b. Regulation should not prevent changing research plans

10. The responsibilities of research leaders should be stipulated
    a. Institutions should provide clear guidance to team leaders how to manage their teams as well as setting out clear lines of accountability
    b. Institutions should ensure that team leaders do not have research groups that are too large to be effectively managed
    c. Institutions should clearly demarcate the responsibilities of the institutions and of the research leader
    d. Research leaders should check crude data to ensure understanding
    e. Research leaders should be incentivized to do research themselves
    f. Research leaders should devote attention to individual research and team members
    g. Research leaders should ensure cooperation and communication among team members

h. Research leaders should ensure team members are performing the tasks which are right for them (*team members are content/happy with their tasks)*

11. Ensure that research leaders pay attention to the human nature of research

i. Allow leaders to create a team with sufficient knowledge
j. Ensure research leaders devote sufficient time to each project
k. Incentivize research leaders to learn how to allow individual researchers to do research their own way and to explore
l. Incentivize research leaders to let the interests of team to come before the interests of the research leader
m. Measures should be in place to prevent the abuse of power and exploitation of dependent relationships, both at the leadership level and the individual level

3.2.8.2 Skeleton guidelines for RFO-related topics and subtopics

3.2.8.2.1 Independence

What counts as an unjustifiable interference?

Title of skeleton guidelines:

Guidelines on what counts as an unjustifiable interference for research funders

Guidelines:

1. RFOs should have an extensive description/definition of justifiable and unjustifiable interferences.
    a. Interferences form third/external parties with the selection and evaluation process of proposals are unjustifiable
    b. Interferences by RFOs during the evaluation and selection process of the proposals is justifiable in case of breaches of integrity
    c. In general, blocking the publication of certain data and interfering with the publication process is unjustifiable, unless specific conditions are foreseen
    d. Interferences with the selection of the proposals or with the expected outcomes of research depending on political orientations are unjustifiable
    e. Preselection of topics is justifiable in the case the money (public or private) is allocated for a specific purpose/objective

f. In general, changing deadlines is not allowed unless specific conditions are foreseen. Changing deadlines is allowed in case of specific unpredictable events (e.g. COVID-19)
g. RFOs can interfere in case of possible breaches of integrity during the evaluation and selection process, the monitoring of the projects, and during and after the publication process

2. RFOs should take into consideration all possible external interference during all phases of the grant process
    a. special attention should be given to collaboration with industry sponsor, political requests and other external parties

3. RFOs themselves should take enough distance from all evaluations related to the proposals and guarantee impartiality within the selection process

4. RFOs should take into account local/institutional considerations when developing a definition of unjustifiable interference:
    a. National RFOs should take into consideration institutional differences concerning the management of funded projects
    b. International RFOs should take into consideration national differences concerning different legislations or guidelines related to RI

5. RFOs should have in place a Conflict of Interest Policy in order to avoid interference from third parties

Preventing interferences by the funders

Title of skeleton guidelines:

Guidelines on preventing interferences by the funders for research funders

Guidelines:

1. RFOs should commit to refrain from unjustifiable interfering with any research process

2. RFOs and all staff members must be impartial and independent in:
    a. formulating research agendas
    b. setting out calls
    c. selecting proposals
    d. monitoring research, after the research is presented
    e. and all other aspects of research

3. Potential interference will be regularly assessed by the RFO in several stages of the research process using a checklist
    a. in the selection of proposal
    b. the monitoring of proposals
    c. and the final reporting of the proposal

4. RFOs should have in place transparent procedures on all possible Conflicts of Interest within the funding agency or between the evaluators/reviewers and the applicants

5. RFOs should guarantee a pool of independent and international experts/reviewers/evaluators in the selection and evaluation of proposals, to ensure impartiality and transparency

6. All RFOs procedures should be publicly available to ensure transparency
    a. RFOs should have in place a quality assurance system and monitoring system to ensure transparency

7. RFOs should not interfere with the publication plan proposed within the proposals

Preventing influence from political/other external influences

Title of skeleton guidelines:

Guidelines on preventing interferences from political/other external influences for research funders

Guidelines:

1. Clear, transparent and open communication should be in place between the different stakeholders in the selection of the priority (e.g. selection of the topics to grant)
    a. Different/external stakeholders should be involved in setting priorities concerning the allocation of the money

2. RFOs should maintain independence and not be influenced by any government or external parties and this position should be regularly evaluated
    a. RFOs should maintain an intermediary position between the government, researchers/research institutions, the press and other stakeholders
    b. RFOs should have an independent/international board in order to prevent any possible political/external interference
    c. To avoid interference by third parties, RFOs should have in place sound, detailed, step-by-step and transparent procedures

3. The committee members of research funding programs should be regularly screened for potential political interference

4. Communication to the public should run through official communication channels of the funder

5. RFOs should (ideally) allocate their money freely without political/external/commercial interference unless.....

Preventing interferences from commercial influences

Title of skeleton guidelines:

Guidelines on preventing interferences from commercial influences for research funders

Guidelines:

1. Clear guidelines about commercial collaborations/co-financing projects with external-commercial partners should be available
    a. conduct or sponsor research that is factual, transparent, and designed objectively; according to accepted principles of scientific inquiry, the research design will generate an appropriately phrased hypothesis and the research will answer the appropriate questions, rather than favor a particular outcome;

b. require control of both the study design and the research itself to remain with scientific Investigators
c. not offer or accept remuneration geared to the outcome of a research project;
d. prior to the commencement of studies, ensure that there is a written agreement that the investigative team has the freedom and obligation to attempt to publish the findings within some specified timeframe;
e. require, in publications and conference presentations, full signed disclosure of all financial interests;
f. not participate in undisclosed paid authorship arrangements in industry-sponsored publications or presentations;
g. guarantee accessibility to all data and control of statistical analysis by investigators and appropriate auditors/reviewers; and
h. require that academic researchers, when they work in contract research organizations or act as contract researchers, make clear statements of their affiliation; require that such researchers publish only under the auspices of the contract research organizations.

2. Clear collaborative contracts in all phases with commercial partners should be available

3. RFOs should have in place clear Conflict of Interest procedures
    a. in the selection of the topics
    b. in the application assessment
    c. in the monitoring process

4. RFOs should guarantee no interference in the publication process
    a. it can be delayed for intellectual property protection

3.2.8.2.2 Selection and evaluation of proposals

Items written in black are based on the empirical work from the first round of co-creation workshops *Items written in blue are based on other insights from the SOPs4RI project*

Research integrity plan

Title of skeleton guidelines:

Guidelines on RI plan for research funders

Guidelines:

1. RFOs should document in their processes how assessment panel members are instructed to assess research integrity plans in their framework procedures

2. The RFO should ensure that grant applicants have undergone RI training
    a. RFOs should require host institutions/PIs to provide research integrity training for researchers working on the funded project
    b. RE/RI training certificate should be attached to the application

3. RFOs should require a plan for how to prevent RI breaches. The RFO could have a specific section in their application forms that is dedicated to RI and that requires the institution or PI to write a research integrity plan where they discuss:
    a. What RI training they will access/provide for their research team and when (needs to be completed within the first year)
    b. How they will ensure responsible research practices such as preregistration, data analysis plans, the use of preprints, the assurance of open science practices, how to deal with responsible authorship guidelines, how to implement and comply with the FAIR principles (Findable, Accessible, Interoperable, Reproducible), how applicant/host institution assures open data/ open access
    c. How early career researchers will be mentored
    d. How data management plans are constructed and how data is managed
    e. If applicable, how the applicant is safeguarding good laboratory practices
    f. How the applicant plans to assure RI in the dissemination and use of the outputs, knowledge and discoveries that the proposal might generate to have as much impact as possible. Researchers should explore ways to do this both within and beyond academic routes.
    g. How the applicant plans to deal with breaches of RI and what supporting policies and processes are in place in the institution to deal with misconduct
    h. plan for effective RI monitoring by the institution/for the PI;

4. RFOs should guarantee RI and RE support for researchers and RPOs concerning the development of the RI plan

Methodological requirements

Title of skeleton guidelines:

Guidelines on methodological requirements for research funders

Guidelines:

1. RFOs should assess proposals on the quality of the research methodology. This must be rigorous and well-planned to ensure that results are as robust and unambiguous as possible, and to enable reproducibility/replicability of studies. RFOs should have in place clear guidelines on how to evaluate the methodology.

2. RFOs should include a methodology section in the proposal that should include, for example (depending on the discipline):
    a. Protocols and methods well established and described (pre-registration)
    b. a description on how to deal with study (pre)registration before the study is conducted.
    c. the extent to which the applicant and their team have had methodological training or have extensive methodological experience, which should be detailed in this section
    d. a methodological training plan for junior researchers and the entire team
    e. If applicable, methodological plans should include how results will be reported and which reporting guidelines are being used
    f. If applicable, research methods should emphasize how they deal with potential gender differences in their study population
    g. If applicable, researchers must describe how they will access advice and guidance from the clinical research infrastructure in the host institution.
    h. If applicable, applicants must describe how potential methodological biases are addressed in the study.
    i. If applicable, the methods should justify the statistical tests being proposed to determine adequate power, sample and group size
    j. The methods should include a description of how bias in data collection and analysis will be managed.

k. When using animals, tissues or cells, researchers must describe how they will determine the appropriate sample sizes, controls and replicates in their studies.
l. Researchers should describe how they plan to maintain accurate records of their methodologies, procedures and the approvals granted during a project. These should be reported clearly in any publications to enable the study to be repeated Control and reproducibility plan)
m. Research records or laboratory notebooks should include clear cross-referencing to electronic data sources (such as data repositories).
n. the literature search should be included
o. How the research institution will describe their standard procedures for signing off and archiving laboratory records and notebooks.

3. RFOs should have assessment criteria/guidelines in place for the assessment of Data Management plans.

4. RFOs should introduce interviews with applicants if something from the methodology is not clear.

Diversity issues

Title of skeleton guidelines:

Guidelines on diversity issues for research funders

Guidelines:

1. The RFO is committed to promoting and supporting all types of diversity in the selection of proposals/applicants —including gender, sexual orientation, geographic, thematic, methodological and other underrepresented groups. OR The RFO should just acknowledge diversity within the research team without taking it into consideration during the selection process
    a. The RFO requires submitted research proposals to include a gender and diversity statement regarding a) the researchers in the call and b) when applicable, the researched population.

2. The RFO is committed to promoting and supporting a diverse membership of their staff members, review members and committee members.
    a. The RFO will undertake positive action towards a proper representation of a diverse reflection in all leading positions, making sure that leadership and processes around leadership are free from bias.
    b. the RFO should guarantee more transdisciplinary expertise among the reviewers and evaluators

3. The RFO has regular monitoring in place to examine whether their organisational structures and processes are susceptible to potential diversity issues. If so, the RFO will develop and implement a plan to mitigate any identified diversity issues. It is crucial that the RFO's leadership commits to this plan, sees it through with appropriate encouragement, support and initiatives, throughout the organisation.

4. Recruitment and/or funding processes should be as open and transparent as possible and be genuinely merit-based.
    a. This includes measures such as briefing selection committees about bias pitfalls,
    b. deciding unclear selection criteria at the outset,
    c. letting external observers monitor the selection process
    d. and involving external evaluators

5. The RFO will undertake action towards eliminating the pay gap and monitor progress, examining bias as a contributing factor to pay gap.
    a. The RFO will monitor precarious contracts and part-time positions for any gender-based differences and correct any inequalities. Universities should examine conditions for part-time positions for professors and their gendered division.

6. The RFO should foresee dedicated calls for women, younger researchers, etc...

7. The RFO should ensure that the language used to communicate to grant applicants is inclusive:
    a. The RFO commits to closely monitor potential bias in language used in recruitment processes and funding calls.
    b. RFOs should guarantee clear guidelines in all official/non-official languages present in the area of the call.

3.2.8.2.3 Monitoring of funded projects

Items highlighted in yellow were particularly discussed during the sessions. Participants expressed contrasting ideas concerning these particular items.

Execution of research grants

Title of skeleton guidelines:

Guidelines on execution of research grants for research funders

Guidelines:

1. RFOs should have clear guidelines about the monitoring process
    a. internal guidelines about how, what, when to monitor
    b. external guidelines to clarify what is expected by the grantees during all steps of the project and the interim and final evaluations
    c. clear reporting timeline
        i. the timing of the evaluations/reports should be done depending on the scale of the award, or its strategic importance
        ii. RFOs should guarantee the possibility to make amendments in case of specific circumstances by providing a clear justification
        iii. not too strict deadlines to avoid pressure that might lead to RI breaches
    d. about what happens if the project does not meet the requirements
        i. any delay has to be justified
        ii. RPOs/PIs have to report timely if something goes wrong
        iii. stop funding and ask money back if no justifications are provided in due time

2. RFOs should monitor all kinds of output
    a. publications, incl. grey literature, participation in conferences, meeting, etc. and all activities related to the project
    b. societal impact/relevance (?)
    c. research outputs should not be linked to the financial management (?)
    d. all training in place, if promised in the grant proposal

3. RFOs should not monitor
    a. what is already framed by international/national legislation

   b. internal rules of each single institution
   c. RPOs/PIs relations with the sub-contractors

4. RFOs and the RPO/PI should maintain a close, cooperative and continuous collaboration during the lifetime of the project
   a. The monitoring process should balance rigidity and flexibility and take into consideration the specificity of each funded project
   b. the monitoring should help researchers and ensure that they fulfil and comply with the grant agreement
   c. RFOs should help beneficiaries in case of a problem during the lifetime of the project
   d. the monitoring should be done by funders in according to the research center
   e. the monitoring should not overburden RFOs and RPOs/PI
   f. scientific and financial monitoring should be done during the entire lifetime of the project
   g. RFOs should have in place good IT tools to help the monitoring process
   h. RFOs should have in place a system of pre-monitoring (checklist) as a form of informal assessment
      i. RFOs should be able to detect easily (with yes/no questions) if everything is going well
      ii. RFOs should further investigate the project if something is not clear during the pre-monitoring process

5. the monitoring process should help RFOs and governmental institutions to think about what is the structural problem that makes compliance more difficult for the beneficiaries
   a. RFOs should check that the RPO/PI is in the position to comply with what they promised to do

6. RFOs should have in place a system of quality assurance to monitor the monitoring process

RI requirements

Title of skeleton guidelines:

Guidelines on compliance with RI requirements for research funders

Guidelines:

1. RFOs should have clear guidelines on monitoring funded projects in accordance with RI/RE requirements
    a. compliance with institutional/national code of conduct
    b. on ongoing basis for project that needed ethics approvals

2. The monitoring process should help contributing to RI
    a. help to avoid RI breaches
    b. to improve the research climate

3. RFOs should monitor RE/RI quality and training
    a. compliance with RI plan
    b. RE approvals
    c. open access/open data
    d. supervision/mentoring
    e. data management plan
    f. conflict of interest
    g. authorship
    h. RI training and certifications
    i. positive and negative results
    j. pre-registration of the study

4. RFOs should monitor all stakeholders interactions within the funded project
    a. cooperation with commercial entities
    b. RFOs should talk with all different actors involved
    c. collaboration with other researchers (in multicenter studies)

5. RFOs should monitor if investigation procedures in case of RI breaches are in place in the RPO that is hosting the funded project

Financial monitoring

Title of skeleton guidelines:

Guidelines on financial monitoring for research funders

Guidelines:

1. RFOs should have clear guidelines about the level of financial management require from the host institution
    a. before the start of the project, a mutual agreement between the grant maker and the grant receiver has to be in place regarding
        i. financial monitoring
        ii. financial requirements
        iii. expectation
        iv. appropriate timeline
    b. the financial reports from the host institution should not be too detailed, especially regarding the travel expenses

2. The financial monitoring should be done in parallel with the scientific monitoring and by a dedicated department

3. RFOs should monitor the compliance with the RPO/PI starting financial plan
    a. RPOs/PIs/Host institutions should ensure a robust financial management
    b. RFOs should guarantee a flexible movement of the budget when necessary and provide a clear justification
    c. RFOs should monitor periodically all expenditures
        i. not monitor in detail the travel expenses
        ii. not monitor the sub-contractor

4. The financial monitoring should not be linked to the research outputs (?)

5. RFOs should use financial monitoring also in relation to RI breaches
    a. to prevent financial fraud
    b. RPOs/PIs should report timely possible financial amendments
    c. Withdrawal of funding would only happen if the RPO/PI failed in its responsibilities

3.2.9 Guidelines format

Items written in blue are based on the empirical work from RPO-related CCWs.

Items written in red are based on the empirical work from RFO-related CCWs.

Items written in black are coming from both RPO and RFO-related CCWs

1. **Test different formats to ensure they suit the audience and target group**
    a. Do not assume that a one-size-fits-all format is most appropriate, different formats should be tested and piloted for their adaptability and appropriateness to the target group
    b. if possible, make sure to provide an audio version of the guideline

2. **Provide the guideline with a section open for external contribution**
    a. Provide an open section where examples of good and bad practices can be added
    b. provide an open section where case studies can be added

3. **Accompany the guidelines with a clear implementation and communication plan**
    a. Make sure the guidelines clearly identify the target group
    b. Make sure the guidelines are visible, easily findable and easily printable
    c. Involve communication specialists, influencers, etc. in raising awareness and communicating the guidelines
    d. Accompany the guidelines with a clear and granular implementation plan that specifies responsibilities
    e. Ensure that the expectations and change from the guideline are measured and monitored
    f. Maximize sustainability of the guideline by clearly defining long term actions and by properly communicating and allocating later responsibilities

4. **Preserve flexibility to adapt and apply the guidelines in different settings**
    a. Make the guidelines flexible enough for different settings and readiness levels to be able to implement them
    b. Address the guideline at national and international institutions to ensure compatibility
    c. Set priorities and scales of achievements to allow different starting points to benefit from the guidelines

5. **Keep the guidelines grounded and realistic**
    a. Provide granularity in the recommendations to ensure that enough details are present for implementation
    b. Make the guidelines specific enough to ensure that they are implementable
        i. Provide concrete means of achieving the recommendations (include genuine examples of best practice and implementation)

c. Favour co-creation and stakeholder involvement in building the guidelines to ensure that the recommendations are grounded in reality and implementable
d. Keep the guideline concise despite the granularity

6. Make the guidelines visually appealing but adapted for use

a. Use a layered approach in which a brief and concise overview is provided, but more detail on the specific points of the guideline are available (e.g., through hyperlinks).
    i. If possible, make sure that each recommendation is followed by a link providing more details
    ii. make sure that a short introductory section with infographics are present
    iii. If possible, make sure that each recommendation is followed by a concrete explanation
b. Make the guidelines appealing and visual, for example by:
    i. listing clear steps or point forms
    ii. using flowchart formats where appropriate
    iii. using colours, fonts, and images
    iv. Accompanying the guideline with video and interactive content
c. Adapt the guidelines to the target group and purpose
    i. e.g., more vibrant, colourful guidelines may be adapted for students; but more serious, textual, and professional-looking guidelines may be more adapted for senior researchers and management)
d. Use a layered approach in which a brief and concise overview is provided, but more detail on the specific points of the guideline are available.
e. Make sure the guidelines look professional, for example by hiring professional design of communication experts to make the guidelines attractive

7. Carefully adapt the language used in the guidelines

a. Use accessible language without oversimplifying
    i. avoid jargon, abbreviations and difficult texts
    ii. when using legal concepts, ensure that the words are used appropriately
    iii. do not use non-standard abbreviations
b. Provide clear definitions of concepts that may differ between countries (e.g., PhD student status as researcher)

8. Show effectiveness of the guidelines

a. Through pilot studies, demonstrate the implementability of the guidelines and the perceived effectiveness

b. Trusted testers and representatives can increase the acceptability, awareness, and willingness of RPOs in implementing the guidelines.

4. SECOND SETS OF CCWs

4.1 Specific objectives

Discuss the skeleton guidelines V1 to refine them. In addition, participants were asked to discuss potential implementation issues.

4.2 Methodology

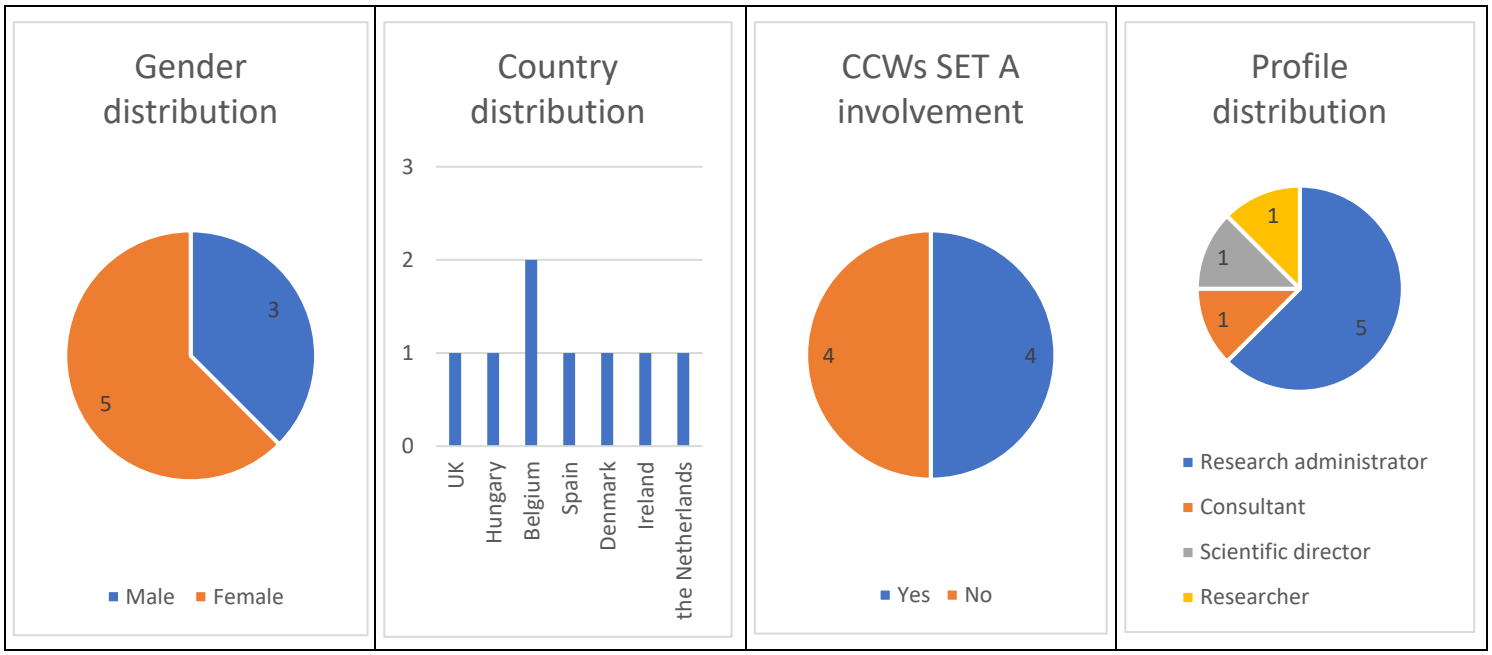
The process of the CCWs SET B consists in the following steps:

- Recruitment
- Sensitizing participants
- Preparing the CCWs
- Conducting the second set of workshops (November24/25 and December 9)
- Member checks and follow-up interviews
- Analysis of the workshops
- Creating the skeleton guidelines V2
- Implementation issues

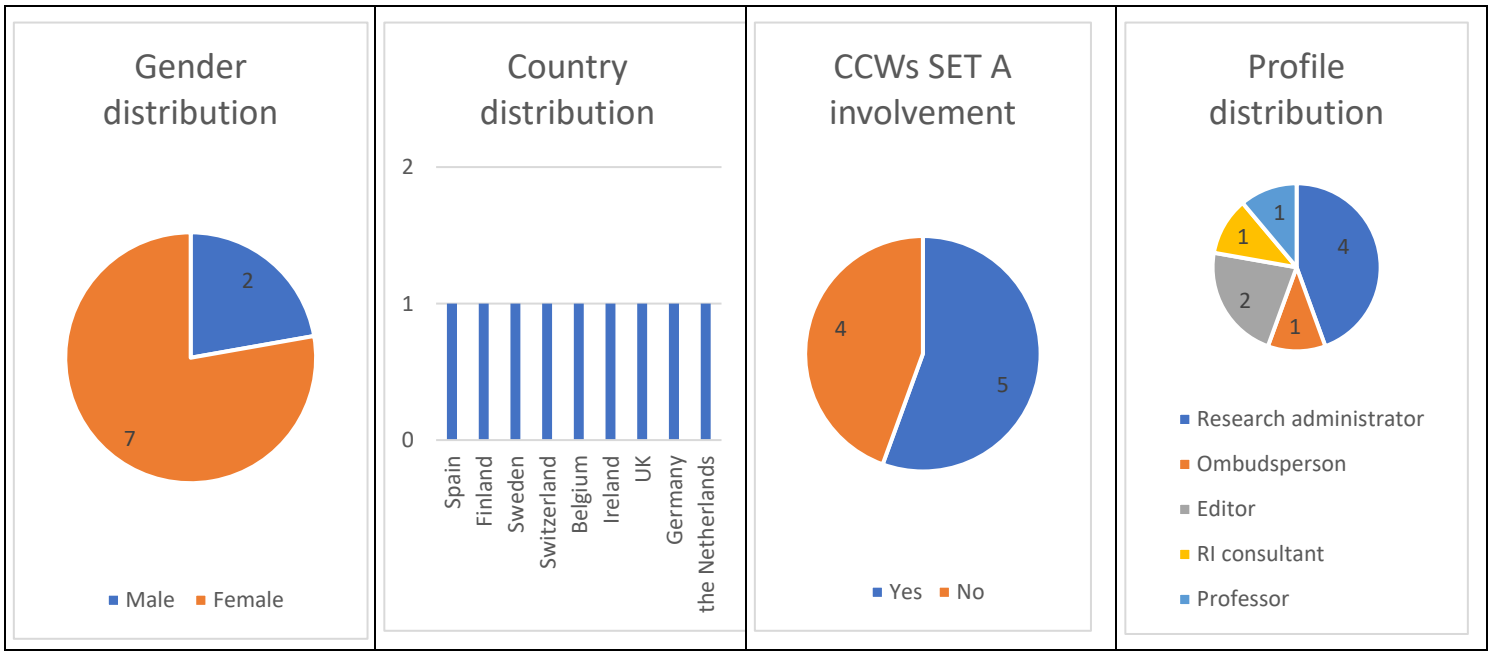
4.2.1 Recruitment

4.2.1.1 RPO-related CCWs

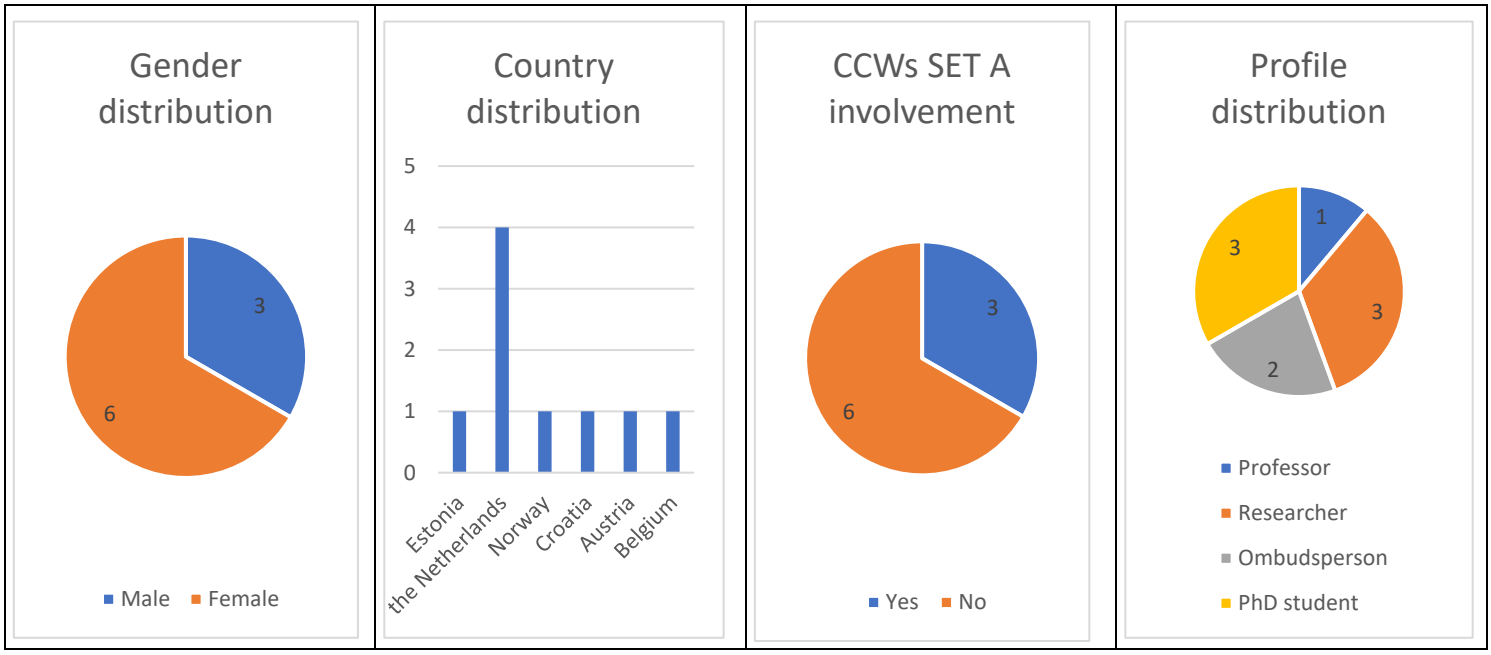
4.2.1.1.1 Research environment



4.2.1.1.2 Education and training in RI

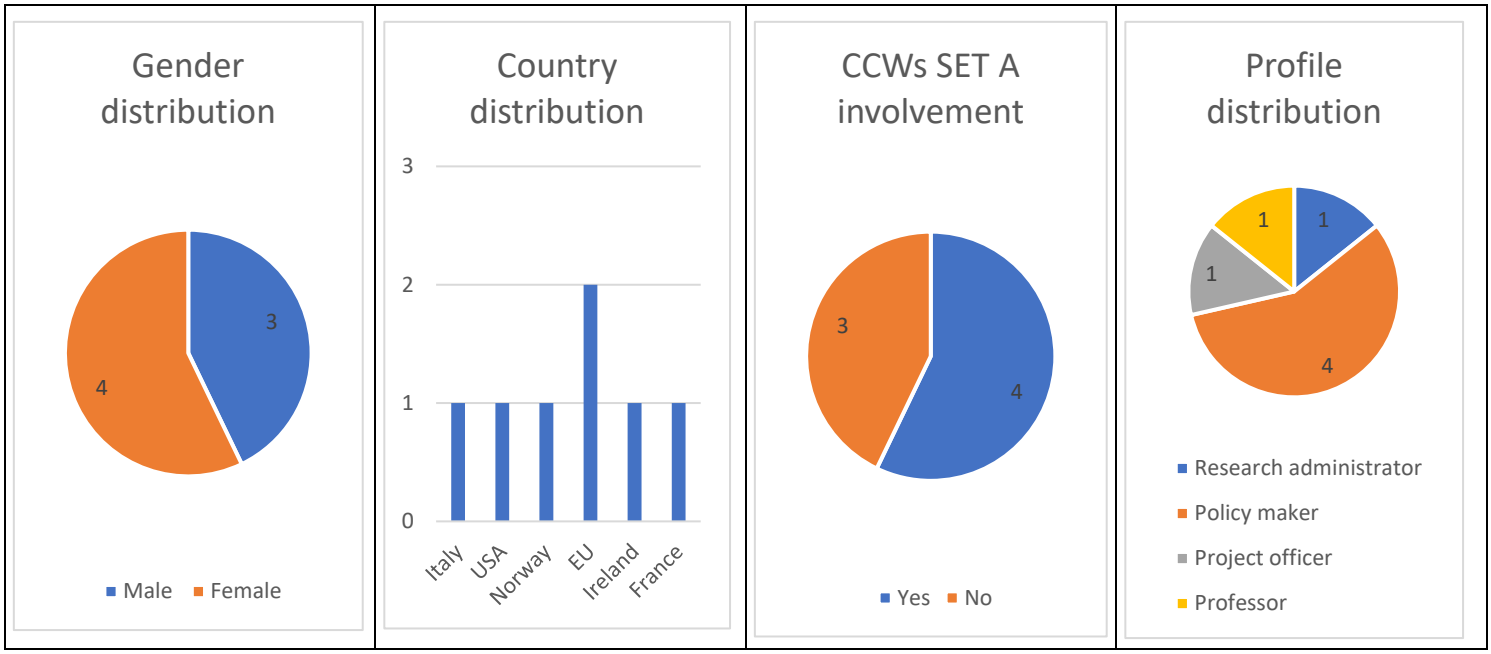


4.2.1.1.3 Responsible supervision and mentoring

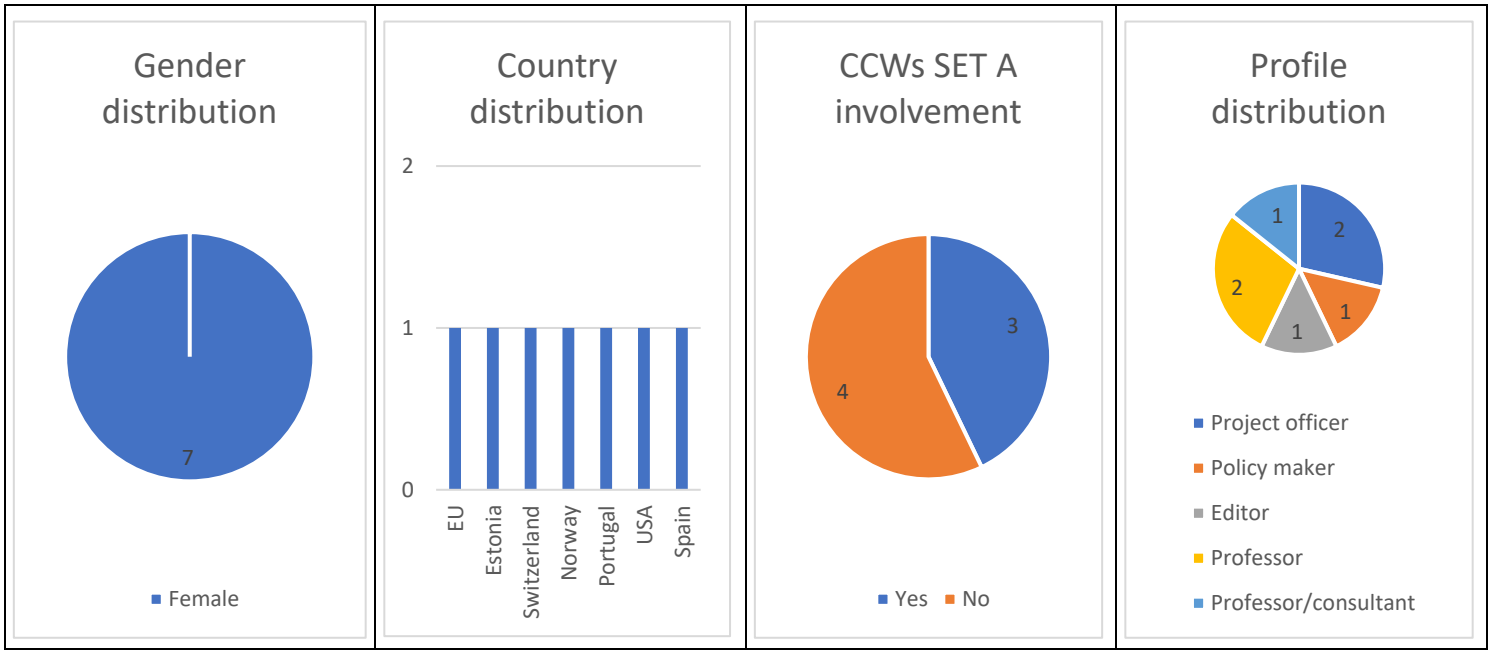


4.2.1.2 RFOs-related workshops

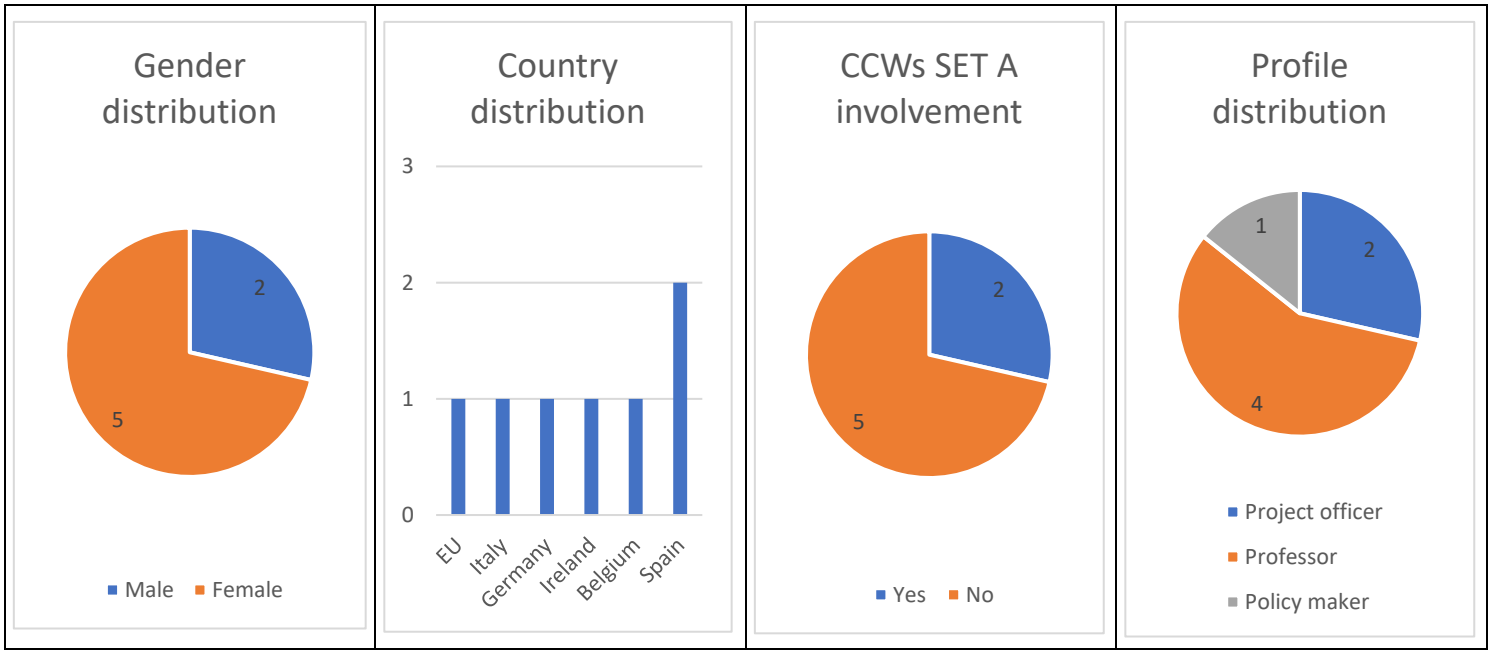
4.2.1.2.1 Independence



4.2.1.2.2 Selection and evaluation of proposals



4.2.1.2.3 Monitoring of funded projects



4.2.2 Sensitizing participants

To prepare the participants for the workshops, we sent them a sensitization package including the visual representation of the outcomes from the first set of CCWs **(Appendix 6.6- Analysis posters)** and the skeleton guidelines V1. The package was sent via email. Participants were asked to reflect on the skeleton guidelines V1 and to think in which way the guideline V1 would have influenced their work and the work of the colleagues. Furthermore, we arranged short 15 minutes one-on-one calls with each participant who did not participate in the first set of CCWs to get them familiarized with the Zoom and MIRO software programs.

4.2.3 Preparing the CCWs

A facilitator who was responsible for the process of the workshops (JT, NE, KL) led each workshop. A co-facilitator was responsible for the technical aspects of the workshop and for supporting the facilitator (DP, IL, BT). A set of instructions for the facilitators and co-facilitators was drafted by KL, in order to have clear directives on how to lead and co-lead the workshop sessions **(Appendix 6.7 - instructions for facilitators and co-facilitators).**

4.2.4 Conducting the second set of workshops (November 24/25 and December 9)

The main focus of these workshops was to refine the drafted skeleton guidelines, by exploring implementation issues. Each of the workshop sessions was carried out using ZOOM and a specific MIRO board specifically created by KL for the CCWs.

The workshop consisted of 5 parts:

- **Introduction** – The workshop facilitator and co-facilitator introduced the workshop plan and goals. To break the ice and get participants familiarized with each other, the facilitator asked the participants to share what they submitted as part of the sensitization exercise, in which they were asked to write down how the skeleton guidelines will have influenced them and their institutions.
- **Stakeholder mapping** – The participants were asked to identify all the stakeholders that have a role to play in the implementation of the skeleton guidelines and/or are affected by them. Additionally, the participants were each asked to select which stakeholders are the most important to consider when developing the guidelines, and why.
- **Refinement of guidelines** – Participants were given the opportunity to provide major comments on and discuss gaps, inconsistencies, unclarities, redundancies, etc. for each of

the skeleton guidelines for that topic. Additionally, they were invited to provide best practice examples for each of the guidelines.

- **Implementation issues** – In this last exercise, participants explored the impacts, resources, opportunities, threats, unintended consequences and any other implementation issues of the skeleton guidelines by first individually writing down their impressions of each of these, and then using the discussion to build on each other's ideas.
- **Conclusion & evaluation** – At the end of the workshop, participants were asked to evaluate the workshop and share what their main take-away from the workshop was. Furthermore, participants were informed of the next steps of the co-creative process.

During each session, participants created a rich board full of new content concerning the development of SOPs and guidelines for the six topics **(APPENDIX 6.8 - Example of Final MIRO boards SET B CCWs session)**.

4.2.5 Participants checks and follow-up interviews

After having summarized the outcomes highlighted for the participants on the MIRO boards, the facilitator and/or the co-facilitator of the session, the participants were asked to check the summary to verify if all was captured during the CCWs and was not misunderstood or misinterpreted by the CCW team. Communication for follow up feedback took place via email.

Just like after the first set of workshops, follow up interviews with one participant from each workshop were conducted by KL to evaluate the workshop methodology. For each topic the following content-related inputs were raised by the interviewees:

(some of the comments are reported in first person)

(all recognizable information have been deleted)

Research environment

- *Nothing specific mentioned*

Education & training

- *Nothing specific mentioned*

Supervision & Mentoring

- *Nothing specific mentioned*

Independence

- Developing guidelines, maybe you should suggest a couple of performance indicators. Having those KPIs will help to bring some focus.
- Try to make the guidelines as actionable as possible. Specific and potentially measurable in their implementation. One of the first comments I had was about organizing the content, based on the stage of the research process: prior to receiving funding, peer review, post-award and patents and stuff. I don't know how it will end-up blending. I was thinking in the sense of the specific guideline on 'Independence' but it could apply to the others. When we put out guidance, a lot of it.. when people are trying to find information, they want information about peer review or information about what to apply.
- The only thing that we are dealing with a lot is the foreign interference part of it, it falls a little bit into what we discussed. It's a touchy project. We want to promote international collaboration but some countries want to exploit that. It falls under the umbrellas as conflicts of interest. We should cover those types of disclosures and signing contracts. It's all about transparency. That's what we think about a lot over here. It's really a balancing act.

Selection & Evaluation of proposals

- I did recommend something again during the workshops: [redacted] I worked with them for language editing services and AI. They have a beautiful program for RI for researchers with online videos. They have a whole big package for funding agencies. They are interested. [redacted], but have people working in Europe. I had put the link in the workshop link. It's a good idea to use their resources, but if they knew that they were being shared, they would be happy to collaborate if they are one of the recommended organizations. The head is interested in COPE and knowledgeable about RI.

Monitoring

- My first impression was that… it was my feeling that I didn't contribute more than to the previous one…You reached a certain point when you cannot contribute more. You can look at the issue from different perspectives; under certain conditions your creativity is limited because you cannot create something which cannot take place. That's why the perspective of other participants is important. My own knowledge is limited to a certain point; I cannot create something more than I know. I had the feeling that the workshops were overlapping, which is also good because it could provoke a deeper discussion but I'm not sure if it was the case in my case. It will move my way of thinking if there are different participants.
- You also sent us the document as a summary [the member check], … maybe I will start with something which I already mentioned. We should be consistent with the terminology in the guidelines. When we write 'RI', it's always research integrity. When we use 'RE', it's always research ethics. We will put it in a more beautiful way. The terminology should be clear with

everybody. The meeting with the other participant showed that some terms can be used differently. A clear glossary of the terminology is important.

- In the summary, you mentioned that the societal relevance is not always important. I think that it is important but it's sometimes not easy to be defined. It's obvious for research in the social studies or medical studies, but some research is for the development of a tool which after more development will be useful (e.g. an algorithm). The research might be a step to a further development and the societal involvement would not be evident, but I would not be so brave to say that the societal relevance is not always important. I think it should always be behind the aims of the research. Human beings are the most important part of the research, we do the research for some reason. This is for the development of knowledge or to discover some historical facts, but this is always for humans or animals (e.g. treatments). You can write instead that 'societal relevant is not always evident', but it is important.
- I also don't understand one of the points under the subtopic 'monitoring of compliance with RI requirements': monitoring of breaches of RI. This point should be clarified.
- One more point: the rest are minor comments. Usually we don't use the word 'money', but budget. Instead of talking about the monitoring of money, we talk about monitoring of the budget dedicated to activities within the project (e.g. travel, salaries, management, infrastructures). We monitor aspects of how the budget is used according to the plan. If there is a plan to organize a meeting, it should not be spend on something else.
- The next point: researchers need to be reminded about RI; funders should remind in case they forget. I was thinking about this, how we can remind them? I think the first point is that the ethics and RI should/must be a part of the contract. This is a contract obligation. It must be monitored as any other part of the project, which is in the grant agreement. If we must remind them, we can remind them that they need to follow the contractual obligations, to give them articles eventually where it's written what the contractual obligations related to ethics are.
- In the implementation issues: what is needed, we don't need to repeat what is needed; change it to what is 'necessary'. No need to repeat the word 'need'. The call description can also give guidance; that's important when you're writing the project. When there is a call for proposals or tenders or competition, all details should be mentioned. Sometimes, when I was a public procurement correspondent and I had to prepare description of what we expected in the final result, it was a book. The tender specifications, it's really detailed. In the calls, it's really general but there are a lot of aspects that should be taken into account when you think of applications. Now for Horizon Europe, ethics and integrity should be taken into account for 'ethics in design' will be added to framework as a basis for any projects that the commission will fund. Apart from contractual obligations, there are also program obligations. If other institutions will follow the example of the commission, it will be great, because the researcher might forget things or it becomes so evident that they don't need to think about it. Sometimes it's treated as an obstacle. Sometimes we have contact with researchers to ask

them why they left the ethics self-assessment empty when it's evident that interviews with children will be conducted in a study; they say because they didn't have time to fill it in. Okay, but that's the part of the proposal, but you cannot just forget it. It's a part of the evaluation process. Maybe if it's part of the evaluation process and they receive points for the ethics part, it might help, but we want them to do it but they do it intentionally. It's difficult to give points for ethics…it should be something on top of everything. That's why we also don't have that in the scientific evaluation. But it's a part after scientific evaluation, without points.

- The last sentence in the member check… 'move from result oriented to participant oriented'. They should think more about the participants and how to protect them rather than have positive results of research. Sometimes, this is often related to data protection. Some researchers forget about data minimization so they take all data they can because they might use it somehow, but it's not participant oriented approach. The participants should know how they will use it and for what purpose. It's the same for research in poor resource setting, we call it ethics dumping. The areas where registration is not so strict, are used for the research to avoid going to the ethics committees and ask for the approvals. The research should consider the participants in the first place rather than the results/the positive results only.
- I'm not sure if that's the aim of the project, to include points related to ethics oversight (in terms of ethical aspects of the project, issues related to human subjects and data protection and research with animals, specific things that EC and other funders look at). That's maybe not falling in the scope of the project. I understand. I'm more involved in the ethics part, but that probably is a big topic in itself and it doesn't fit. There are so many other issues to discuss. Maybe it doesn't fit into oversight in general.

During the interviews, **general inputs** on the development of RI-related guidelines were also collected:

- [redacted]. They conduct workshops with stakeholders and they provide general guidance for funders. Based on that, there will be additional policies. I don't know if you are talking about policy changes and best practices. OSTP put out best practice guidelines and other stakeholders discussions. When it comes from the government, that level, people are more likely to implement it. Different scientific societies, like the endocrine society, they put together their own guidelines, they are targeted towards their own type of researchers. When you are trying to create guidelines for different types of research, it's helpful to fine-tune guidelines to make them applicable

- If I translate it to this: high level paragraphs, more concrete level (within this paragraph, there was the possibility of this choice or that choice); another level with 'use these colors or that color'. Then you can tailor it more specifically for that organization. We had that discussion in the first workshops, people responded quite differently in terms of what they like and didn't like. There is the element: who are you targeting? If it's at students, you might need something differently than if it's the management of the department. These are also things to take into account.
- If you put the guidelines in, ensure that there is a link to your toolbox and a clear link. The reference document should be more overall, you cannot overrule national guidelines. Even though the ALLEA code is a good document, it's for political reasons but not for individual researchers. We also have to respect the EU system and how this huge institution works and that we have national standards that can be expected. We cannot have things that overrule national standards. It's good to make the link to your toolbox. It's good that the toolbox and the focus is on ensuring that different disciplines apply. Some guidelines might be more relevant for some disciplines than others. Broader field and broader understanding of fields and how research projects go across disciplines also need a separate set of guidelines. Making a toolbox is a clever way of doing it. You make the guidelines available to ones needing it, without telling the humanities need to focus on things not relevant for them.
- What you want in the end is that the final users, institutions – because they need to implement tools and strategies for promoting and fostering integrity – and the post-docs/technicians… they in the end need to go through: 'I have this problem what can I do? I have a clear guideline on how to approach it'.
- The first workshop that was devised by Natalie, it would have been nice to see the outputs of that in Joeri's workshop. He quickly showed things, but did we look at it? Not really. It would be nice to show a flow diagram. We were at step 0 again, but now we are at this later stage. We've completed the methodology, introduction, but this is where we need to be. It would be nice to see the learning outcomes that we would be getting involved in. What were the milestones that were met? A flow chart would be helpful as there was a bit of a disjoint. I know I participated in workshops for two different topics. It would be nice to see the linkage between the topics. To visualize all this, it might be helpful if you have a flow chart and show that your end result is an SOP for RI. You show that in order to achieve that milestone, we had to have various workshops. You'd have the workshop 1. What were the actual outputs? What were the outputs of workshop 2. At the end, this is where we are, and this is where we need to be. To address the different topics covered in the workshops, you could provide the following: have the overall deliverable in the middle, have triggers in the sides. What were the 6 outputs from each workshop, and then have them feed into the overall RI output.

4.2.6 Analysis of the workshops

In line with the analysis of the first workshop set, two working groups analyzed all data collected in the second workshop set independently. The RPO-related CCWs were analyzed by the Amsterdam team (JT, KL, IL, NAB) while the RFO-related CCWs were analyzed by the KU Leuven and EARMA (KD, DP, BT, NK). The full analysis was carried out using on a dedicated MIRO board (created by KL) specific for each topic.

The purpose of the analysis of the SOPs4RI co-creation workshops was to merge insights provided by the CCWs participants during the two sets of CCWs.

The analysis was carried out as follow:

- **Reading the transcripts and selection of the quotes**

The CCWs transcripts and the notes from the follow-up interviews were read individually within the working groups. Important quotes related to each sub-topic were highlighted. Besides quote non-related specifically to one of the subtopics were highlighted (e.g. things about implementation issues relevant for multiple/all subtopics).

- **MIRO board**

All outputs from the workshop (i.e. sticky notes of participants) were added to the analysis.

- **Clustering**

All important quotes and outputs coming from the sessions related to the same topics were analyzed collaboratively within the two working groups. Similar quotes and the CCWs inputs were clustered together and labeled in order to identify specific themes. The clustering of the data was done by using pre-defined clusters coming from the analysis done after the first set of CCWs. New clusters have been created when quotes or data did not fall under the pre-defined clusters.

- **Creating visual results**

After having clustered and labeled, visual representations of the results of the first set of CCWs were created for all topics. **(Appendix 6.9 - analysis posters SET 2 CCWs sessions)**.

- **Refining the skeleton guidelines V1**

Based on the insights gained from the analysis of the second workshops, each sub-topic skeleton guideline V1 was refined (specific recommendations were added, removed and/or adjusted) to finalize the skeleton guidelines V2.

4.2.7 Creating the skeleton guidelines V2

We integrated the feedback from the participants in the second set of workshops to refine the first version of the skeleton guidelines and produce V2 of the guidelines. Afterwards, we sent V2 of the skeleton guidelines to all the workshop participants that were involved in the guidelines for that topic via email, to ask them for any additional feedback. Any additional input was used to finalize the skeleton guidelines.

4.2.7.1 Skeleton guidelines for RPO-related topic and sub-topics

4.2.7.1.1 Research environment

Items written in red are new or modified recommendations based on the empirical work from the second round of co-creation workshops.

Items written in black are based on the empirical work from the first round of co-creation workshops

Items written in blue are based on other insights from the SOPs4RI project and included in the skeleton guidelines from the initial SoRs.

1. **Ensure that researchers can work in a safe, inclusive and open environment where they feel responsible and accountable, can share concerns about dilemmas and can discuss errors made without fearing the consequences ('blame-free reporting').**
    a. Create opportunities for community building activities
    b. Create fora, open discussions and dialogues for sharing research activities, viewpoints and ideas
    c. Ensure that the institution adequately tracks and assesses this objective to ensure its fulfilment (i.e., consider researchers' honest feedback)

Explanation: Participants in the second workshop expressed that having a safe, inclusive, and open environment was crucial and needed to be a starting points for universities. One participant even added a note to mention that this aspect was "difficult to implement, but the most important thing!!" One of the participant insisted that the inclusive environment must also feel safe and inclusive for

those involved when performing co-research with members of the public or research participants, but given the specificity of this comment we decided not to include it. Participants worried that this point was difficult to implement because it is difficult to track that an environment is safe and open, and while it may be on paper, reality sometimes differ. In this regard, participants proposed that finding a way to assess how researchers feel about the environment of an institution and making the results public may be a good way to push for better implementation of the guidelines.

2. **Ensure transparent cooperation and responsible leadership**
    a. Ensure leaders positively influence the research environment of their team
    b. Implement an open-door policy with research leaders
    c. Facilitate regular meetings between leaders, research staff, managers and support staff
    d. Ensure that cooperation occurs between all levels of the institution, including between research support and university management, between research support and research groups, and between leaders and researchers within the research groups

Explanation: In the second workshop, participants mentioned that this main recommendation needed more clarity and required further granularity and concrete examples. The main concern was that the levels of collaboration were not clear. In this regard, we added point d. to exemplify different levels at which such collaboration should happen.

3. **Ensure responsible performance management, assessment and evaluation**
    a. Revise evaluation processes and criteria and ensure implementation by committees
    b. Assess research on aspects such as versatility, quality and actual impact of research
    c. Assess researchers on non-research related tasks, such as supervision, leadership, peer review
    d. Do not assess research on metrics that emphasise quantity or journal-level impact, such as publication counts, H-index, and Journal Impact Factor, and always complement metrics with human input
    e. Appreciate all research outputs, including those that are not published in high impact factor journals
    f. Aim to align definitions of excellence with research quality
    g. Broaden perspectives of impact to include different expressions and forms it can take

Explanation: Participants in the second workshop mentioned that the definition of excellence and impact were highly problematic and needed to be addressed, explaining the addition of points e. and f. Nonetheless, participants acknowledged that such universal definitions were often beyond the reach of research institutions, and may need to be addressed at the funders' level or even at the

European level. On a second read, we further increased the granularity on the point d. (initially "Do not assess research on standard metrics such as bibliometrics and impact factors"). The reason for the change comes from the reflection that metrics are not problematic in and of themselves, but they become problematic when they are used in isolation, when they focus on quantity rather than quality, or when they explain journal-level activity rather than article-level activity. Yet, since indicators of open access, peer-review, and transparency are increasingly metricised, we deemed important to add this distinction.

4. **Provide training**
    a. Provide research integrity training for all within institutions
    b. Apply training on how to effectively recognize and produce transparent and reproducible research (from experimental design through to publication) to help alleviate researchers' stress and improve their mental well-being.
    c. Ensure that training is a continuous process that is adapted to the needs of different stages of the academic career

Explanation: This item was not extensively discussed except on the point that training should be a continuous process and that it should be adapted to the needs of the researchers to be available at all career stages.

5. **Implement an institutional framework for diversity, equality and inclusion**
    a. Consider all aspects of diversity, including, but not limited to gender, race, disability, career profiles, career breaks, caring obligations, and consider their intersectionality
    b. Foster an environment where diversity, equality, and inclusion are part of the culture
    c. Implement a policy and action plan for diversity, equality and inclusion
    d. Provide diversity and inclusion training
    e. Embrace cultural intelligence, i.e. that all cultural backgrounds should be considered

Explanation: In the second workshops, participants made a strong case for the need to consider diversity in a broad manner which also considers intersectional issues (e.g., combination of diversity factors). We added point a. to exemplify this idea, which will be captured further in the specific guideline set on diversity and inclusion. Participants also insisted that diversity should be part of the mindset of the institution, rather than only in the policies, and mentioned that diversity initiatives should be tracked appropriately. Since we will describe this point in greater depth below, we did not add the need for tracking, but will delve into this in more details in the diversity-specific section. One participant also raised an interesting point about the need to adapt research timelines to allow

participatory action research with people with disabilities. While this point is very interesting, we felt that it was too specific to be included in the guidelines.

6. **Implement an institutional framework for good scientific practice which provide support mechanisms, documents and the appropriate infrastructures**
    a. Ensure existing support services are reachable and findable. Examples of support systems are:
        i. RI services
        ii. Library services
        iii. Data management services
        iv. Information services and package for new employees
        v. Diversity and inclusion support
    b. Ensure guidelines and documents are findable and practical. Examples of support documents are:
        i. Capturing and implementing feedback
        ii. Collaborating with industry
        iii. Data management plans
        iv. Open access policy
        v. Promotion processes
        vi. Guidelines on diversity and inclusion, for example inhiring, promotion, and research activities
        vii. Whistleblowing guidance
    c. Invest in digital infrastructures to ensure that all researchers can access and share information (e.g. data management plans, data limitations, etc.)
    d. Frequently seek feedback from researchers to capture the support, infrastructures, and documents that are needed

Explanation: Participants in the second workshop mentioned that this point should be more specific, yet this may be due to the exercise which only included the main guidance, but none of the subpoints. While this point was otherwise not addressed so deeply, it was addressed in other points by mentioning the need for adequate infrastructures and support that respond to researchers' needs.

7. **Provide guidance and incentives for good mentorship**
    a. Ensure guidance and incentives for good mentorship
    b. Foster an inclusive research environment and best practices by setting an example of good mentorship culture
    c. Implement training and other institutional tools to promote good mentorship

d. Provide support on mentorship for groups with language challenges (i.e. foreign students, etc.)
e. Reward good mentorship
f. Support mentors to work with students

Explanation: This point was briefly addressed in the second workshop where it was mentioned that good mentorship was difficult to define, and that mentors should receive training on good mentorship). A new point from the second workshop was the need for support in groups where language and communication was difficult, now added in point d.

8. **Appoint support persons to foster and support research integrity, including:**
    a. Provide different levels of support
        i. research integrity officers,
        ii. library services,
        iii. support ways to implement diversity and inclusion measures
        iv. research integrity champions at the researcher level
        v. RI information services
        vi. Ombudsmen and resource persons for students (e.g., RI, mental health support)
    b. Ensure that all levels of support are visible and easily accessible
        i. Provide a safe place for raising concerns in which power differences are minimized and in which a clear whistleblowing policy is ensured

Explanation: Participants in the second workshop agreed with this item, but added that power differences needed to be considered carefully to ensure that power differences do not hamper safe whistleblowing, and to ensure that research integrity support was provided and easily accessible on multiple levels.

9. **Appoint an RI champion per faculty or department to support the research environment.**
    a. Ensure that research integrity champions (i.e., trained researchers who are able to advise on best practice) are available at a faculty or department level, not only at a management level
    b. Provide a channel of local confidential advisors (i.e., researchers who can be consulted in confidence when integrity issues arise) to help raise doubts and questions as soon as they arise (i.e., early contact)
    c. Ensure that everyone feels confident approaching advisors, for example by designating champions from different seniority levels

Explanation: There was a full support for research integrity champions in the second workshops, and the topic was discussed recurrently throughout the session. Therefore, we added a few details on the champions according to what participants mentioned was important. One of these points was the need for confidential advisors as individuals with whom questions and doubts could be raised without too much formality. These early support points were said to help discuss issues before they escalate into unsolvable problems. The need to have integrity champions at different levels of seniority was also mentioned as essential to ensure that those in more junior position feel confident and at ease in approaching champions.

10. **Pay sufficient attention to the psychological health and well-being of research group members and the people who lead them.**
    a. Ensure a climate that is conducive to a healthy work-life balance (i.e., minimize productivity pressures, short-term contracts, competition, and acknowledge their impact on mental health and wellbeing)
    b. Provide team leaders the tools necessary to assess the health of the researchers working in a group.
    c. Increase awareness of mental health issues among researchers to help them detect early signs of burn-out and other issues (i.e., consider including as part of the introduction training)
    d. Establish mental health professional channels accessible to everyone (dedicated resources and funding)
    e. Assign and provide training to mental health and wellbeing champions as first responders
    f. Set standards for avoiding the mistreatment of people.
    g. Ensure prevention and when necessary, appropriate response to harassment in the field, lab, office and at conferences
    h. Provide confidential and independent channels for support in case of bullying and interpersonal conflict (i.e., outside of the department)

Explanation: In the second workshop, participants spontaneously addressed the need to look at mental health. Participants linked mental health issues with the pressures of high demands in research careers and the unhealthy research climates, but acknowledged that these issues may be difficult to change. We decided to include these issues as a first point here since they need increased consideration. Participants also proposed that it was important to train researchers so that they can recognize early signs of burn out or other problems, and that it was necessary to have trained

'champions' also in this setting to act as first responders. Finally, the issue of bullying was mentioned as something that may need to be dealt with external channels to ensure complete confidentiality.

Best practice examples:

BP1: In Flanders, a research integrity commission external to institutions is available to provide second, disinterested opinions on integrity cases http://vcwi.be

BP2: Some universities assign 'diversity officers' who ensure that diversity issues are considered in all aspects of university tasks

BP3: In Flanders, specific 'ombudspersons' serve to help PhD students deal with problems, including with interpersonal issues with their supervisors and integrity issues

BP4: Some universities set mandatory requirements for data management plan at the PhD students level. The university provides the appropriate digital infrastructure. This ensures that students understand the data and its limitations, understand if special approvals are needed, know how to handle the data, etc.

BP5: To encourage training, universities can provide ebadge/accreditation for internal ethics training (Epigeum)

Managing competition and publication pressure

Title of skeleton guidelines:

Guidelines for managing competition and publication pressure in research institutions

Guidelines:

Related to the research environment

1. **Ensure that researchers have the freedom of investigating their own research ideas.**

    a. Allow more creativity in setting up and performing research
    b. Allow for more time to work on publications truly reflecting the interests of the researcher
    c. Incentivize researchers to only write grant proposals for calls fitting their research
    d. Avoid to source funding on calls with criterion that are overly specific and risk to hinder researcher's freedom and possibility to change gear
    e. Ensure the research setting reflects societal needs, and recognizes future problems which require sustainable solutions through scientific research

f. Increase academic freedom to also research areas which are not always considered a prioritized area of research
g. Collaborate with and involve external stakeholders such as policy makers, funders, etc. to promote research freedom more broadly

Explanation: Several participants in the second workshop mentioned the crucial role that funders also have in setting research agendas, and thus believed that funders, but also other stakeholders such as policy makers must be involved to ensure freedom of research. Some points around specific funding channels where projects are too descriptive were criticized, while the need to still keep the priorities of society at heart were also mentioned.

2. Foster a culture of coordination and collaboration

a. Foster collaboration
   i. Incentivize internal collaboration to avoid researchers apply for the same grants
   ii. Incentivize internal collaboration to apply for joint collaborative projects
   iii. As an institution, foster collaboration with external stakeholders such as policy makers and funders (see 3. below)
b. Provide young researchers incentives and opportunities to be involved in institution management
c. Remove barriers between fields
d. Reward, promote and incentivize interdisciplinary research
   i. Allow the possibility to publish interdisciplinary work in journals of the specific disciplines for community endorsement and engagement
   ii. Incentivize collaboration between various institutions to prepare joint publications to reduce publication pressure of early career researcher
   iii. Maintain integrity and best practices between fields

Explanation: Participants to the second workshop agreed with the need to foster a culture of collaboration, and they emphasised that this culture must involve stakeholders outside of the institution. Later in the workshop, the idea that "Junior researchers don't always have opportunity or incentive to be involved in management" was mentioned and we believed that it would add to this multi-level collaboration and coordination topic.

3. Involve external stakeholders such as policy makers, funders, and society

a. Facilitate an open conversation between stakeholders

Explanation: As detailed above, the need for institutions to involve different external stakeholders was a recurrent topic, most often mentioned as one of the reason the guidance risk being difficult to implement.

4. Shared responsibility between the institution and individuals for funding and contracts

a. Share the responsibility of securing funding with the researchers
b. Favour more permanent career structures in which researchers' salary are secured rather than temporary self-funded contracts
c. Foster an environment in which researchers can keep the bigger picture of their work without needing to focus on securing funding

Explanation: This point was raised in the second workshop and proposed an interesting idea to reduce the pressure on researchers to seek funding (which can lead them to compromise research freedom, to experience stress and psychological health issues, and several other potentially damaging issues and behaviours. In response, participants thought that institutions should share the responsibility of funding with researchers, at least to ensure that researchers' salaries are secure and that contracts are as stable as possible.

<u>Related to rewarding and valuing researchers</u>

5. Provide rewards and incentives for research, non-research, and non-publication related activities

a. Reward and evaluate non-publication activity such as
   i. Teaching
   ii. Peer review
   iii. Editorship
   iv. Supervision
   v. Dissemination
   vi. Outreach
   vii. Societal impact

Explanation: This item was discussed in the second workshop, not so much for its content, but for its wording. Participants explained that it was not clear what non-research activities were, so the expression non-publication activities was added to provide further distinction.

6. Adopt responsible evaluation practices

a. Base researcher evaluations on inputs from different levels of colleagues by including individuals in supervisor and supervisee positions (i.e., 360° evaluation)
b. In evaluations and promotions ask for a selected list of publications and ask the researcher to reflect on their work to move from quantity to quality.
c. Consider diverse forms of impact
d. Set and clarify the diversity of criteria used in evaluation, including mandatory criteria for all those receiving evaluation and role-specific evaluation criteria
e. Make efforts to implement the recommendations from the Declaration on Research Assessments (DORA), the Hong Kong Principles, the Leiden Manifesto, and other guidance on good research assessment
f. Aim for a standard of evaluation practices across universities, countries, disciplines
g. Coordinate assessments with an "equality impact assessment" to ensure that they do not deepen inequalities
    i. Ensure that evaluations do not disadvantage researchers who had parental leave (e.g., do not rely on cumulative number of publications)
h. Avoid monetary incentives.

Explanation: Participants from the second workshop recurrently mentioned this item during the workshop. Aspects a and c were added to capture the recurrent perspective that assessments need to have a broad perspective of candidates and their achievement, both by involving a diversity or evaluators and input and by challenging traditional perspectives of impact in research. Point g. tackles an aspect that was mentioned several times as a possible barrier to implementation. In fact, participants explained that, to impact cultures, evaluation practices needed to become standards across institutions and, if possible, also across countries. And finally, responsible evaluation practices were also associated with diversity issues. Participants explained that the impact of assessments on equality and diversity should be considered, and that career breaks and leave which can result in lower cumulative outputs should not disadvantage applicants. On this last point, participants reiterated the point c. according to which evaluating should be based on an in-depth selection of applicants outputs rather than on a full profile. (initially "Endorse and implement DORA, the Hong Kong Principles, the Leiden Manifesto") to ensure that institutions focus on implementing the recommendations of those documents before signing their name on them (i.e., they should ensure that they have the infrastructure and resources needed to follow these guidance before endorsing them). Since different assessment guidance might not be completely compatible with one another, we also deemed that, when facing conflicting recommendations, institutions should be allowed to select recommendations that fit best their setting.

7. **Create and implement a research career roadmap**
    a. Ensure stability and opportunities of career paths
    b. Create shared responsibility between the institution and those with short-term contracts/early career researchers to strengthen the position of the early career researchers to remain within the institution
    c. Formally inform students about alternative career paths (e.g. dedicated lectures)
    d. Allocate part of funding to junior researchers when senior researchers receive grants
    e. Older investigators should be encouraged to move into alternative stages of their career — working in teaching, mentoring and science advocacy — that don't require research funds. This could help a shift of resources to the younger people.
    f. Consider diversifying career options also within academia with intermediate options (i.e., between post-doc and professor positions)
    g. Develop a research career roadmap which includes:
        i. Long term prospects for within academia
        ii. Possibility to develop the relevant skills and requirements to transition to industry

Explanation: Academic careers were briefly discussed by participants in the second workshop, mostly in relation to the lack of careers in academia and the general closeness of academia towards external career options. Participants mentioned that students should be better informed about careers outside academia, a point we will revisit in the section on 'Adequate education and skills training'. Nonetheless, participant pointed out that the fact that most of those who are in academia have never worked outside academia created a roadblock both in acceptability and in awareness of external career options. Finally, one respondent proposed that careers within academia should also be diversifies to allow more permanence in careers that are not necessarily at the level of responsibility of a PI. This last point relates back to the item 4. above in which participants discussed the need for institutions to alleviate the burden experienced by early career researchers who constantly need to look for funding.

<u>Related to publications and workload</u>

8. **Ensure that published research is open and transparent**
    a. Provide training on good publication practices
    b. Create opportunities to involve students in editorial and peer-review practices
    c. Prevent bad publication practices by:
        i. Not asking for long publication lists
        ii. Setting reasonable expectations that take into account different stages of career

iii. Focusing on the overall output of the researcher, rather than only their publication

d. Promote good publication practices by:
   i. Recognizing the quality, not only the quantity of publications
   ii. Encouraging and recognizing preregistrations and preprints
   iii. Encouraging and recognizing publication of negative/null results
   iv. Encouraging and recognizing open access publications (and invest the resources to allow researchers to afford reasonable APCs)

Explanation: Publications were briefly described in the second workshop. The first point that was mentioned was that the initial recommendation, which asked that publications be 'qualified' was unclear. Instead, participants described practices which largely relate to openness and transparency. Among other things, participants mentioned the need for preregistrations, preprints, publication of negative results, and open publications. On this last point, although it was not mentioned directly by participants in this item, we added that institutions should also help participants secure the means for open access publications before valuing them. Finally, one participant provided an example in which young researchers were introduced to editorial practices and peer-review and argued that such experiences help young researchers understand the publication process and should be valued by institutions, for example by encouraging student journals.

9. Ensure a balance in researchers' workload

a. Ensure researchers have dedicated research time
b. Ensure researchers have equal opportunities to publish
c. Ensure researchers can balance teaching and research activities
d. Implement strategic selection of funding calls within institutions. Send one strong funding call to decrease competition in a certain field
e. Ensure that expectations allow for parental leave, diversity, and reasonable expectations at different career stages
f. Ensure well-being of researchers
   i. Implement surveys to investigate the well-being of staff members and act upon the findings to improve perceived pressure and stress

Explanation: The issues related to researchers' unhealthy workloads were mentioned on a few instances in the second workshop, but the specific aspects were scarcely discussed. One aspect that was slightly new was the idea that parental leaves may be perceived as an hindrance on researchers' career, and the need to prevent this problem (point i.).

Best practice examples:
BP6: Publish institutional staff survey results including the negative comments
BP7: Create opportunities to involve student in peer- review and journal editorials (e.g., student run journal)
BP8: Support researchers in their activism (e.g., decision to avoid to peer-review for profit-motivated journals)
BP9: In Wallonia there is a funding programme for PhD students and postdocs to start spinoffs

Adequate education and skills training

Title of skeleton guidelines:

Guidelines for providing adequate education and skills training in research institutions

Guidelines:

1. **Foster cooperation, communication and discussion among researchers to ensure that they can learn from each other's skills**
    a. Ensure established researchers have a background in collaboration and openness
        i. Foster cooperation with management, researchers and support staff
    b. Have an open door policy and open communication practices
        i. Create fora for discussions and plan internal meetings
    c. Ensure good peer review practices at all levels of research
    d. Encourage work-in-progress seminars, also at the interdisciplinary level
    e. Provide researchers and students the space and the resources needed to enable them to organize bottom up initiatives for support, training, and informal discussion
    f. Encourage researchers to organize events where they can discuss non-project-specific affairs (e.g., integrity, policy, etc.)
    g. If possible, include junior researchers in Research Integrity Committees

Explanation: This topic captured particular interest in the second workshop. Participants discussed the importance of more informal meetings and discussion among researchers, and mentioned that many researchers are willing to take initiatives to organise these events themselves, so institutions should encourage them and provide infrastructures and facilitators. Another point that was mentioned was the possibility of involving junior researchers in research integrity committee discussions. This point, however, raised a debate between participants since some argued that confidential information should not be entrusted to young researchers while others maintained that trusting young researchers' confidence was part of the contribution.

2. **Create support offices**
    a. Have support offices to support open science and best practices, such as data curation, data sharing, reproducibility, correct statistical analyses, etc.
    b. Reward and recognize the cooperation with support staff
    c. Ensure that support offices also encourage bottom up initiatives from researchers
    d. Ensure that support offices focus on supporting researchers, not the institution
    e. Provide research support infrastructure such as software, access to statisticians

Explanation: Support offices were mentioned several times in the second workshop as the facilitators for several other initiatives. The point was also made that support offices should sometimes be reminded to focus on supporting researchers, not institutions.

3. **Develop a relationship with other sectors to ensure researchers have transferable skills for future employment**
    a. Transferable skills include
        i. Organization management
        ii. Negotiation skills
        iii. Communication skills
    b. Strengthen the partnership with other sectors (e.g., industry but also policy makers and public sector) to provide students an opportunity to experience and build skills for careers outside academia
    c. Encourage co-financing of research from industry partners to open opportunities for investment and employment
        i. Clarify to researchers and research leaders under which circumstances new industry collaborations are allowed (e.g. collaboration with the tobacco industry is prohibited)
        ii. Ensure transparency on industrial collaborations preferences and contributions (e.g., mention both institutions on publication to strengthen the visibility of both)
    d. Tackle negative attitudes towards those leaving academia

Explanation: The need to develop a relationship with other sectors was a topic of great interest in the second workshop. Participants were highly positive about students' experience in industry, and there was a general agreement that internship placements should be encouraged and that collaboration with other sectors should be actively sought. Importantly however, other sectors was widened to include also policy sector and public sector as opposed to the typical industry sector which was covered in earlier versions of the guidance.

4. **Provide opportunities to conduct research at other institutions and/or abroad**
    a. Encourage mobility schemes (e.g., Erasmus) also at the faculty level

Explanation: As part of the placement ideas, the importance of obtaining experience in different settings was also discussed in the second workshop, and participants mentioned that such experiences should also be encouraged for more senior members of the institution.

5. **Provide adequate guidance about good research practices, in which the responsibility of research leaders and institutions is also clarified (e.g. related to grants, conflict management, research practices, etc.)**
    a. Ensure visibility, awareness, and use of relevant European guidance
    b. When possible, coordinate requirements for good research practice across institutions

Explanation: On this item, participants in the second workshop highlighted that numerous excellent guidance already exist, and that instead of reinventing the wheel, institutions should promote their visibility. Also, the importance of standardizing good research practice expectations and training was described as something important.

6. **Provide sufficient training to researchers on various skills required for their work, such as technical skills, analytical skills, and research methods:**
    a. Dedicate a budget for training, training infrastructures, and training staff
    b. Provide training and opportunities for skills building to all levels of seniority
    c. Create a large course at the beginning of academic career, and smaller, tailored courses throughout career
    d. Embed history and status of science in educational programs to teach general understanding of science
    e. Involve researchers in the training curriculum to ensure that training offered corresponds to their needs
    f. Education and regular updates on research methods
    g. Leadership skills to principal investigators

Explanation: On the training for hard skills development, the need to provide training at all levels of seniority and to ensure that the needs of researchers are covered in the training offered in the

institution was mentioned by several participants of the second workshop. The fact that a dedicated budget for training is necessary to provide quality training was also a small aspect in the discussion.

7. **Ensure strong mentorship during degree phases to teach young researchers the right research methods**

Explanation: This point was not addressed in great depth in the second workshop.

8. **Provide sufficient support for data management practices**
    a. Ensure there are sufficient data support structures, including human resources (e.g. data stewards, data offices) and those are accessible
    b. Establish a clear collaboration between research offices, libraries, and research management to ensure that the services provided are aligned
    c. Ensure visibility, awareness, and use of relevant European guidance
    d. Have control and understanding about data: storage, meta-data, data management, etc.
    e. Create good and easy to use data repositories
    f. Have clear structures for data management plans
        i. Establish data management plans that apply to all researchers, as well as data management plans specific to each department
    g. Research leaders should support group members in adequate data management
    h. Ensure researchers transferring data between institutions do this properly

Explanation: On the point of data management practices, participants to the second workshop stressed the importance of ensuring a strong collaboration between the different services of the university.

9. **Implement strategies to also train and support researchers' transferable skills**
    a. Provide training that target a broad range of skills such as
        i. organizational skills,
        ii. project management,
        iii. conflict management,
        iv. reproducibility expertise,
        v. emotional intelligence training and development,
        vi. curiosity, empathy, listening skills,
        vii. etc.
    b. Allocate dedicated time for soft skill development at all seniority level

Explanation: The need for soft skills development also raised some interest among participants of the second workshop. Participants explained that often it is difficult to find the time to develop soft skills (e.g. communication, teamwork, creativity) in later seniority levels and proposed that institutions allow more senior researchers to dedicate time to it.

10. **Implement monitoring and feedback structures focusing on researchers' skills**
    a. Allow possibility for giving constructive feedback as a team to each other, and specifically to supervisors and research leaders
    b. Provide researchers the opportunity to set their own objectives upon which they should be assessed
    c. Implement monitoring and feedback at all level, not only for junior researchers
    d. Implement monitoring and feedback on open access compliance
    e. Those in charge of the monitoring should be qualified to do so.

Explanation: In the second workshop, the use of the term audit was raised as being problematic. Participants explained that audits had a negative connotation of policing which could reduce the willingness of researchers to collaborate. Instead, terms such as 'sensitivity check' and 'spot check' were proposed. For clarity, we settled for the term 'monitoring' in the guidance.

Best practice examples:

BP10: Erasmus scheme can help support staff to exchange ideas

BP11: In Denmark, Responsible Conduct of Research courses are coordinated across institutions to ensure a common agreement on what is good scientific practice

BP12: In institutions where RI committees have different phases, students and junior researchers could be involved in organization phases where no confidential information is discussed

BP13: Marie Curie secondments are meant to promote placements in non-academic institutions (but not always realized)

BP14: In Wallonia there is a funding programme for PhDs and postdocs to start spinoffs

BP15: Encourage exchanges where Masters and PhD students perform research in the industry for part of their degree (initiative that is frequently in place in the UK)

BP16: European Commission co-fund, where national funding bodies get co-funding from the European Commission for PhD or Postdoc programs, upon the condition that they include some kind of secondments in the programs.

BP17: Transferrable skills training for all researchers can be fostered easily in online webinars, incorporated as part of Structured PhD programmes etc.

Diversity and inclusion

Title of skeleton guidelines:

Guidelines for diversity and inclusion in research institutions

Guidelines:

1. **Understand diversity in its broad meaning, without limiting to specific diversity issues**
    a. Consider all aspects of diversity, including gender, ethnicity, sexual orientation and disability, but also different factors that may impact outputs and researchers' achievements, such as care or family issues, or simply different backgrounds and sectors that must be taken into account in certain research decision
    b. Embrace an intersectional approach to diversity issues to consider cumulative impacts
    c. Ensure that invisible populations, such as those with learning disability, are adequately considered
    d. Avoid comparing profiles without considering underlying conditions (e.g., medical issues, care issues, family issues, career change, etc.)

*Explanation: This point is entirely new from discussions in the second workshop. Indeed, participants were very interested in diversity issues, but maintained that the current views of diversity were often limited to gender issues, rarely even discussing race and disability. Participants argued that, instead, diversity should consider all minority groups, and that the intersectionality of diversity issues (e.g., black **and** woman) were also very important to consider appropriately.*

2. **Implement a structure of data collection and metrics for diversity and inclusion**
    a. At the center of any diversity and inclusion guideline or policy should be data collection and metrics on diversity and inclusion to evaluate the status of the institution which will aid in improving the D&I policy
    b. Transparently and publicly report the progress on diversity initiatives and diversity metrics (e.g., on the university website)
    c. All aspects of diversity should be included in the data collection: including gender, ethnicity, disabilities, socio-economic background, etc.

Explanation: Participants to the second workshop did not extensively discuss the need for a metric for diversity, but they supported that diversity reports from research institutions should be made public,

mentioning both the advances and the issues that are still lacking behind. More specifically, participants maintained that a form of inter-university competition to do well on diversity issues could be helpful. The bronze, silver, and gold medals of the Athena Swan program were mentioned many times as a good practice example, as we will discuss further in point 4.

3. **Adopt institutional policies on diversity and inclusion**
    a. Create action plans on diversity and inclusion with clear deliverables, timeline, resources and responsibilities
    b. Go beyond the minimum directives and EU jurisdiction
    c. Implement a holistic institutional framework on increasing diversity and inclusion where various issues are addressed including recruitment, promotions, mentorship, research performance assessment, training, etc.
    d. Adopt and uphold strict consequences for derogatory and discriminatory behaviours
    e. Monitor diversity policies to ensure that they are adapted to the context and remain helpful without generating further discrimination
    f. Include policies for diversity in conference and seminar organization and attendance policies
    g. Ensure fair pay

Explanation: In terms of policies, participants to the second workshop emphasised the need to go beyond the legal minimum of diversity policies. The need for genuine consequences (i.e., a no tolerance policy) on derogatory comments was mentioned a few times, while the issue of fair pay was mentioned but scarcely expanded upon.

4. **Have high level institutional awareness and commitment**
    a. Institutions should commit and prioritize diversity at the highest level
    b. Create a holistic diversity policy to not just consists of different components but to connect all aspects
    c. Create a diversity policy within institutions from the highest levels to ensure complete embedment within the entire institution
    d. Make efforts to keep open mindedness and openness to change expectations at high level institutional structures
    e. Clearly communicate the diversity and inclusion policy.
    f. Include cultural awareness, tolerance and openness, acceptance of different ideas and viewpoints, raising awareness and celebrating diversity policies and practices that promote diversity and inclusive environment

g. Sign up to the principles of the Athena SWAN Charter and adopt other employment practices that support diversity and inclusion

Explanation: The discussion did not discuss institutional awareness and commitment in depth, but the need for institutions to keep an open mind for change was mentioned.

5. **Build a supportive community for diversity and inclusion**
   a. Create a supportive and safe space for people to express their thoughts and feelings, speak of the racism they experience inside science as well as outside.
   b. Foster a shared understanding and dialogue which considers also perspectives of the majority to adapt policies and support adequately and increase acceptation
   c. Build a 'landscape of care' at all levels: interpersonal, organisational, structural (i.e., micro, meso, macro)
   d. Openly discuss diversity issues whenever possible to increase awareness and to embed the discourse in the landscape or everyday practices — See BP18
   e. Consider the impact of research expectations on diversity issues (e.g., short term contracts and assessments based on outputs can strengthen discrimination)
   f. Involve researchers bottom up to increase community engagement and to make diversity and inclusion an institutional priority
   g. Involve dedicated associations to foster a sense of community at all levels in the institution
   h. Accept that researchers may not speak at conferences where gender issues are ignored, or participate in panels where diversity is not considered.

Explanation: The role of the supportive community in diversity and inclusion was one of the most mentioned item on this topic in the second workshop. In fact, participants recognised the importance of discussing diversity in all research activities was mentioned as a way to embed it in the culture of the institution. The need for a landscape of care in which all levels of the institution are involved was also mentioned. Interestingly, the voice of the majority was also said to be essential to building a supportive community, not only to understand the issues and reservations individuals can have towards diversity initiatives, but also to involve the majority in the diversity discourse and ensure that they take part in it rather than feel it imposed on them. Furthermore, a recommendation to involve dedicated association in the institution and also in research was said to be a way to increase support and involvement of minority groups. Finally, participants to the second workshop raised an interesting point related to researchers' activism, stating that researchers can also take a strong

stance by refusing to partake in activities and groups where diversity issues are not respected, and that this choice should be embraced by the institution.

6. **Adopt models, examples and representations**
    a. Have role models and success stories of individuals or teams to set an example for others
    b. Establish diverse top-management teams
    c. Have open discussions about research at all levels
    d. Consider renaming important structures (e.g., buildings, aulas, etc.) to reflect diversity

Explanation: This item was not really targeted in the second workshop except in one small and relevant recommendation to consider diversity when naming buildings, which we expanded to any university structures.

7. **Create support systems**
    a. Have safe and transparent mechanisms in place for reporting diversity and inclusion issues
    b. Have procedures for whistleblowers in place
    c. Have support structures in place to allow mediation and discussion

Explanation: We did not add any specific point to this item based on the second workshop.

8. **Ensure a safe environment for all**
    a. Ensure that researchers can work in a safe, inclusive and open environment where they feel responsible and accountable, can share concerns about diversity and inclusion issues, racism, sexual harassment and discrimination.
    b. Adopt and uphold strict consequences for derogatory and discriminatory behaviours
    c. Involve affected collectives to determine what a safe environment means to them

Explanation: One participant to the second workshop added a post-it note stating "!!!! Super important!!!!" next to this point, and indeed other participants mentioned that this was essential, and should be a starting point. Participants, however, mentioned that the concept of a 'safe environment' may differ between people, and that minority groups should be involved in the discussion to determine what is a safe environment for them.

9. **Provide diversity and inclusion training program and practices, such as:**
    a. Have diversity and inclusion as a part of standard training (i.e., integrate diversity training in the regular curriculum)
    b. Consider implementing unconscious bias exercise and training for all
    c. Do not limit diversity and inclusion training to young researchers, but involve all researchers and research staff, including those who lack interest to participate
    d. Provide diversity and inclusion workshops
    e. Build diversity and inclusion into research induction
    f. Offer courses related to diversity and inclusion, such as:
        i. unconscious bias
        ii. sex/gender dimension in research
        iii. intersectionality issues

Explanation: Diversity training was discussed in the second workshop, but participants maintained that diversity issues should not be taught in separate courses, but rather be included throughout regular training and regular courses. This would also ensure that diversity training is not limited to those interested on the topic, but reaches everyone in the institution. For this reason, we removed the former point which maintained that RPOs should 'Have separate diversity and inclusion training'.

10. **Reward diversity and inclusion by giving 'gold medal' for the diversity status of the institution**
    a. Increase public information on diversity efforts, but also transparently reflect limits of diversity within the institution
    b. Reward diversity efforts in research institutions and research activities, and impose consequences for failing to embrace inclusion (e.g., tie funding to diversity)
    c. Ensure that rewards and assessments for diversity do not result in discrimination of the majority

Explanation: Participants to the second workshop proposed that there should be rewards for upholding diversity efforts, but there should also be consequences for failing to do so (i.e., the carrots and the sticks). For instance, increasing the visibility of diversity issues and failed objectives were mentioned, and the possibility of tying funding to diversity was also raised.

11. **Implement recruitment sensitive to diversity and inclusion**
    a. Create a shared and transparent plan of recruitment procedures
    b. Remove physical barriers for people with mental or physical disabilities

c. Ensure that diversity issues are not only considered in the selection of candidates, but also in the composition of selection panels
    i. Introduce specific training on unconscious bias, focusing on managers who are part of interview board
d. Ensure that applications and job advertisement promote diversity
    i. Ensure that job advertisements are transparent, visible, and open to all — See BP20
    ii. Consider the wording of job advertisement to ensure that it does not attract only majority profiles (e.g., use collaborative terminology, not only leadership terminology)
    iii. Ensure that application channels are inclusive and accept applications in many forms (e.g., not only by email or online applications, but also by post)
e. Always take the context from which applicants come from into account (i.e., past opportunities, seniority, caring duties, etc.) to fairly assess profiles
f. Consider introducing anonymous application processes
g. Consider positive discrimination when it is justified to reduce existing gaps (e.g., quotas)

Explanation: Diversity and inclusion in recruitment was one of the most addressed topics of the second workshop, and visibly one that participants cared a lot about. For instance, participants explained that beyond including diversity measures in hiring decisions, the hiring panels should also be inclusive and diverse. In addition, the format of job applications was mentioned several time, with participants insisting that the wording of applications should be attentive to attract diverse profiles, that the places where the positions are advertised should be highly visible to all, and that the channels through which applications can be received should not depend on an internet connexion. One participant mentioned that applications could be anonymous, but this recommendation was not exemplified further (point e.). One participant also proposed that we should not be afraid of imposing strong quotas, but there were also reservations from certain participants about positive discrimination which, although useful, was said not to be accepted in all countries. For this reason, we phrased these two recommendations loosely by proposing that universities 'consider' these recommendations

12. **Ensure diversity in research samples**
    a. Encourage consideration of diversity in selection of research topics and research priorities
    b. Encourage adequate gender diversity to build representative samples in animal research to maximize generalizability of results, but avoid imposing research sample specifics (i.e., avoid over-regulating),

c. Increase awareness for the benefits of inclusivity in research designs (e.g., diverse research culture enhances research results, diverse and representative research samples contribute to generalizability, etc.)

Explanation: Participants in the second workshop also added several elements of details to the need of including diversity in research samples. First, they mentioned that this could apply both to research topics, or to the selection of animals in animal studies. In the latter case, participants explained the problems that the all-male-medical-research have caused on generalizability of the data, and they discussed the need to ensure that the samples are representative. Some proposed that funders and institutions could mandate balanced samples, but other participants felt uneasy about letting funders and institutions take decisions about how the research is conducted in the lab. Consequently, we carefully phrased the recommendation i. by adding "but avoid imposing research sample specifics".

Best practice examples:

BP18: When political events in which diversity issues are discussed, events and discussion can be organised in the institution as a platform to increase awareness

BP19: Join international reward schemes such as Athena Swan

BP20: Best practice: (inter)national public website for all academic job advertising (e.g., jobs.ac.uk)

4.2.7.1.2 Education and training in RI

Items written in red are new or modified recommendations based on the empirical work from the second round of co-creation workshops.

Items written in black are based on the empirical work from the first round of co-creation workshops.

Items written in blue are based on other insights from the SOPs4RI project and included in the skeleton guidelines from the initial SoRs.

Pre-doctorate research integrity training

Title of skeleton guidelines:

Guidelines on pre-doctorate research integrity training for research institutions

Guidelines:

At the Bachelor/Master level:

1. **Integrate research integrity training into the curriculum, making it mandatory**
    - **a.** As a part of the introduction to the curriculum
    - **b.** As a part of the thesis writing process
    - **c.** Providing adequate contact hours for students

Explanation: Participants in both sets of workshops discussed the importance of starting research integrity (RI) training as early as possible. There was some disagreement in the first workshop about whether the starting point should be the bachelor or master level, since bachelor students might not have any actual experience with research, but some participants in the second workshop explained that all students including those at the bachelor level will experience research to an extent. In fact, there were even suggestions in the second workshop from one participant that starting at the bachelor level is already too late, since many students experience research for the first time in high school and might learn irresponsible research behavior already at that point. Points 1a and 1b were suggestions of where in the curriculum to place RI training; 1a was suggested in the second set of workshops, whereas 1b was mentioned in both sets. Furthermore, item 1c was added from the SoRs, but confirmed as important to ensure that students do not see RI training as something optional, but rather mandatory and important.

At the PhD level:

1. **Deliver a mandatory course about the basics of research integrity at the start of the PhD**
    a. Employ trainers with general expertise in research integrity or collaborate with trainers in other institutions
    b. Empower trainees to speak up in their teams, by teaching them about institutional policies.
    c. Provide RI trainings as complete courses rather than one-off workshops, providing adequate contact hours.
    d. Provide RI training in multidisciplinary groups during which participants from different disciplines are given the opportunity to discuss and address the specific challenges faced in their disciplines.

Explanation: Participants in both sets of workshops explained that in order to ensure that all PhD students who need RI training receive it – rather than only those who are interested in RI in the first place – it is important to deliver mandatory RI training. They suggested to do this at the start of the PhD to ensure that students had the basic awareness and skills about RI early on. Item 1 arose from

discussions in the first workshop set, where some participants suggested that the most suitable person to deliver the mandatory training would be someone with general knowledge about RI, rather than someone with more specialized knowledge (e.g. about data management). In the second set of workshops, some participants were concerned that not all institutions might be able to employ their own trainers; therefore, item 1a offers some flexibility and guides institutions with less resources to collaborate with other institutions or trainers. Item 1b was based on discussions in the first set of workshops, where some participants mentioned that awareness about policies and rules can empower students to speak up about RI to those higher in the hierarchy, and that this would be highly desirable. In the first set of workshops, it was already suggested that this basic RI training for PhD students should consist of a course, rather than a smaller event (item 1c). Finally, some participants in the first workshop highlighted the importance of providing the training in a multidisciplinary context, to allow exchange of experiences and cases from different disciplines in the training (item 1d).

2. Follow up with elective specialized courses throughout the PhD

a. Employ trainers with specialized expertise or collaborate with trainers in other institutions
b. Refer students to existing educational resources such as codes of conduct, online training, or other relevant guidelines

Explanation: It was already discussed by many participants in the first set of workshops that basic RI training at the PhD level needs to be supplemented with follow up courses on specific topics (e.g. data management) further on in the PhD. This is because as students progress in their research, they will uncover new RI questions and challenges. To allow students to follow the specialized courses that are most useful for them, these participants suggested to keep follow up courses optional. However, in the second set of workshops, one participant was concerned that it would be very difficult to coordinate the delivery and uptake of optional specialized courses. Item 2a was brought up in the first set of workshops, and slightly modified after the second set of workshops where some participants were concerned that not all institutions will have the means to hire their own trainers. Item 2b is based on suggestions from the second set of workshops, that referring students to resources can already be good enough when institutions do not necessarily have the means to offer follow up courses themselves.

3. Encourage and support informal discussions at departments or research teams to supplement formal training

a. Mix junior and senior researchers in some of these sessions.
b. Foster multi-disciplinary discussions.

Explanation: Item 3 was raised in the first set of workshops, where many participants highlighted the importance of sharing experiences and problems in informal meetings for RI education. They suggested to have mixed-rank groups for some of the sessions to allow for sharing of different types of experiences, and learning across ranks (item 3a). In the second set of workshops, some participants stressed that having multi-disciplinary informal discussions is especially useful as much of research today is multidisciplinary (item 3b).

At all pre-doctorate levels:

1. **Employ respected, enthusiastic and qualified trainers**
    a. Employ a set of trainers to ensure expertise in all aspects of RI are covered (e.g. ethics, data management, open science, etc.)
    b. If possible, hire internal or external trainers
    c. If it is not possible to hire trainers from your own institution, collaborate with trainers or training programs from other institutions
    d. Involve faculty in the delivery of trainings

Explanation: Participants in both sets of workshops discussed the importance of hiring suitable trainers for RI training. In the first set of workshops, participants mentioned that a suitable trainer has the following characteristics: young, good communicator, enthusiastic, researcher. In the second set of workshops, one participant emphasized the importance of ensuring that trainers are sufficiently trained and qualified to offer good RI education. Another participant in the second set of workshops explained that a good trainer of RI does not necessarily need to do research, but must learn enough about it to train others. Yet another participant explained that the most important feature of trainers is that they are respected by those they train. If they are not, then the training material will not be taken up successfully. Taking these considerations together, we decided to not make any judgments in the guideline about the age or profile of the trainers, as different institutions can go for different options, but to emphasize the importance of hiring trainers that are sufficiently qualified, enthusiastic, and respected. Item 1a arose because some in the second set of workshops mentioned that a team of trainers with different types of expertise might be needed. Items 1b and 1c are based on insights from the second set of workshops about how internal trainers are most suitable since they know the local context best, but that it might not always be possible hire these. Item 1d is from results of the first set of workshops, where some participants suggested that it can be helpful to have senior colleagues deliver the trainings, to show support for RI and illustrate its importance for practice.

2. Use blended-learning formats to allow for continuous learning

a. Communicate to trainees that they are on a continuous path of research integrity training
b. Ensure that trainees can turn back to the training material to look at the content later.

Explanation: This item was discussed and agreed on in both sets of workshops. In the second set of workshops, some participants highlighted that blended learning formats are most suitable for continuous training, as they allow trainees to go back to training materials to look at the content again (item 2b), and since they allow for the formation of online support groups. Furthermore, in the second set of workshops, participants suggested to communicate to trainees what the added value of the blended-learning format is for continuous learning so they can make the best use of it (item 2a).

3. **Emphasize practice over theory in RI education and trainings**

a. Consult with potential trainees on what to cover during training and update the training based on trainees' needs
b. Teach students the basic values of research integrity
c. Focus on the daily practice of research, rather than emphasizing ethical theory
d. Integrate relevant practical elements of research ethics issues into research integrity trainings
e. Address cultural differences in the understanding of research integrity during training
f. Discuss case studies and real-life examples during training

Explanation: One of the participants in the first set of workshops stressed that training should not focus on ethical theory, as that is not what is most interesting or relevant to students. Many other participants in both sets of the workshops agreed with this, and suggested to emphasize the practical issues of RI in training, rather than focusing on ethical theory. Item 3a came up in the second set of workshops, where some participants highlighted that it might be useful to consult potential students about what to include in courses, to ensure that courses' emphasis remain close to practice. Items 3b-3e were brought up in the first set of workshops, to explain that while some basic theory (e.g. about values) can be introduced to students, it should be integrated into the trainee's questions about their own research. Item 3f was discussed in both sets of workshops, where there was strong agreement to use case studies and real-life examples to keep training programs close to practice.

4. **Motivate trainees using tangible incentives and positive instruction**
    a. Clearly communicate the purpose and value of research integrity training (e.g. improving research quality, helping with grants, etc.)
    b. Explore what rewards and incentives motivate trainees and tailor these accordingly
    c. Focus on a positive approach to research integrity rather than on research misconduct or on telling trainees what to do.

Explanation: In the first set of workshops, some participants suggested to provide trainees with tangible incentives for training, such as digital badges, as that would be sufficient for this target group. However, in the second set of workshops, some participants explained that incentives and rewards should be tailored, as different trainees might appreciate different types of incentives. Therefore, they suggested to explore what rewards motivate participants and then tailor these accordingly (item 4b). Furthermore, items 4a and 4c were added based on discussions in the second set of workshops, where some participants highlighted that a good understanding of the benefits of RI training and a positive approach to RI can also motivate trainees.

5. **Evaluate training programs**
    a. Use subjective measures (e.g. trainees' perception of course usefulness)
    b. Use follow up measures (e.g. number of participants enrolled in elective courses)

Explanation: In the first workshops, some participants mentioned that to evaluate training effectiveness, students could be asked to reflect on RI in their thesis. While there was no disagreement with this particular point in the second set of workshops, the participants there discussed how evaluating 'effectiveness' of courses through objective means is difficult and maybe not even possible. Therefore, they suggested to evaluate training based on subjective means (item 5a) or on simple objective measures not related to effectiveness (item 5b). Therefore, we reformulate this entire item in the guideline to remove the word 'effectiveness' and add some flexibility in how training programs can be evaluated.

6. **Foster a positive research culture**
    a. As a prerequisite for training, to allow trainees to speak freely and engage in open discussions
    b. Through training.

i. Rather than telling researchers what to do during training, focus on giving awareness of RI standards and best practices, as well as enthusiasm and support to act with integrity

Explanation: This item was discussed in the first set of workshops, but under the subtopic 'post-doctorate RI training'. We added it to this subtopic as well, as it also applies here. Participants' rationale for including this item was that "education and 'good' research culture have to be hand in hand", since they influence each other. This was supported by the SoRs. Furthermore, item 6bi was added based on a comment in the second set of workshops that RI training should not be about telling researchers what to do but rather giving them the means and tools to act responsibly, to create a collaborative and healthy environment.

Best practice examples:

- Research integrity training program at University College London: https://www.ucl.ac.uk/research/integrity/research-integrity-training-framework
- Committee on publication ethics resources: https://publicationethics.org/core-practices
- 'Science in action' course at University Pompeu Fabra: https://www.upf.edu/web/phd-biomedicine/science-in-action
- Editage educational resources: https://www.editage.com/insights/
- Stockholm University's 'Research ethics for human sciences' course: https://www.su.se/department-of-philosophy/education/courses-and-programmes/research-ethics-for-human-science-1.523153?eventopenforinternationalstudents=true&q=&xpanded=

Additional remarks: The best practice examples above were mentioned by participants in the second set of workshops. There are likely many other best practice examples available, which can be added to the list here.

Participants also mentioned some implementation considerations for these guidelines in the second set of workshops including that:

- *The guidelines are already well developed.*
- *Targeting young researchers is helpful as they are the future of research and they will mentor future young researchers*
- *It would be optimal to start RI training already at the high school level, as students are first acquainted with research at that level*
- *Top down support for the guidelines is necessary for implementation*
- *Measuring training effectiveness is difficult.*
- *Supervisors and mentors play an important role in RI training*

- *The purpose of RI training has to be clear to everyone for implementation*
- *A balance is needed between supporting bottom up initiatives and providing top down support, but is difficult to achieve*
- *It might be difficult to account for disciplinary differences in general RI training courses*
- *Training should start with general issues and move to specifics later*
- *Follow up formal and informal training is difficult to coordinate and organize*
- *Standardized terminology should be used in the guidelines to ensure everyone understands all concepts*

Research integrity training for post-doctorate and senior researchers

Title of skeleton guidelines:

Guidelines on post-doctorate research integrity training for research institutions

Guidelines:

1. **Deliver mandatory training about research integrity basics for researchers with a doctorate starting a new position.**
    a. As part of the introduction package for new employees
    b. Include employees starting a new position at the same institution in the training
    c. Recap the basics of research integrity in this training
    d. If the researchers have not yet obtained research integrity training at the PhD level, ask them to follow a PhD research integrity course as well.
    e. Employ trainers with general expertise in research integrity or collaborate with trainers in other institutions
    f. Supplement the mandatory trainings with follow-up peer support meetings.

Explanation: Participants in both sets of workshops explained that in order to ensure that all post-doctorate researchers receive RI training – rather than only those who are interested in RI in the first place – it is important to deliver mandatory RI training. For feasibility purposes, they suggested to mandate the training to incoming researchers and those who start new positions (i.e. are promoted) at the institution (items 1a and 1b). Items 1c and 1d were brought up in the second set of workshops, as a means to ensure that all post-doctorate researchers have sufficient background in the basics of RI. Items 1e was based on participants' suggestion in the first set of workshops that the most suitable person to deliver the mandatory training would be someone with general knowledge about RI, rather than someone with more specialized knowledge (e.g. about data management). In the second set of workshops, some participants were concerned that not all institutions might be able to employ their own trainers; therefore, item 1e offers some flexibility and guides institutions with less resources to

collaborate with other institutions or trainers. The last item (item 1f) was only discussed in the first set of workshops; participants highlighted that peer support meetings could be very helpful and feasible ways to ensure continuous RI learning.

2. Follow up with mandatory specialized trainings every 2-3 years at all post-doctorate levels.

a. Use small events, like half-day workshops, rather than full courses.
b. Provide or refer trainees to easily accessible online modules with specialized content.
c. Employ trainers with specialized expertise or collaborate with trainers in other institutions.

Explanation: In the first set of workshops, some participants suggested that in order to keep up with the newest regulations and policies and refresh researchers' knowledge and skills about RI, it would be helpful to offer optional follow up training events, focusing on specific RI issues (e.g. data management). However, in the second set of workshops, many of the participants preferred to make the follow-up training events obligatory, to ensure that all researchers are up-to-date on RI. These participants thought that a 2-3 year interval between trainings would ensure that these follow-up events are not burdensome. Furthermore, they suggested to keep the training events small, also to reduce the burden (item 2a). Item 2b was discussed in both sets of workshops. Item 2c was brought up in the first set of workshops, and slightly modified after the second set of workshops where some participants were concerned that not all institutions will have the means to hire their own trainers.

3. Use blended-learning formats

a. Ensure that trainees can turn back to training to look at the content later
b. Discuss case studies, but with a focus on positive aspects of research integrity rather than research misconduct.

Explanation: Item 3 was only discussed in the second set of workshops for this guideline, and therefore recently added. Due to participants' suggestions that many of the items in the pre-doctorate training guideline also apply to this guideline, we added item 3a here to ensure some consistency. Item 3b was discussed in the second set of workshops.

4. Encourage and support the organization of informal discussions at departments or research teams to supplement formal training

a. Mix junior and senior researchers in some of these sessions.
b. Foster multidisciplinary discussions

Explanation: This item was raised in the first set of workshops, where many participants highlighted the importance of sharing experiences and problems in informal meetings for RI education. It was slightly altered in phrasing from 'Organize informal events' to 'Encourage and support the organization of informal discussions' to take into account some concerns raised by a few participants in the second set of workshops, that organizing informal discussions can be difficult to coordinate and arrange. Item 4a was taken from the guidelines on pre-doctorate training, as it also seems to apply here. Item 4b was based on discussions in both sets of workshops as many participants stressed that having multi-disciplinary RI discussions is especially useful as much of research today is multidisciplinary. After the first set of workshops, item 4b was a main item but we eventually decided to place it as a sub-item under item 4 based on the suggestion of one of the participants of the second set of workshops that this should not be a main heading, and the suggestion of another participant that multidisciplinary concerns are especially interesting to discuss in informal discussions.

5. Teach post-doctorate and senior researchers about research integrity by stimulating them to teach about the topic at the pre-doctorate level

Explanation: Item 5 was included based on the results of the first set of workshops, where it was discussed that when post-doctorate researchers have to deliver RI training, it is a means for them to progress in their own RI education as well. However, in both sets of workshops, and especially so in the second set, there was hesitancy about the usefulness of this guideline as many participants were afraid that if post-doctorate researchers are not sufficiently trained in RI and enthusiastic about it to begin with, it would be risky to ask them to train more impressionable junior researchers.

6. Motivate trainees to actively participate in training

a. Convey clearly that research integrity is important for research quality and relevant for all researchers.
b. Label trainings as 'Masterclass' rather than 'training' to make them more attractive.
c. Integrate research integrity trainings into existing courses
d. Link research integrity and research integrity training to funding, promotions, ethics review, etc.
e. Highlight the importance of research integrity training in preventing reputational damage.

f. In case of resistance to training, consider not labelling trainings with normative titles such as 'research integrity', but rather use more relatable and neutral terms such as 'research practices'

Explanation: This point was highlighted in the SoRs and extensively discussed in both sets of workshops. It was repeatedly emphasized by many participants motivating trainees is especially difficult at the post-doctorate level, so this needs a lot of attention in the guideline. Initially the item was named 'Incentivize training', but a participant in the second set of workshops suggested that 'incentive' is not appropriate to use when we discuss mandatory training, suggesting that 'motivating trainees' is more appropriate. Item 6a was raised in the second set of workshops, while items 6b, 6e-6f were raised in the first set of workshops, and items 6c-d originate from the SoRs.

7. Employ respected, enthusiastic and qualified trainers

a. Employ a set of trainers to ensure expertise in all aspects of RI are covered (e.g. ethics, data management, open science, etc.)
b. If possible, hire internal or external trainers
c. If not possible to hire internal trainers, collaborate with trainers or training programs from other institutions
d. Involve senior peers in the training delivery

Explanation: Just like for the guidelines on pre-doctorate training, participants in both sets of workshops discussed the importance of hiring suitable trainers for RI training of post-doctorate trainees. As such, this item mirrors the item on suitable trainers for the pre-doctorate training guideline. Item 1a arose because some in the second set of workshops mentioned that a team of trainers with different types of expertise might be needed. Items 1b and 1c are based on insights from the second set of workshops about how internal trainers are most suitable since they know the local context best, but that it might not always be possible hire these. Item 1d is from results of the first set of workshops, where some participants suggested that it can be helpful to have senior colleagues deliver the trainings, to show support for RI and illustrate its importance for practice.

8. Tailor the trainings to the needs of the trainees:

a. Conduct a training needs analysis (TNA) to learn about your target groups' needs and tailor training accordingly
    i. Senior post-doctorate researchers might need a different training strategy than more junior ones.

b. Plan meetings with researchers, to discuss what should be covered during training and tailor training accordingly
c. Address cultural differences in the understanding of RI in training.
d. Give researchers the space to share stories and challenges.
e. Address all roles of good researchers in training including mentorship, reviewing, leadership, etc.
f. Have follow up meetings with researchers to discuss how to integrate research integrity considerations into their research
g. Ensure that training has an added value to trainees and communicate this value clearly (e.g. helping with grant application success)

Explanation: The need to use a bottom up approach for training was highlighted in both sets of workshops for the guidelines at the post-doctorate level. Item 8ai was already brought up in the first set of workshops, but the idea to do a trainings needs analysis and hold meetings with trainees to discuss what to include in training (items 8a-8b) was brought up by some participants in the second set of workshops. Similarly, items 8f-8g were also brought up in the second set of workshops. Items 8c-8d were based on insights from the first set of workshops, while 8e was adapted based on a recommendation in the SoRs that the role of the reviewer should also be addressed in training.

9. Evaluate training programs

a. Use subjective measures (e.g. trainees' perception of training usefulness).
b. Use follow up measures (e.g. number of participants enrolled in optional training)

Explanation: For this guideline, evaluation was not discussed in the first set of workshops. Instead, we integrated this item from the SoRs phrased initially as 'Evaluate training effectiveness using appropriate measures'. However, the participants in the second set of workshops discussed how evaluating 'effectiveness' of courses through objective means is difficult and maybe not even possible. Therefore, they suggested to evaluate training based on subjective means (item 9a) or on simple objective measures not related to effectiveness (item 9b). Therefore, we reformulate this entire item in the guideline to remove the word 'effectiveness' and add some flexibility in how training programs can be evaluated.

10. Foster a positive research culture

a. As a prerequisite for training, to allow trainees to speak freely and engage in open discussions
b. Through training

i. Rather than telling researchers what to do during training, focus on giving awareness of RI standards and best practices, as well as enthusiasm and support to act with integrity

Explanation: Participants' rationale for including this item was that "education and 'good' research culture have to be hand in hand", since they influence each other. This was supported by the SoRs. Furthermore, item 10bi was added based on a comment in the second set of workshops, that RI training should not be about telling researchers what to do but rather giving them the means and tools to act responsibly, to create a collaborate and healthy environment.

Best practice examples:

- Data management seminars for senior researchers
- Small research integrity workshops
- Marie Curie research integrity programs for postdoctoral researchers: https://www.mariecuriealumni.eu/topics/research-integrity
- Ghost, as a way to evaluate courses: https://ghost.org/

Additional remarks: The best practice examples above were mentioned by participants in the second set of workshops. It is unclear whether there are other best practice examples available; it would be helpful to look for these further.

Participants also mentioned some implementation considerations for these guidelines in the second set of workshops including that:

- *Mandatory training can lead to a box-ticking mentality*
- *It is more difficult to make courses mandatory at the post-doctorate level compared to the pre-doctorate level*
- *Funders can help to incentivize RI training by requiring it*
- *It is difficult to focus on concrete research practice, rather than ethical theory, in general RI training since each discipline has different practices*
- *Evaluating training effectiveness through objective measures is difficult.*
- *Standardizing RI training at the post-doctorate level across Europe is difficult when there are no/few formal courses available*
- *Many of the items mentioned in the pre-doctorate RI training guidelines have been added here as they also apply for this target group.*

Training of research support staff & research integrity trainers

Title of skeleton guidelines:

Guidelines on training of research support staff & research integrity trainers

Guidelines:

1. **Organize formal and/or informal events where personnel from various departments are brought together to share roles, experiences, and discuss how to work together on research integrity.**
    c. Include: research integrity committee members, data management personnel, legal staff, library staff, research integrity trainers, researchers, policy and management staff, confidential counselors, etc.
    d. Ensure that staff are equipped with the relevant skills needed for their role.
        i. Research integrity officers/committee members should address skills relevant for responsibly investigating allegations of misconduct.
        ii. Confidential advisors/counselors/ombudspeople should address facilitation, mediation and interpersonal skills.
    e. Discuss case studies, relevant for the institution, to learn from each other.
        i. Less experienced staff should be presented with possible cases they might face.
        ii. More experienced staff can present their own cases and discuss how they have dealt with them.
    f. Help staff understand researchers better
    g. Face-to-face trainings are more suitable here, but online sessions can be used to supplement the face-to-face components.

Explanation: This item was discussed in the first set of workshops and was initially phrased as: 'Provide trainings, where personnel from various departments at the institution are brought together to share roles, experiences, and discuss how to work together'. The rationale behind the item was that bringing various support staff together to discuss questions, cases and experiences would be very informative and help staff to work better together. In the second set of workshops, a participant explained that the term 'training' might not be appropriate here, considering that a more informal event might be more suitable for this type of peer exchange of knowledge and experience rather than 'training' which involves a more top down approach to education. The participant even mentioned that it is not suitable to discuss hiring official trainers for this target group – an additional item that we had put in the earlier version of this guideline, which we then deleted. To further account for this view, we reformulated item 1 to exclude the word 'training' and explicitly mention that the exchange can occur in a formal or informal event, leaving room for flexibility in implementation. In line with

this, we also reformulated item 1b which was initially phrased as 'Teach staff the relevant skills', to ensure 'Ensure that staff address the relevant skills'. In the earlier draft of this guideline (after the first set of workshops), item 1a was also partially mentioned as a separate item as 'Include researchers in the training', but we removed that item due to redundancy. The rest of the points under this item arose either directly from the first set of workshops (items in black) or the SoRs.

2. **Ensure that research integrity trainers are provided with train-the-trainer training by referring them to existing training programs or developing an in-house training.**
    a. Ensure that trainees learn about the foundations of research integrity and ethical theory
    b. Ensure that trainees are taught about training methods.

*Explanation: In the first set of workshops, some participants stressed that specific training is needed for trainers of RI, where both RI basics (item 2a) and training methods (item 2b) are taught. In the second set of workshops, there was agreement about the importance of the item, but some participants expressed concern that not all institutions will be able to provide their own train-the-trainer RI training. To account for this, after the second set of workshops, we formulated item 2 as 'Ensure that RI trainers are provided with… by referring them to existing training programs or developing an in-house training' (rather than the previous formulation of 'Provide RI trainers with…), and item 2b as 'ensure that trainees are taught' (rather than the previous formulation of 'Teach trainees about training methods').*Provide multidisciplinary trainings where disciplinary considerations can be discussed

3. **Organize training events regularly, with new trainings offered at least when policies/regulations/infrastructures change.**
    a. Use examples and cases to illustrate new policies, regulations, and/or infrastructures

Explanation: This item was discussed in both sets of workshops as important to include to ensure that staff are aware of the most updated policies/regulations and infrastructures. Item 3a was added based on some participants' suggestions in the second set of workshops that policies and regulations are often boring, and need to be 'brought to life' using interesting cases and examples.

4. **Facilitate the formation of and participation in European level support groups about research integrity to support peer-to-peer learning.**
    a. Facilitate participation in online seminars and workshops
    b. Facilitate the sharing of institutional resources with others.

Explanation: The usefulness and importance of European level support groups for RI staff was highlighted by participants in both sets of workshops, as was the sharing of institutional resources with others (item 4b). Item 4a was added due to some suggestions in the second set of workshops that online events are especially helpful to deal with problems with mobility across countries.

5. Commit strongly to research integrity training, also for staff

a. Include research integrity/ethics as a central value of the institution
b. Highlight the intrinsic (e.g. improved research quality) and extrinsic (e.g. in relation to grants) importance of research integrity for research

Explanation: Item 5 is more of an implementation issue for the guideline, rather than a point directly related to the training of RI staff. However, it was mentioned as a point to include in the guideline in both the first and second set of workshops, since many participants exclaimed that without top down support, the guideline would not work. Items 6a and 6b were additions made in the second set of workshops, to help make the overall item more concrete.

6. Evaluate training programs

a. Use subjective measures (e.g. trainees' perception of event usefulness)
b. Use follow up measures (e.g. number of participants in an event)

Explanation: For this guideline, the item on evaluation – item 6 – was brought up by two participants in the second set of workshops, who stressed that evaluation of training programs for RI personnel & teachers was just as valuable as for other target groups. Therefore, we added this item to this guideline and formulated it in the same way as for the guidelines on RI training for pre-doctorate and post-doctorate researchers.

7. Reward RI teachers and support personnel for their work

a. Reward the involvement of support staff, recognise their involvement in teaching RI in their career assessments, and appreciate their work.
b. Reward researchers who also take on RI support roles (e.g., confidential advisors, ombudsperson, etc.).

Explanation: This item and its subpoints were brought up in the first set of workshops, and there was agreement on its importance in the second set of workshops. Although the item is not directly about

training, it is important issue that is likely to have a significant influence on the implementation of this guideline.

Best practice examples:

- ERION: https://www.earma.org/about/governance/thematic-groups/ethics-and-research-integrity-officer-network-erion/
- EU project Recaphe: https://recaphe.eu/
- EURASHE: https://www.eurashe.eu/
- EURAXESS: https://euraxess.ec.europa.eu/

Additional remarks: The best practice examples above were mentioned by participants in the second set of workshops. There are likely many other best practice examples available, such as materials from the VIRT2UE project, which can be added here.

Participants also mentioned some implementation considerations for these guidelines in the second set of workshops including that:

- *It is less suitable to use the word 'training' for this target group, as exchange of knowledge is more suitable here rather than top down training*
- *Top down support is crucial for the implementation of this guideline*
- *Making RI a central strategy of the institution will ensure that sufficient time, resources and personnel are allocated to its implementation.*
- *Evaluating training programs is difficult.*
- *COPE can help SOPs4RI with organizing European-level webinars*
- *Piloting the guidelines would be very helpful*
- *These guidelines are already well-developed.*
-

RI counseling and advice

Title of skeleton guidelines:

Guidelines on research integrity counseling & advice for research institutions

Guidelines:

1. **Appoint trustworthy trained official confidential counselors, familiar with research, whom researchers can turn to in case of doubts or questions per department or research team.**
    a. Ensure that counselors are knowledgeable about all relevant policies and guidelines at the international and local level
    b. Have higher management endorse the trustworthiness of the counselor.

c. A clarification should be given on what researchers can and cannot expect from this contact person.
d. Set up a procedure for handling conflicts of interest relating to the role of the confidential counselor.

Explanation: *This item was raised in the first set of workshops, and expanded on in the second set of workshops. Item 1a was discussed in the second set of workshops. Item 1d are integrated from the SoRs. Initially, we had also put another item under here, as an outcome of the first set of workshops, stating that institutions should 'clearly communicate to researchers that counseling is confidential'. However, a participant in the second set of workshops mentioned that in some countries, confidentiality cannot always be guaranteed as counselors might have a legal obligation to report misconduct cases. Therefore, we removed that item, and hope to have further addressed this concern under item 1d.*

2. Research institutions should provide researchers with contact persons for advice on specialized/domain specific RI issues (e.g. privacy officers, librarians, etc.)

Explanation: This item was not discussed in the first set of workshops, but was integrated into the guidelines from the SoRs. In the second set of workshops, participants mentioned that they did not see the difference between this item and the previous one on confidential counselors. However, we decided to keep this item because it is rather different from item 1, which is about general RI counseling, as it is focused on specialized RI issues which general RI counselors might not have sufficient expertise in. To highlight this, we now provide some examples of specialized RI contact persons in the item, i.e. privacy officers, librarians, etc.

3. Ensure that needed advice is provided in a timely manner and with sufficient follow-up.

Explanation: Some participants in the second set of workshops mentioned that the guideline was missing some information about what the institution should require about the quality of the counseling provided. Item 3 was added to address this point. Some participants explicitly stated that good counseling is timely and provides sufficient follow up.

4. **Recruit volunteers to be research integrity stewards and to act as informal 'first responders' to researchers with research integrity questions, in order to guarantee that researchers have access to low-threshold counseling.**
    a. Ensure that the volunteers are sufficiently trained in research integrity, although they do not need to have undergone official training specifically targeted at counselors.
    b. Harmonize the work of data stewards and RI stewards

Explanation: This item was addressed in both sets of workshops and the SoRs. In the second set of workshops, one participant explained that volunteers also need sufficient training in RI, while others asked for more coherence between the work of data stewards and RI stewards (items 1a and 1b).

5. **Set clear roles and responsibilities for different bodies/persons involved in counseling & advice**
    a. Communicate clearly what the legal responsibilities of each body/role are (e.g. reporting on cases of misconduct)
    b. Do not overburden research integrity staff with too many roles (e.g. teaching and handling cases)

Explanation: To prevent RI staff from becoming overburdened and to make it clear and transparent what their different roles and responsibilities are, participants in the second set of workshops suggested to add item 5 to the guideline.

6. **Ensure that the counselors and research integrity stewards are visible, approachable and easy to find.**
    a. Provide information and contact details of counselors and research integrity stewards on the institutional website.
    b. Balance visibility with secrecy: Ensure that those approaching the research integrity counselors and stewards can do so without being noticed

Explanation: There was agreement in both sets of workshops on the importance of item 6. Some participants in both workshops brought up item 6a, while one participant in the second workshop raised the issue of balancing visibility with secrecy (item 6b).

7. Provide researchers with resources they can consult to become informed and prepare for counseling or advice sessions.

a. Refer researchers to a European level online helpdesk containing general information on research integrity.

Explanation: In the first set of workshops, participants mentioned that institutions should provide researchers with an online helpdesk which answers simple questions. However, in the second set of workshops, participants were concerned that this would not be feasible for each institution since it would require significant amount of resources. Additionally, some participants in the second set of workshops expressed that simple questions do not exist, as all RI questions they have experienced are context specific and complex. These participants suggested that rather than providing researchers with an institutional helpdesk to address in case of questions, institutions should refer researchers to existing resources that can help them prepare for counseling sessions so that they come to sessions more prepared. On the other hand, a few participants suggested that a helpdesk would be very valuable for 'simple questions', but on a European level rather than an institutional level. We have reformulated this item now to include both perspectives (referral to existing resources and to a European level helpdesk).

8. Have a strong institutional commitment towards providing RI support.

a. Include research integrity/ethics as a central aim of the institution
b. Mandate the implementation of the guideline
c. Hold open forums with researchers to explore their needs
d. Allocate sufficient resources and time to counselors, both reactively and proactively.

Explanation: Item 8 is more of an implementation issue for the guideline, rather than a point directly related to RI counseling and advice. However, it was mentioned as a point to include in the guideline in both the first and second set of workshops, since many participants exclaimed that without top down support, the guideline would not work. Items 8a- 8c were additions made in the second set of workshops, to help make the overall item more concrete. Item 8d was raised in the first set of workshops.

9. Include counselors & support staff in policy and education, so that counseling can improve policy and education and vice versa.

a. Co-create institutional policies together with the counselors and support staff
b. Counselors should report on the types of cases they receive to use for education and policy

Explanation: There was agreement about the importance of item 9 in both sets of workshops, since participants mentioned that counseling, policy and education are interrelated, and counselors can play a role in helping to align these. However, based on how it is interpreted, this point could be seen to clash with item 5b (not overburdening counselors) in the guideline. Items 9a and 9b were additions made in the second set of workshops to make the overall item more concrete.

10. Offer people in support roles the possibility to progress in their career, for instance by involving them in executive decisions of the institution

Explanation: Item 8 is more of an implementation issue for the guideline, rather than a point directly related to RI counseling and advice. Some participants in the first set of workshops emphasized that to ensure good quality counseling, institutions should ensure that counselor are able to climb the career ladder. However, some participants in the second set of workshops questioned the feasibility of this item as it would require a significant budget and resources. A suggestion was made by one of these participants to deal with this feasibility issue by increasing the decision-making weight of the counselors, rather than necessarily creating new positions for them. The current formulation of item 10 takes is an attempt to merge these important considerations.

Best practice examples:

- Ghent university trust point where confidential counselors and RI officers meet with researchers to discuss things

Additional remarks: The best practice examples above were mentioned by participants in the second set of workshops. There are likely many other best practice examples available which can be added here.

Participants also mentioned some implementation considerations for these guidelines in the second set of workshops including that:

- *Support from the institutional leadership is needed for the implementation of this guideline*
- *Despite the importance of the previous point, to ensure that researchers make use of counseling & advice services offered at the institution, counseling & advice should not just be seen as an extension of the executive board but rather as something that meets the needs of researchers.*
- *In some countries, confidential counselors have a legal duty to report on misconduct cases*

- *RI officers do not have the power to influence many of the items in this guideline (e.g. allowing people to climb the career ladder)*
- *To help implementation, it would be helpful to co-create the institutional policy on counseling and advice together with the community using a bottom up approach*
- *Budget constraints are important for this guideline.*
- *COPE might be interested in helping SOPs4RI develop a European level RI helpdesk.*

4.2.7.1.3 Responsible supervision and mentoring

Items written in red are new or modified recommendations based on the empirical work from the second round of co-creation workshops.

Items written in black are based on the empirical work from the first round of co-creation workshops

Items written in blue are based on other insights from the SOPs4RI project and included in the skeleton guidelines from the initial SoRs.

PhD guidelines

Title of skeleton guidelines:

Guideline for PhD mentoring and supervision in research institutions

Guidelines:

The institute will install support mechanisms for supervisees to foster a good relation between the supervisors and supervisees

1. **Develop a document for PhD students containing essential information about the PhD trajectory, including institutional rules, the rights and responsibilities of the PhD student**
    a. Communicate essential information of rights and responsibilities, rules and deadline policies to all PhD students
    b. Communicate how and when PhD students should inform their supervisor in case of problems or challenges.
    c. Communicate the expected workload of a PhD.
    d. Include information on the ethical considerations and practicalities pertaining their projects.

e. Ensure that students know contacts of institutes' ombudspersons or other relevant persons at the institute
f. Inform students about how a good research culture can be built and maintained
g. If applicable, refer to national and international codes of conduct

Explanation: Guideline 1.1 is the result of the clustering exercises in the first workshop, where the emphasis lay on communicating institutional guidelines to PhD students, and where students should be made aware of the guidelines. This was mentioned by both groups. The main recommendation was rephrased based on the insights from workshop round 2, the critique from participants was to not overburden PhD students with responsibilities. Guideline 1a and 1b were selected from the SORs. Guideline 1c and 1d were the result from the creating and clustering exercises of workshop round 1. Guideline 1e was based on the SORs, and the second part was added. Guideline 1f and 1g were based on the analysis of workshop 2, and aim to integrate emphasizing a good research culture. One guideline was moved to guideline 1.5 "Maintain a communication policy that allocates time specifically for addressing needs of PhDs." as it fit that specific sub-topic better.

2. Provide adequate support and training for PhD students.

a. Host supervision seminars or provide training to PhD students on responsible supervision and mentoring
b. Create extra support mechanisms to reach and support foreign and guest students
c. Ensure tailoring support to meet the needs of individuals is possible
d. Train PhDs to become aware of good supervision by creating opportunities for them to supervise more junior students in their research projects (e.g., Master students)
e. Use trainings as an opportunity to increase students' awareness of their own needs

Explanation: Guideline 2 is the result from the creating and clustering exercises from workshop 1. Both groups mention support and training. In guideline 2a the second part of the guideline is removed, as it is too much off-topic. Guideline 2b and 2c were added as a result of the analysis of workshop round 2. Guideline 2d and 2e were added as a result of the SORs. Facilitate peer support groups for PhD students: PhDs for/to PhDs

3. Provide an independent body students and supervisors can turn to in case of problems.

a. Responsibilities of internal and external bodies need to be clearly defined to handle conflicts and problems

b. For small research institutes and small research groups, providing independent bodies can be valuable
c. Ensure student counsellors or ombudspersons are approachable and visible for students to turn to when facing problems with their supervisors

Explanation: Guideline 3 is based on the clustering exercises from workshop round 1. A conflict was identified during the analysis of workshop round 2, where the usefulness of independent bodies was questioned. Based on this conflict, guideline 3b was developed; as it was stressed independent bodies are especially important for small institutes. However, a gap remains in whether the independent body can only be an 'external' body, or can also be internal. Guideline 3a was developed based on the discussion on how the responsibilities should be defined. One possible solution is to leave open the possibility of having an internal or external body to turn to. And leave it up to the institutions: an ombudsperson or confidential counsellor who includes this as their responsibility could already help – this was mentioned in the topic research environment & training. For small institutes an 'external' body could be more valuable. For large institutes an 'internal' body could be sufficient. Guideline 3c was included after reanalyzing the first workshop data, a student counsellor was mentioned in the poster, but having a student counselor or ombudsperson was 'lost' in drafting the skeleton guidelines.

4. Create and implement support structures for the well-being, care and mental health issues of students

a. Ensure the support structures for well-being, care and mental health are visible and approachable for all students
b. Assist PhD students in understanding and respecting their own needs.
c. Facilitate interdisciplinary student discussion groups to discuss the students' well-being, self-care and mental health issues
d. Maintain a communication policy that allocates time specifically for addressing needs of PhDs.

Explanation: Guideline 4 was included based on the clustering and exercises from workshop round 1, based on the analysis and the quotes of the participants. Mental health issues were added after workshop round 2. Guideline a was rephrased after workshop round 2 to fit better feasibility (previously Ensure students know where to go when they face problems). Guideline 4b needs to be clarified in terms of the following comment from a participant on the guidelines: 'I think this will become much more powerful if you can add means how to do that – training/courses? Coaching from someone not linked to the project? Human resource department?'. This is currently an implementation issue. Guideline 4c was the result from workshop round 1, where discussing problems and issues with peers was considered beneficial, after round 2 this was explicated to fit the subtopic and improve feasibility. Guideline 4d was previously in guideline 1, but fitted better in guidelines 4.

One implementation issue is that this guideline needs to be made more concrete. Two subtopics were removed because of redundancy with 1.3b. (Provide both formal and informal settings for communication between students.) and 1.5c (Provide peer support possibilities out of one's own social group).

5. Develop a procedure to change supervisors or terminate a PhD-trajectory

a. Have a mechanism, policy or procedure in place to change supervisors
b. Have a mechanism, policy or procedure in place to terminate a PhD-trajectory

Explanation: Guideline 5 was developed based on insights from workshop round 2. Guideline 5a and 5b and reflect the discussion on having the possibility to change supervisors and terminate a PhD.

The institute will foster a good relation between the supervisors and the PhD student by implementing the following:

1. Require supervisors and PhD students to sign agreements regarding supervision in an early stage of the career trajectory

a. The written agreement on supervision centers around creating good cooperation between the supervisor and supervisee
b. The agreement discusses differences in expectations and maintaining transparent communication.
c. The agreement sets common understanding on expectations, requirements, roles, responsibilities to address and incentivize not only practical issues, but also social relationships
d. The institution should keep a retrievable record of the agreements

Explanation: Guideline 1 is the result from the content creation and clustering exercises from workshop round 1. One group stated the importance of setting agreements between the PhD candidate and supervisor. Guideline 1a is the result of an identified conflict between participants in the second set of workshops, where written agreements could be perceived as hostile if they are used as legally binding documents. The word binding is also removed from guideline 1, to address the conflict. Guideline 1b is included based on the insights from workshop round 1. Guideline 1c is rephrased to further explain what should be in the agreement. Guideline 1d is a revised recommendation from the SORs, where the institutions (rather than solely the student) should be responsible for keeping a record of the agreement, based on the insights of a comment from a participant.

2. **Create a space for the exchange of ideas between supervisors and PhDs.**
    a. Make periodical meetings between supervisors and supervisees mandatory
    b. Provide opportunities for feedback, ideas and experiences.
    c. Organize peer group discussions with students and senior researchers.
    d. Facilitate discussions between individuals from different disciplines.
    e. Encourage PhDs to ask for guidance in complying with policies and procedures and facilitate this process.
    f. Provide constructive feedback sessions oriented towards supervisors.
        i. Integrate the above into annual review meetings.

Explanation: The new Guideline is the result of the content creation and clustering exercises of workshop round 1. Guideline b, c and d are the result of workshop round 1. Recommendation e and f are based on the SoRs. Guideline a is based on the insights of workshop round 2.

Best practice example:

- Provide an PhD students with an independent mentor with whom they can meet once a year
- In cases where PhD students wish to change supervisors or terminate their PhD, have an external board draw up a conclusion on the requests.

Supervision requirements and guidelines

Title of skeleton guidelines:

Guideline for supervision requirements and guidance in research institutions

Guidelines*:*

1. **Ensure that supervisors have sufficient time for supervising research**
    a. Allocate official research time to all doing research, including e.g. clinical researchers
    b. Allocate official supervision time to all supervisors of research
    c. Limit the number of PhD students per supervisor

Explanation: Guideline 1 is the result of workshop round 1. No new insights were given in workshop round 2, however, the importance of sufficient time was stressed again, also as an implementation issue.

2. Provide supervisors with the necessary support structures needed to supervise

a. Provide and disseminate clear rules, guidelines and procedures about supervision
b. Set-up a body to periodically evaluate supervision and provide feedback
c. Facilitate supervisor commitment to their supervisees
d. Provide structures and policies which place a stronger focus on negative results and replication studies
e. Set-up supervisor peer-support systems to ensure that supervisors also have someone to turn to for advice and support regarding supervision.
f. As an institution, support and engage in research on supervision
g. Co-supervisors can support each other in supervision tasks
h. Implement a communication policy between supervisors and higher management levels to ensure good cooperation between all parties, and setting expectations on roles and responsibilities regarding good supervision

Explanation: Guideline 2 is the result of workshop round 1. Guideline 2a and 2b are from workshop round 1.. Guideline 2c and 2d should be further explored for implementation. Guideline 2e and 2f are from the SORs. Guideline 2f could be a more general recommendation to institutions, rather than a support structure for supervisors. Guideline 2g and 2h are from workshop round 2.

3. Provide obligatory training on supervision to all supervisors

a. Implement repeated supervision training to ensure continued learning as a supervisor to keep skills and knowledge up to date
b. Include a broad range of skills in the training, including skills to ensure that supervisors learn how to listen and communicate
c. Involve more experienced supervisors in the training of less experienced supervisors

Explanation: Guideline 3 is the result from the content and clustering exercise from workshop round 1. Guideline 3a was revised based on the analysis of workshop round 2, to ensure continuity of training. Guideline 3b and 3d were added as new insights. Guideline 3c reflects the discussion in workshop round 1.

4. **Promote a positive research environment which fosters good supervision**
    a. Promote and implement a positive error culture, where individuals are allowed to make mistakes
    b. Value supervision as an important part of the research endeavor
    c. Use trainings as a tool of fostering culture change
    d. Promote an 'open door culture', where supervisees perceive a low barrier to contacting their superiors and other colleagues

Explanation: Guideline 4 reflects the discussion of workshop round 1. Guideline 4a, 4b and 4c are the reflections from round 1, guideline 4d a new insight from round 2. Guideline 4a was revised based on the comments from participants in workshop round 2.

5. **Facilitate a positive interaction between students and supervisors**
    a. Let supervisors and supervisees tailor the interaction between them
    b. Facilitate discussions, open and direct communication, between supervisors and supervisors
    c. Promote an 'open door culture', where supervisees perceive a low barrier to contacting their supervisors – both offline and online
    d. Ensure regular meetups, especially at the start of the PhD, between the supervisor and supervisee and provide supervisors with guidance on what to discuss with supervisees, e.g.
        i. Establish standards for research
        ii. Teach students about best practices
        iii. Provide students with constructive feedback
        iv. Support students in all phases of their research (i.e., also when they obtain disappointing results)
        v. Ask about their well-being and perceived problems, including asking questions whether they feel alone in the process
        vi. Acknowledge the academic accomplishments of supervisees
        vii. Engage in open and responsive communication with the PhD student about questionable research practices

Explanation: Guideline 5 is the result from workshop round 1. Guideline 5.1a was revised, and preventing students from becoming lonely was placed under 5e; to make sure not too much responsibility concerning well-being of students is placed on the supervisors guideline 1b (open and

direct communication) was combined with facilitation of discussion, as this was perceived as quite a similar recommendation. Guideline 5c is rephrased to reflect the discussion from workshop round 2. Guideline 5d reflects the discussions in workshop round 1, and is rephrased based on the analysis of workshop round 2. The sub-points reflect both the workshop in round 1 (point i-iii), the SoRs (v-vii) and the earlier mentioned point about guideline 1a.

6. Set requirements for responsible supervision

a. Provide supervisors with concrete examples of good supervision
b. Require supervisors to meet with their supervisee regularly
c. Where possible, assign multiple supervisors per PhD student
d. Provide supervisors with a list of requirements to meet as supervisors, such as:
    i. Familiarity with PhD procedures
    ii. Ensuring that supervisees are aware of PhD procedures
    iii. Provide support and personal guidance to the supervisee
    iv. Knowledge of the institutional support structures, when there is a need to refer the supervisee to other personnel (e.g. for psycho-social support or mental health issues).
    v. Acting as exemplars.
    vi. The skills necessary to communicate effectively with supervisees from different cultures
    vii. Be able to balance between supporting supervisees and allowing them to grow as independent researchers.
    viii. Taking the time to explain decisions to the supervisee to engage the supervisee in the decision process

Explanation: Guideline 6 reflects the discussions in workshop round 1. Guideline 6a, 6d are based on the results of workshop round 1. 6c was moved from guideline 1.3. guideline 6b was added based on the SoRs. Guideline 6d was added based on the focus groups – after workshop round 2. Guideline 6e.i-6evii were based on the SoRs. Iv was altered to include mental health issues. Vii was added based on the discussions in workshop round 2.

7. Responsible and skillful supervision should be at the core of supervision tasks

a. Provide training to all researcher who supervise and to all those who wish to supervise in the future to become skilled at supervision

b. Ensure that supervisors are sufficiently qualified in the specific research field of their supervisee
c. In some circumstances, consider allowing researchers who do not wish to supervise to progress in their academic career without the need to supervise (room for everyone's talent).

Explanation: Guideline 7 was made based on the reflections in workshop round 1. The changes made to the guideline and the subpoints reflect three points made in workshop round 2: 1) the need to specify what suitable is, 2) that institutions should not assume that everyone is already a suitable supervisor, and everyone needs training and support and 3) Make sure parts of supervision program are obligatory to ensure people who wouldn't otherwise come, show up, and improve supervision skills of those who need it the most. These changes were made to subpoint a and c, point b was not changed.(previously 'Ensure that only suitable people take on the role of supervisor').

8. Require supervisors and PhD students to sign agreements regarding supervision about:

a. See guideline 1.7 for further details
b. Tailor the supervision agreements to the personal needs of the supervisee

Explanation: The subpoints under this item were removed to reduce duplication in the guidelines

9. Reward and recognize good supervision

a. Reward supervision through recognition and awards
b. Reward good supervision with tangible rewards, such as funding, financial rewards and career advancement
c. Give supervision more acknowledgement as an important task in the research process

Explanation: Guideline 9 is the result of workshop round 1, mentioned as an important topic by both groups. For guideline 9a, what soft measures mean is a gap. Guideline 9b is the result from workshop round 2.

10. Facilitate peer-to-peer support for supervisors

a. Create and stimulate peer to peer support groups for supervisors
b. Possible options for peer to peer support include the organization of:
    a. Interdisciplinary supervisor workshops
    b. Meetings between supervisors to exchange experiences
    c. The exchange of knowledge and experience through co-supervision

Explanation: Guideline 10 is the result from workshop round 2, where participants noted PhD-to-PhD peer support was present, but was absent for supervisors. The subpoints were also added based on the insights from both groups from workshop round 2.

11. Evaluation structures for supervision

a. Address supervision problems in evaluation meetings
b. Create a structure of regular constructive feedback between supervisor and supervisee, and superiors of supervisor

Explanation: Guideline 11 is the result from workshop round 2, where evaluation structures was analyzed to be a separate point from rewarding and recognizing good supervision.

Best practice examples:

- When providing training for supervisors, provide separate training for starting and experienced supervisors
- Reward and stimulate good supervision by attributing a supervisor-of-the-year award

Building and leading an effective team

Title of skeleton guidelines:

Guideline for building and leading an effective team in research institutions

Guidelines:

1. Organizational structures related to leadership need to be in place

a. Improve support services for research leaders concerning
   i. Finances
   ii. Grant writing and publications
   iii. Transparent management
   iv. Easing the administrative burden of research leaders

b. Improve protection of research leadership against issues of
   i. Research misconduct
   ii. Leadership failure
c. When leadership issues arise in the institution, transparently report the concerns to ensure that they are dealt with

Explanation: Guideline 1 is the result of workshop round 1. Point 1.iii and iv were added based on insights from the second workshop

2. Facilitate training for leaders

a. The content of the training should include
   i. Improving knowledge and communication on research integrity
   ii. Improving interpersonal and leadership skills, such as management skills, listening skills, empathic skills (also see item 12)
   iii. Tips on how to be, or become a good and effective leader
b. Training should become part of the employment package and be mandatory

Explanation: Guideline 2 is the result of the exercises from workshop round 1, and was considered important for both groups. Point a.iii was revised based upon a comment from a participant.

3. Provide research leaders with the time, skills, and resources to build a strong research team

a. Ensure that research leaders are able to create a positive environment
b. Ensure that research leaders have the skills and resources to build their own team with their own knowledge base in which a diversity of profiles (diverse skills and backgrounds) can thrive
c. Provide sufficient resources to research leaders to create good teams, create support structures and create a good facility

Explanation: Point 3 is the result from the exercises from workshop round 1. The text is changed from 'community' to 'research team' to better reflect the discussion on this topic in workshop round 2. Point 3.3.b is altered to reflect the discussions of workshop round 2.

4. Create 'leaders for leaders groups'

a. For research leaders to learn, support, exchange, discuss, engage and share

Explanation: This was separated from point 3.3, the community aspect now is covered in 'leaders for leaders groups'. subpoint 3.3.a was included in point 3 previously.

5. Create and implement support structures for the well-being, care and mental health of research leaders

a. Provide guidance to leaders on balancing their time between their own needs and those of their team members
b. Provide support services for well-being and mental health of research leaders

Explanation: Guideline 5 is the outcome of workshop round 1, but rephrased to aim to answer to the implementation issues (previously: Ensure the well-being of the research leader). Point a is from workshop round 1, point b was refined.

6. Ensure that only suitable researchers take on leadership roles as researchers

a. Train research leaders (see point 3.2) on important skills for research leaders, such as
    i. Share skills with the research team
    ii. Good communication skills - institutions should require research leaders to develop clear policies and procedures on collecting, maintaining and communicating data with the research group/team
    iii. Keeping a positive attitude
    iv. Interpersonal skills and empathy
    v. Good supervisor skills
b. Ensure that research leaders are sufficiently qualified in their specific research field
c. In some circumstances, consider allowing researchers who are not suitable research leaders to progress in their career with other academic duties without the need to take on research leader tasks

Explanation: Point 6 was the result of workshop round 1. In the second workshop a 'conflict' was identified between whether an academic career is possible without taking on supervision or research leader tasks. This is an implementation and not easily addressed. For point a. iii – 'Usually also helps personally, for your own well-being; but besides that, this is not something that everyone has by

nature, and it will also be difficult to really train', implementation issue addressed in the comments on the guidelines.

7. Promote incentives for good leadership

a. Create the right research environment which sees good leadership as important
b. Recognize supervision as an important task of a research leader
c. Allow researchers to set their own goals to realize different ambitions and talents
d. Assess leadership (e.g., feedback from colleagues)

Explanation: Guideline 7 is made based on the insights from workshop round 1. Point d was added based on the insights from workshop round 2.

8. Introduce good criteria for promotions and assessment

a. Criteria for promotions and assessment should include other elements besides publications and grants
b. Have periodic reviews to assess leadership

Explanation: Guideline 8 reflects the discussions from workshop round 1. Point a was refined to better reflect the discussion in round 2.

9. Ensure a positive environment in which rigorous research can flourish

a. To slow down science
b. Take responsibility to keep up with global developments of science
c. Desensitize mistake and failure

Explanation: Guideline 9 reflects the exercises and discussions from workshop round 1. A big implementation issue arises here: 'Is it really the responsibility of the research leader? Responsibility is more at national level, EU level, funding system, political responsibility for system of science'. Needs to be further refined, as these issues cannot be addressed by only rephrasing the guidelines.

10. Ensure academic freedom by providing research leaders, and in extension the research teams, with adequate opportunities and possibilities to determine the direction of the research

a. Research leaders should, if no other options are available, have the possibility to change the research plan
b. Regulations (from funders?) should not prevent the possibility to change the research plan under changing circumstances
c. Grant writing competition should be addressed to ensure researchers do not try to fit 'their research' in a mold that isn't theirs to fit, and to allow them to have more freedom in setting the research topic

Explanation: Guideline 10 was developed based on workshop round 1. Based on the discussed implementation issues in round 2, a more restrictive version of freedom was set up; previously the recommendation was ***(Provide the opportunity for research leaders to have freedom to set the directions of research).*** *However, it is still difficult to let research leaders get more freedom of setting the directions of research. Guideline a and b were rewritten to fit the topic, and to restrict the definition of freedom. 10.c was added based on insights from workshop round 2. For topic c, the implementation levels lies at addressing this problem not only on an institutional level, rather it should be done on a national or EU level.*

11. The responsibilities of research leaders should be stipulated

a. Institutions should clearly demarcate the responsibilities of the institutions and of the research leader
b. Communicate the responsibilities to research leaders – and communicate which responsibilities are the institutions'
c. A research leader should be a role model of good research practices
d. Institutions should provide clear guidance to team leaders how to manage their teams as well as setting out clear lines of accountability
e. Institutions should ensure that team leaders do not have research groups that are too large to be effectively managed
f. Research leaders should check crude data to ensure understanding
g. Research leaders should be incentivized to do research themselves
h. Research leaders should devote attention to individual research and team members
i. Research leaders should ensure cooperation and communication among team members
j. Research leaders should ensure team members are performing the tasks which are right for them (*team members are content/happy with their tasks)*
k. The objective of a researcher should be to contribute to the advancement of science and the knowledge base: a focus should be on quality over quantity to slow down science

Explanation: Guideline 11 is the results from workshop round 1. Recommendation 11.a,f,g,h,j are based on workshop 1. Guideline 11.b and 11k are based on insights from workshop round 2. Recommendations 11d, e, i are from the SoRs.

12. Ensure that research leaders pay adequate and caring attention to their team members

a. Ensure research leaders can devote and spend sufficient time to each research project
b. Incentivize research leaders to empower individual researchers (i.e., team members) to do research and to explore and follow their interests.
c. Incentivize research leaders to consider the interests of the team before their own interests, where appropriate
d. Measures should be in place to prevent the abuse of power and exploitation of dependent relationships, both at the leadership level and the individual level

Explanation: Guideline 12 was rewritten based on the comments from workshop round 2 – previously it was 'human nature of research'. 12.d was based the SoRs. 12.e was deleted because of redundancy (already covered in 12.3.b). (Allow leaders to create a team with sufficient knowledge)

4.2.7.2 Skeleton guidelines for RPO-related topic and sub-topics

4.2.7.2.1 Independence

Items written in red are new or modified recommendations based on the empirical work from the second round of co-creation workshops.

Items written in black are based on the empirical work from the first round of co-creation workshops

What counts as an unjustifiable interference?

Title of skeleton guidelines:

Guidelines on what counts as an unjustifiable interference for research funders

Guidelines:

1. **RFOs should have an extensive description/definition of interferences**
    a. clear description should be publicly available online
    b. listing all possible positive and negative interferences
        i. using case studies as examples
    c. the internal staff should have available clear guidelines on how to deal with possible interferences
    d. Interferences by third/external parties with the selection and evaluation process of proposals are not justified
    e. Interferences by RFOs during the evaluation and selection process of the proposals is justifiable in case of breaches of integrity
    f. In general, blocking the publication of certain data and interfering with the publication process is unjustifiable, unless specific conditions are foreseen
    g. Interferences with the preselection of the proposals or with the expected outcomes of researches depending on political orientations are unjustifiable
    h. Preselection of topics is justifiable in case the money (public or private) is allocated for a specific purpose/objective
    i. In general, changing deadlines is not allowed unless specific conditions are foreseen. Changing deadlines is allowed in case of specific unpredictable events (e.g. COVID-19)
    j. RFOs can interfere in case of possible breaches of integrity during the evaluation and selection process, the monitoring of the projects and during and after the publication process

Explanation: All participants agreed on the fact that all interferences have to be stated clearly to avoid all possible misinterpretations. In addition, interferences can be understood as justifiable or unjustifiable depending on the cultural background

2. **RFOs should take into consideration all possible external interference during all phases of the grant process**
    a. listing all possible interferences at all possible stages/levels of the evaluation process
    b. the whole evaluation process has to be as transparent as possible
    c. RFOs should have clear guidelines for the evaluators, including a briefing session before starting the evaluations
    d. evaluators have to disclose all possible positive and negative COIs
    e. special attention should be given to collaboration with industry sponsors, political requests and other external parties

3. **RFOs themselves should take enough distance from all evaluations related to the proposals**
    a. RFOs should have in place a regular review of the selection process
    b. RFOs should have in place internal policies for the staff members
        i. staff members should disclose all possible COIs
        ii. RFO staff should not give unfair advantages to the applicants

4. **RFOs should take into account diverse considerations/differences when developing a definition of unjustifiable interference**
    a. in general terms, RFOs should take into consideration cultural, national, institutional and local differences
    b. national RFOs should take into consideration institutional differences concerning the management of funded projects
    c. international RFOs should take into consideration national differences concerning different legislations or guidelines related to RI

5. **RFOs should have in place a Conflict of Interest Policy in order to avoid interference by third parties:**
    a. COI checklist attached to the application
    b. COI checklist for reviewers and panel members
    c. financial COI checklist
    d. disclosure of all possible COI during all phases of the evaluation process
    e. disclosure of all possible COI during all phases of the projects

Preventing interferences by the funders

Title of skeleton guidelines:

Guidelines on preventing interferences by the funders for research funders

Guidelines:

1. **RFOs should commit to refrain from unjustifiable interfering with any research process**
    a. all procedures have to be as transparent as possible
    b. the size and the capacity of the RFO has to be taken into consideration
    c. RFOs should guarantee diversity and a rotation system of evaluators to avoid as much as possible COI and interferences
    d. RFOs should make available the list of reviewers and evaluators

Explanation: All participants agreed that transparency in all the procedures has to be guarantee.

2. **RFOs and all staff members shall maintain impartial and independent:**
    a. in formulating research agendas
    b. in setting out calls
    c. in the selection process of the proposals
    d. in monitoring research, after the research is presented
    e. by publishing all internal procedures
    f. by ensuring evaluations by a panel of peers
    g. by complying with existing international guidelines, e.g. DORA or Leiden Manifesto
    h. and all other aspects of research

Explanation: Regarding the sub-points a and b, participants highlighted the role of the government in setting out the research priorities. Impartiality and independence depend on the typology of the RFO (public or private) and the typology of the grant call (co-funded by commercial entities or not).

3. **Potential interference will be regularly assessed by the RFO in several stages of the research process using a checklist/declarations of all possible interferences by all stakeholders involved in the call**
    a. in the selection of the proposals
    b. in the monitoring of the proposals
    c. in the final reporting

Explanation: The level of control depends on the approach used by the RFO. A more trust-based approach would diminish the level of control of potential interferences

4. **RFOs should have in place transparent procedures on all possible Conflicts of Interest within the funding agency or between the evaluators/reviewers and the applicants**
    a. including financial COIs that have to be published by the RFO

5. **RFOs should guarantee a pool of independent and international experts/reviewers/evaluators in the selection and evaluation of proposals, to ensure impartiality and transparency (the implementation of this recommendation can be difficult for small RFOs)**
    a. self-declaration of all possible COIs
    b. ensuring diversity within the evaluators (gender, country, disciplines, expertise)

c. ensuring a rotation system for reviewers
d. all names (of who?) have to be publicly available

Explanation: The involvement of international evaluators depends on the size of the RFO and its reputation.

6. All RFO procedures should be publicly available to ensure transparency

a. RFOs should have in place a quality assurance system and monitoring system to ensure transparency

7. RFOs should not interfere with the publication plan proposed within the proposals

a. publication in open access has to be the main option
b. Public access to all data
c. RFO has to take into consideration institutional and national policies
d. unless it is contractually defined a priori

8. RFOs should have in place training for the internal staff

Preventing interferences from political/other external influences

Title of skeleton guidelines:

Guidelines on preventing interferences from political/other external influences for research funders

Guidelines:

1. Clear, transparent and open communication should be in place between the different stakeholders in the selection of the priority (e.g. selection of the topics to grant)

a. Different/external stakeholders should be involved in setting priorities concerning the allocation of the money
b. the criteria for the selection of the priorities have to be specified
c. open discussion between the government (involving all ministries) and the RFOs
d. the set of priorities has to be defined also through a public hearing with the involvement of scientists

2. RFOs should be independent from political and external influences

a. RFOs should maintain an intermediary position between the government, researchers/research institutions, the press and other stakeholders

b. RFOs should have an independent/international board in order to prevent any possible political/external interference
c. To avoid interference by third parties, RFOs should have in place sound, detailed, step-by-step and transparent procedures
d. to avoid the exclusion of topic taboo from the research agenda
e. RFO should maintain an independent position within the evaluation process
f. to avoid political interferences, RFOs have to take into consideration national/regional/local interferences

Explanation: The typology of interference can be different depending on the country and cultural background. Moreover, political interferences at national level might be not the only ones. Depending on the country, regional or local political interferences might be stronger than national ones.

3. The committee members of research funding programs should be regularly screened for potential political interference

a. a collective control system should be implemented
b. strict rules should be applied to governmental employees regarding COI
c. RFO committee members (decisional board) should not be part of the political system
d. political COIs should be integrated within the list of the COI

Explanation: The participants debated about the feasibility of a political screening. This typology of screening can be very challenging and difficult to achieve. The implementation of the recommendation also depends on the typology of the national government in charge

4. RFOs should have in place a clear communication procedure to avoid communications with politicians about the results before the results are presented to the RFO

a. communication to the public should run through official communication channel of the RFO

5. RFOs should (ideally) allocate their money freely without political/external/commercial interference unless:

a. specific research priorities have been already set
b. specific calls
c. specific allocation of money depending on disciplines

6. **RFOs should have in place specific trainings for the internal staff on how to detect political interferences**
    a. In order to avoid political interferences, RFOs have to take into consideration national/regional/local interferences

Explanation/final consideration: The sub-topic related to political interference was the most challenging and debated. During both co-creation workshops it was highlighted how national, regional and local differences might play a role in the definition of a guideline and in its subsequent implementation.

Preventing interferences from commercial influences

Title of skeleton guidelines:

Guidelines on preventing interferences from commercial influences for research funders

Guidelines:

1. **Clear guidelines about commercial collaborations/ co-financing projects with external-commercial partners should be available**
    a. about how to make the decision process independent from commercial influences
    b. transparent allocation of public/private funding has to be guaranteed
    c. specifying the nature of the commercial partner
    d. clear definition of the funding scheme is needed to define the guidelines
        i. distinction between co-funding and other typologies of commercial funding when institutions collaborate in the project
    e. conduct or sponsor research that is factual, transparent, and designed objectively; according to accepted principles of scientific inquiry, the research design will generate an appropriately phrased hypothesis and the research will answer the appropriate questions, rather than favor a particular outcome;
    f. require control of both the study design and the research itself to remain with scientific Investigators
    g. not offer or accept remuneration geared to the outcome of a research project;
    h. prior to the commencement of studies, ensure that there is a written agreement that the investigative team has the freedom and obligation to attempt to publish the findings within some specified time frame;
    i. require, in publications and conference presentations, full signed disclosure of all financial interests;

j. not participate in undisclosed paid authorship arrangements in industry-sponsored publications or presentations;
k. guarantee accessibility to all data and control of statistical analysis by investigators and appropriate auditors/reviewers; and
l. require that academic researchers, when they work in contract research organizations or act as contract researchers, make clear statements of their affiliation; require that such researchers publish only under the auspices of the contract research organizations.

2. Clear collaborative contracts in all phases with commercial partners should be available

a. the contract has to be available at the beginning of the project
b. clear definition of the role of each partner
    i. detailed enough to cover all possible situations
c. in the case of confidential research, there should be transparency and it should be clearly stated where and when commercial partners have a say in the research
d. before starting the project and before getting the funds, a collaborative contract among partners has to be signed
    i. ensuring that the RPO has the capacity to engage in this kind of contract

3. RFOs should have in place clear COI procedures

a. in the selection of the topics
b. in the application assessment
c. in the monitoring process
d. checklist of COIs from both sides
e. clear procedure on how to manage COI

4. RFOs should have in place a system of monitoring the collaboration contract and its compliance

a. RFOs should make a pre-check of the contract

5. RFOs should guarantee no interference in the publication process

a. an early agreement about the publication of the data has to be in place
    i. important to define who the project owner is
b. transparent procedures regarding the publication of the data
    i. balance between open science and intellectual property rights
c. clear guidelines to avoid interferences in not publishing non-favorable data
d. the publication process can be delayed for intellectual property protection

Final considerations: The implementation of the guidelines is strongly dependent on the type of RFO and the country where the RFO is based. Small and south/east RFOs might encounter several difficulties in implementing the guidelines.

The formulation of RFO-related guidelines is made difficult due to the many variables related to country differences, the size of the RFO, if the RFO is national or international, private or public and its disciplinary focus.

We tried to report all ideas, doubts, suggestions from our participants, rather than make a selection of them.

4.2.7.2.2 Selection and evaluation of proposals

Items written in red are new or modified recommendations based on the empirical work from the second round of co-creation workshops.
Items written in black are based on the empirical work from the first round of co-creation workshops
Items written in blue are based on other insights from the SOPs4RI project and included in the skeleton guidelines from the initial SoRs

Research integrity plan

Title of skeleton guidelines:

Guidelines on RI plan for research funders

Guidelines:

1. **RFOs should have guidelines and a framework for those assessing RI plan**
    a. RFOs should provide guidance to panels on how to review RI
        i. important to instruct panel member on what and how to assess
        ii. RFOs should document in their processes how assessment panel members are instructed
    b. training for those assessing (what by whom)
    c. considering national differences about different RI understanding
    d. it is important to have a special review panel with specific RI expertise

Explanation: although taking account of national differences is very important, the task might be difficult to implement in practice for RFOs

2. RFO should have research integrity policies to support their projects or establish procedures with RPOs

a. logistic support about preparing the RI plan
b. creation of templates with best practices and examples

3. RFOs should take country/regional differences into consideration

a. differences about RI awareness and legislation
b. guidelines difficult to implement in some countries because of national specificities. A support could be to provide:
    i. step by step process with a priority list
    ii. guidelines about how to implement
c. important to achieve a general understanding beyond country differences, e.g. international dialogue template

Explanation: same as in point 1, although taking account of national differences is very important, the task might be difficult to implement in practice for RFOs

4. RFO should ensure that there is a plan for RI training

a. RFO is NOT responsible for providing training
    i. RFO can suggest and recommend some RI trainings
    ii. RFO should ensure there is a plan for training
b. RPOs are responsible for the training
    i. RI and DMP training are responsibilities of the RPOs
    ii. training has to be relevant for dealing with RI issues related to the project
    iii. it is important to define who delivers the training
        a. who is responsible for the training? host RPO/PI/consortium?
c. Completion of RI training should be done within a year after starting the project
    i. Completion of training before presenting the application is not always feasible because of institutional and country differences
    ii. RFOs should however push RPOs to have RI training in place within a reasonable time
    iii. RE/RI training certificate should be attached to relevant documentation
d. There is need for standardization, e.g. national/international RI plan template

i. EU certification might be relevant despite the difficulties in putting it into practice

Explanation: the discussion about clarification of responsibilities (who is responsible for what) was very important for participants in the workshop

5. RI plan specific requirements

a. There should be a clear distinction between RI and RE
b. There should be a clear definition of responsibilities and who is responsible for what
c. RI requirements should be highlighted according to the research methodology used within the project
d. The DMP can be completed after receiving the grant
   i. usually after 6 months

Explanation: Same as in point 4, the discussion about clarification of responsibilities (who is responsible for what) was very important for participants in the workshop. Despite recognizing that point 5a is not easy to clarify in practice, participants emphasized its importance.

6. RFOs should require a plan for how to prevent RI breaches

a. The RFO could have a specific section in their application forms that is dedicated to RI and that requires the RPO or PI to write a research integrity plan where they discuss:
   i. What RI training they will access/provide for their research team and when (needs to be completed within the first year)
   ii. How they will ensure responsible research practices such as preregistration, data analysis plans, the use of preprints, the assurance of open science practices, how to deal with responsible authorship guidelines, how to implement and comply with the FAIR principles (Findable, Accessible, Interoperable, Reproducible), how applicant/host RPO assures open data/ open access
   iii. How early career researchers will be mentored
   iv. How data management plans are constructed and how data is managed
   v. If applicable, how the applicant is safeguarding good laboratory practices
   vi. How the applicant plans to assure RI in the dissemination and use of the outputs, knowledge and discoveries that the proposal might generate to have as much impact as possible. Researchers should explore ways to do this both within and beyond academic routes.
   vii. How the applicant plans to deal with breaches of RI and what supporting policies and processes are in place in the RPO to deal with misconduct (the applicant)

viii. plan for effective RI monitoring by the RPO/for the PI

Explanation: Guideline 6 was discussed in first set of workshops not directly in the second round.

Methodological requirements

Title of skeleton guidelines:

Guidelines on methodological requirements for research funders

Guidelines:

1. **RFOs should have clear guidelines and rules about the evaluation process**
    a. clear guidelines about the definition of the evaluation criteria
        i. clear definition of RI-related challenges
    b. clear guidelines for the assessment (evaluation guidelines)
        i. checklist for evaluators
        ii. inclusion of best practices
    c. RFOs should have in place clear guidelines on how to evaluate the methodology
        i. RFOs should assess proposals on the quality of the research methodology. This must be rigorous and well-planned to ensure that results are as robust and unambiguous as possible, and to enable reproducibility/replicability of studies.
        ii. The methodology part is usually assessed under research quality and not under RI plan.

Explanation: Participants in the workshops discussed that generally RFOs should ensure that there is no overlap between methods per se and concerns about RI with regards to methods.

Point 1c was discussed only during the first set of workshops therefore seems to be slightly different in rationale if compared to point 1a and 1b.

2. **RFOs should include a methodology section in the proposal that should include, for example (depending on the discipline):**
    a. Guide for specific parts related to RI and RE in the methodology
        i. specifically, in relation to RI
    b. checklist of priorities for the review process
    c. Protocols and methods well established and described (pre-registration)
    d. a description on how to deal with study (pre)registration before the study is conducted.

e. the extent to which the applicant and their team have had methodological training or have extensive methodological experience, which should be detailed in this section
f. A methodological training plan for junior researchers and the entire team
g. If applicable, methodological plans should include how results will be reported and which reporting guidelines are being used
h. If applicable, research methods should emphasize how they deal with potential gender differences in their study population
i. If applicable, researchers must describe how they will access advice and guidance from the clinical research infrastructure in the host RPO.
j. If applicable, applicants must describe how potential methodological biases are addressed in the study.
k. If applicable, the methods should justify the statistical tests being proposed to determine adequate power, sample and group size
l. The methods should include a description of how bias in data collection and analysis will be managed.
m. When using animals, tissues or cells, researchers must describe how they will determine the appropriate sample sizes, controls and replicates in their studies.
n. Researchers should describe how they plan to maintain accurate records of their methodologies, procedures and the approvals granted during a project. These should be reported clearly in any publications to enable the study to be repeated Control and reproducibility plan)
o. Research records or laboratory notebooks should include clear cross-referencing to electronic data sources (such as data repositories).
p. Where appropriate, the literature search should be included
q. How the RPO will describe their standard procedures for signing off and archiving laboratory records and notebooks.

3. Guidelines should consider country differences

a. However, the guidelines should balance the level of details (not too general/not too detailed)

Explanation: as in previous guidelines, participants highlighted the need to balance specificity (country differences) with feasibility (too many details).

4. Guidelines for the assessment of the data management

a. during the interim evaluation and not in the selection

i. it cannot be assessed in the application

b. clear definition of the criteria of evaluation

c. DMP training and mentoring is needed

5. An equal treatment should be ensured in follow-up interviews

a. to ensure an equal treatment, all the applicants or no one should be interviewed

i. depending on the capacity and size of the RFO, interviews can be organised for all shortlisted applicants

b. interviews cannot focus only on specific parts but need to be general, e.g. not just for the methodology section

Explanation: Partcipants in the workshop emphasised the principle of fair treatment.

Diversity issues

Title of skeleton guidelines:

Guidelines on diversity issues for research funders

Guidelines:

1. RFOs should support diversity in the application

a. First of all, a merit-based evaluation process needs to be ensured

i. minorities/ less represented groups can be taken into account/prioritised in case of equally ranked proposal

b. A general acknowledgement of diversity can be recognized without taking it into consideration in the evaluation process

i. No disclosure of personal, sensible, confidential information can be allowed under the umbrella of ensuring diversity, e.g. sexual orientation questions

c. RFO should provide guidance on diversity

d. The RFO requires submitted research proposals to include a gender and diversity statement regarding a) the researchers in the call and b) when applicable, the researched population.

Explanation: point 1d is from first set of workshops therefore it can sound slightly from the other points.

2. **The RFO has regular monitoring in place to examine whether their organisational structures and processes are susceptible to potential diversity issues.**
    a. If so, the RFO will develop and implement a plan to mitigate any identified diversity issues. It is crucial that the RFO's leadership commits to this plan, sees it through with appropriate encouragement, support and initiatives, throughout the organisation.

3. **The RFO will undertake action towards eliminating the pay gap and monitor progress, examining bias as a contributing factor to pay gap.**
    a. The RFO will monitor precarious contracts and part-time positions for any gender-based differences and correct any inequalities. RPOs should examine conditions for part- time positions for researchers and their gendered division.
    b. Pay gap measures are NOT the responsibility of RFOs
    c. Pay gap measures are responsibility of the RPOs
    d. Pay gap measures need to be addressed at national level

Explanation: There is some disagreement between first set of workshops (point a) and second set of workshops (points b to d) concerning the degree of responsibility for RFOs concerning the pay gap which is normally a national/RPO responsibility

4. **The RFO should ensure that the language used to communicate to grant applicants is inclusive:**
    a. The RFO commits to closely monitor potential bias in language used in recruitment processes and funding calls.
    b. RFOs should guarantee clear guidelines in all official/non-official languages present in the area of the call
    c. All possible main languages in the region need to be taken into consideration

5. **RFOs should ensure/promote diversity within the internal staff and evaluators**
    a. RFOs should avoid possible biases
    b. RFOs should promote transdisciplinarity
    c. RFOs should make sure that evaluators and committees are briefed on bias and COI before the evaluation
    d. Gender diversity should be ensured in assessment panels

6. **RFOs should provide training and good guidelines on how to recognize and avoid diversity-related bias**
    a. COI training is needed as part of bias training

7. **RFOs could foresee dedicated calls for specific minority groups e.g. juniors and women**
    a. A merit-based evaluation system should however be the reference point

Explanation: There was some disagreement among participants concerning at what degree minority groups need to be encouraged while ensuring merit.

8. **Recruitment and/or funding processes should be as open and transparent as possible and be genuinely merit-based.**
    a. This includes measures such as briefing selection committees about bias pitfalls,
    b. deciding unclear selection criteria at the outset,
    c. letting external observers monitor the selection process and involving external evaluators

Final considerations:

In general, the guidelines are too detailed if we require funders to implement them. A balance will need to be found between prescription and feasibility.

The implementation of the guidelines is strongly dependent on the typology of the RFO and the country where the RFO is based. Small and south/east RFOs might encounter several difficulties in implementing the guidelines.

The formulation of RFO-related guidelines is made difficult due to the too many variables related to country differences, the size of the RFO, if the RFO is national or international, private or public and disciplines specific.

We tried to report all ideas, doubts, suggestions from our participants, rather than make a selection of them.

4.2.7.2.3 Monitoring of funded projects

Items written in red are new or modified recommendations based on the empirical work from the second round of co-creation workshops.

Items written in black are based on the empirical work from the first round of co-creation workshops

Execution of research grants

Title of skeleton guidelines:

Guidelines on execution of research grants for research funders

Guidelines:

1. **RFOs should have clear guidelines about the monitoring the execution of the research**
    a. Internal guidelines about what to monitor
        i. involvement of all relevant stakeholders in the definition of the guidelines
        ii. clear procedures in place
        iii. monitoring should depend on the lifetime of the project, on the budget and on the capacity and size of the RFO
        iv. guidelines should not be too long and complicated
    b. Guidelines to the beneficiary
        i. about what is expected and how to comply with the grant agreement
        ii. these guidelines should not be too long or complicated
    c. clear reporting timeline
        i. RFOs should guarantee the possibility to make amendments in case of specific circumstances by providing a clear justification
        ii. Ensure that the deadlines provide enough flexibility/adaptability to avoid pressure that might lead to RI breaches
    d. about what happens if the project does not meet the requirements
        i. any delay has to be justified
        ii. RPOs/PIs have to report timely if something goes wrong
        iii. stop funding and ask money back if no justifications are provided in due time

Explanation: all the recommendations are concerning the what, how and when of the monitoring process.

2. **RFOs should monitor:**
    a. Timing and compliance with the grant agreement
        i. depending on the capacities of the RFO
    b. Implementation of the project
    c. Depending on the research (clinical trials, education programs, trainings, communication, outcomes) but also on relevant approvals (ethics included), and infrastructure necessary to do the research, budgetary capacities etc.
    d. Publications, diverse deliverables (e.g., databases, websites, educational resources, and other forms of grey literature), participation in conferences, meetings, etc. and all activities related to the project
    e. The availability of open data
        i. this should include all data
        ii. quality rather than quantity
    f. Societal impact only to a certain extent
        i. depending on the scope of the RFO/grant call
        ii. transparency about possible societal impact

3. **RFOs should not monitor elements that are already monitored by other institutions, e.g.:**
    a. what is already framed by international/national legislation
    b. internal rules of each single institution
    c. RPOs/PIs relations with the sub-contractors (As a matter of principle, RPOs can freely choose their sub-contractors
    d. subcontractors, except:
        i. in case of misconduct
        ii. marginal monitoring if needed

Explanation: the points 2 and 3 gather recommendation about what RFOs should monitor or not. High disagreement within the participants about monitoring the societal impact. The disagreement depends on the differences between European and national/local RFOs and between open or stricter calls'

4. **RFOs and RPOs/PIs should maintain a close, cooperative and continuous collaboration during the lifetime of the project**
    a. The monitoring process should balance rigidity and flexibility and take into consideration the specificity of each funded project
    b. the monitoring should help researchers and ensure that they fulfil and comply with the grant agreement
    c. RFOs should help beneficiaries in case of a problem during the lifetime of the project
    d. the monitoring should be done by funders in according to the research center
    e. the monitoring should not overburden both parties, RFOs and RPOs/PI
    f. the scientific and the financial monitoring should be done during the entire lifetime of the project
    g. RFOs should have in place good IT tools to help the monitoring process
    h. RFOs should have in place a system of pre-monitoring (checklist) as a form of informal assessment
        i. RFOs should be able to detect easily (e.g. with yes/no questions) if everything is going well
        ii. RFOs should further investigate the project if something is not clear during the pre-monitoring process

Explanation: The level of collaboration is closely related to different parameters such as the lifetime of the project, the capacity of the RFO and the grant budget

5. **The monitoring process should help RFOs and governmental institutions to think about what is the structural problem that makes compliance more difficult for the beneficiaries**
    a. RFOs should check that the RPO/PI is in the position to comply with what they promised to do
    b. monitoring should also aim to help beneficiary in the implementation of the guidelines from all point of views

6. **RFOs should have in place a system of quality assurance system to monitor the monitoring process in order to guarantee transparency**
    a. RFO internal procedures to control step by step the monitoring of the research grant

RI requirements

Title of skeleton guidelines:

Guidelines on compliance with RI requirements for research funders

Guidelines:

1. RFOs should have in place RI-related guidelines, in particular:
    a. Clear guidelines about what it is expected from the beneficiary
        i. making clear who is responsible for what in the project
        ii. In addition, grant beneficiary should also clearly state who is responsible for what from the beginning of the project
    b. There should be separate guidance for research ethics and research integrity and how to deal with them in relation to the guidance at RPOs
    c. Where possible, assign an ethics or integrity adviser within the project to have an internal monitoring
    d. Pre-agreement between RFO and beneficiary about the what will be monitored is necessary from the beginning
    e. Reinforce the need for compliance with institutional/national code of conduct
    f. On ongoing basis, that needed ethics approvals are available

Explanation: The majority of the participants made it clear that a clear distinction between RE and RI is needed. The main problem is related to the diverse understanding of the concepts of RE and RI.

2. **RFOs should have clear guidelines on what should be monitored, what should not and by whom (depending on the capacity of the RFO)**
    a. RFOs should monitor compliance with RI standards
    b. RE approvals
    c. Open access/open data
        i. positive and negative results
    d. supervision/mentoring
    e. data management plan
    f. authorship
    g. potential COI
    h. RI training and certifications (quality of ethics/RI training is difficult to monitor)
    i. pre-registration of the study
    j. RFOs should NOT monitor the sub-contractors (except when relevant to funding)

i. RPOs should monitor the sub-contractors

k. the beneficiary should be able to freely manage its relations with all stakeholders involved, unless:

i. it is a co-funded project with the involvement of commercial partners

Explanation: Even if there was disagreement among participants concerning different sub-points, we decided to keep all suggestions made during the CCWs

3. RFOs should support a better RI culture and infrastructures

a. RFOs should promote a RI culture and create a more supportive environment for researchers

b. The RPO is responsible for promoting the guidelines and RI standards

i. In addition, the beneficiary is responsible for respecting the guidelines

4. RFOs should monitor if investigation procedures in case of RI breaches are in place in the RPO that is hosting the funded project

a. The RFO should make sure that RPO/host institution has procedures and structures in place.

b. The RFO should be informed as soon as possible about the breach, the investigation and its outcomes

c. Clear procedures and consequences need to be in place in case of misconduct, e.g. stop available funding and clarify consequences in terms of future funding

Explanation: Different views about the level of involvement of the RFO in case of allegation of misconduct. Main differences between European and national organizations

Financial monitoring

Title of skeleton guidelines:

Guidelines on financial monitoring for research funders

Guidelines:

1. **RFOs should have clear guidelines for financial monitoring**
    a. The RFO should have clear guidelines about the level of financial management required
    b. Before the start of the project, a mutual agreement between the RFO and the beneficiary has to be in place regarding
        i. financial monitoring
        ii. financial requirements
        iii. exceptions
        iv. appropriate timeline
    c. The RFO should monitor if the funding is well managed by the RPO
        i. financial monitoring should be done by a dedicated office (depending on the RFO capacity)
    d. RFO should have a dedicated office for complaints
    e. RFO should check if the money goes to the researchers
    f. RFO should be aware of the level of support the host institution can give to the grant beneficiary

Explanation: The level of the financial monitoring depends on the size and capacity of the RFO

2. **Financial monitoring should take place in parallel with the scientific monitoring by a dedicated department**
    a. clear guidelines about the interaction between financial and scientific monitoring should be in place
    b. a dedicated department should be in charge of linking the two
    c. the project manager should also have a financial overview

Explanation: In this case, a strong disagreement among participants about the link between the financial monitoring and the societal relevance.

3. **Financial monitoring should NOT be linked to the research outputs:**
    a. If the research outputs are a part of the work plan it needs to be monitored
    b. The monitoring should be independent of positive or negative results and of publications
    c. Societal relevance is normally not linked to the financial monitoring

4. **Compliance with the initial financial plan is mandatory**
    a. compliance with the grant agreement needs to be ensured
    b. while some flexibility in terms of deadlines can be allowed, all deviations from the initial plan have to be justified
    c. annual report procedures need to be in place
        i. not monitor in detail the travel expenses
        ii. not monitor the subcontractors

5. **RFOs should use financial monitoring also in relation to RI breaches**
    a. to prevent financial fraud
    b. RPOs/PIs should report timely possible financial amendments
    c. Withdrawal of funding would only happen if the RPO/PI failed in its responsibilities
    d. Clear communication between the scientific and the financial department is essential

Final considerations: The implementation of the guidelines is strongly dependent on the type of the RFO and the country where the RFO is based. Small and south/east RFOs might encounter several difficulties in implementing the guidelines.

The formulation of RFO-related guidelines is made difficult due to the too many variables related to country differences, the size of the RFO, if the RFO is national or international, private or public and disciplines specific.

We tried to report all ideas, doubts, suggestions from our participants, rather than make a selection of them.

The aspect of the societal impact is dependent on the typology of the RFO and the typology of the grant call.

4.2.8 Implementation issues

During the CCWs, participants were asked to discuss and analyse issues concerning the implementation of the guidelines within RPOs and RFOs. Participants were asked to discuss different aspects, namely:

- impact of the guidelines
- resources needed for implementation (tangible and intangible)
- facilitators for implementations

- barriers
- unintended consequences

For both, RPO and RFO-related workshops, a visual representation of the outcomes regarding the implementation issues was created **(Appendix 6.10 - Analysis posters for the implementation issues)**

4.2.8.1 RPOs

Requisite for implementation

Throughout the co-creation workshops, participants mentioned points that were needed to ensure an adequate implementation of the guidelines. In the end of the second workshops, we also probed this point directly by asking participants what were the resources needed for implementation, the facilitators for implementation, and the barriers for implementation. A few points became clear from the discussion.

First, the participants repeatedly mentioned that the guidelines should come as a response to a need, rather than an added burden on the researchers. In this regard, increasing awareness about the importance of research integrity and research integrity guidelines — for instance by holding meetings, seminars, and by raising awareness towards real cases of misconduct — should be a first step to implementing the guidelines adequately. Participants also added that awareness was not sufficient to implement the guidelines, but that a change in attitude should be achieved. This is a difficult endeavor, especially considering that fostering integrity requires a change in a number of traditional practices. Opening the discussion about the need for changing these traditions could help reach the change in attitudes needed for implementation. Finally, the need for a clear and effective communication strategy, as well as the need to involve researchers in the implementation process, were thought to be requisites for successful implementation.

Second, the need for increased support and coordination was mentioned several times. Indeed, participants thought that the guidelines would only become effective if they were implemented in multiple RPOs and settings to allow a certain standardization of the demands and recognition for research integrity. This point was thought to be very important especially considering the frequent migration of researchers between institutions and countries.

Third, the need for incentives and recognition at the RPO level were also thought to come into play. Participants mentioned that benefits and incentives should be put in place to counter the powerful influence of university rankings and productivity demands which may go against some of the recommendations proposed in the guidelines. Along these lines, the introduction of recognition medals was mentioned as a possible idea, as well as the possibility to make funding opportunities

contingent upon the implementation of the guidelines. On this point however, participants warned that it is important to ensure that institutions who have few research integrity guidelines and standard operating procedures (SOPs) in place could also partake and benefit from small improvements, either by different levels of achievement or by setting minimal priorities in the guidelines.

Fourth, implementing guidelines for research integrity comes with important costs and resource involvements, and these should be considered thoroughly in a clear implementation strategy. Participants mentioned that dedicated personnel, training, and support were essential for a smooth implementation, and that the researchers should be provided with the space, the time, and the resources to adapt their practices to new guidelines.

Related to this last point, respondents also believed that the current reward and assessment system could be an important barrier for properly implementing the guidelines. In fact, the high pressures imposed on researchers, the hyper-competition of research environments, and the precarity of academic careers were all seen as major obstacles to implementation. A re-evaluation of researcher assessments and of the demands and expectations imposed on researchers should thus be a priority for ensuring that the guidelines can be implemented smoothly. In addition, the pressures imposed on RPOs themselves to perform and increase their placement in international rankings was also perceived as an important and largely out-of-reach obstacle that the guidelines may face. No concrete recommendation was found to address this issue, but aiming for the long-term goal of rethinking RPO-level assessments and rankings could be a necessary step for sustainable changes.

1. **Awareness and change of attitude**
    a. The guidelines must come as a response to a clear sense of necessity from the research community, otherwise they risk being perceived as an added burden. Ensuring a clear awareness of the problems of RI should be part of an effective implementation of the guidelines (see BP1)
    b. The guidelines will challenge traditions and usual practices, and may face resistance for implementation. This disruption should be discussed openly throughout the implementation of the guidelines.
    c. A clear and effective communication must accompany the guidelines to ensure that all stakeholders are aware of the guidelines and know how to find them
        i. Providing discussion venues to allow exchange between different stakeholder groups may help communicate the guidelines effectively
    d. Researchers and other stakeholders should be involved in the implementation of the guidelines

2. **Support from and coordination with external organisations**

a. Involve national research ethics committees and international policy makers in the implementation of the guidelines
    i. Where possible, implement the guidelines in a coordinated fashion together with other research institutions (See BP2)
b. Involve international organisations such as COPE, the European Commission, HRS4R, ERION in recognizing and raising awareness about the guideline

3. Incentives and recognition for implementation

a. Recognise and reward the implementation of the guidelines within RPOs
b. Tie research resources (funding, eligibility for grants, etc.) to the implementation of the guidelines (also at the university level)
c. Increase transparency on the levels of implementation that RPOs achieve
    i. Provide different levels of achievement (e.g., gold, silver, bronze) and make it clear what the improvements and remaining challenges are in the institutions

4. Sufficient and adequate resources

a. Within each RPO, build a clear and concrete implementation strategy (See BP3)
b. Within each RPO, dedicate funding and resources for the implementation of the guidelines
    i. Hire personnel dedicated to the implementation of the guidelines
    ii. Provide training to all (management, researchers, support staff) to ensure that the guidelines are understood in the same way by all
    iii. Provide increased support for researchers in the transition period (consider new research support personnel, trained champions and ambassadors for the guidelines, etc.)
c. Ensure that researchers are provided the space, time, and resources to implement the guidelines (e.g., if open access publications are expected, provide funding for article processing charges, if open data is requested, provide adequate infrastructures and training).

5. Adapted climates and demands for the implementation of the guidelines

a. Ensure that the other demands imposed on researchers are coherent with the new demands of the guidelines
b. Ensure that researchers are provided with sufficient employment stability to be able to implement the guidelines without risking their career

c. Ensure that hiring, tenure, and promotion assessments are adapted to the demands of the guidelines
d. Although largely beyond the remit of RPOs, higher level demands, such as demands and indicators used to assess or fund RPOs should also be adapted to foster better RI (e.g., university rankings, structural funding calculations from governments, etc.). RPOs may play a role in lobbying for changes to promote better RI

Best practice examples:

BP1. As previously mentioned, implementing better RI SOPs is likely to raise issues related to RI. The cases raised can be used as relevant examples to increase awareness of the need for better RI.

BP2. Pair organisations with less support with organisations in which support and SOPs are already largely in place so they can assist one another in the implementation of the guidelines

BP3. Where possible, couple the guidelines with other new changes in the institution, such as with the digitization of science.

Actor involvement

Adding to the required changes within RPOs, different actors should also be involved in the implementation of the guidelines. Participants to the co-creation workshops spontaneously mentioned the need for bottom up and top-down approaches for implementation of the guidelines. Both approaches were said to be crucial in ensuring a smooth and genuine implementation, and examples of each were brought throughout the workshops. Interestingly, participants also raised the issue of middle management, who is crucial in implementing the guidelines, but is often disconnected from more junior researchers and from top executive management. Participants explained that a better discussion between the different levels should happen both for the acceptance of the guidelines, and for ensuring a true and useful implementation.

1. **The guidelines require top-down involvement for implementation**
    a. The implementation of the guideline needs to be initiated from the RPO management and executive boards
    b. The executive board has the final responsibility for the implementation.

c. RPO management should explicitly, openly, and clearly support the guidelines as a minimum
d. RPO management should provide the means to implement the guidelines. Sufficient and adequate resources in the *Requisite for implementation*)

9. The guidelines require bottom-up involvement for implementation

a. Students and researchers should be involved in the implementation of the guidelines to ensure that it suits their needs
b. Students and non-executive members should be included on RPO boards to discuss the implementation of the guidelines, RI SOPs, and any other aspects influencing the environment and climate they work in
c. Local influencers, champions, or ambassadors for the guidelines should be selected and trained to facilitate adoption of the guidelines

10. The guidelines require middle management involvement for implementation

a. Middle management (e.g., principal investigators, departmental support offices, etc.) play an important role in implementation
b. Middle managers should be involved and included in the discussions on how the implementation should take place

11. The guidelines require a good balance of top-down and bottom-up involvement for implementation

a. Ensure a good balance between top-down and bottom-up implementation to avoid the perception of a passive imposition of the guidelines, and to preserve a genuine involvement of researchers in RI
    i. An interplay of mandatory and voluntary SOPs may help achieve this balance
    ii. A clear involvement of researchers in the implementation of the guidelines may help achieve this balance
b. All levels should be aligned for implementation (See BP4)

12. Higher stakeholders external to the RPOs should also be involved in the implementation

a. National and international funders, policy makers, and research organisations (e.g., European Commission) also need to be involved to ensure a smooth and unified implementation of the guidelines
    i. These higher stakeholders can help by issuing statements of support or by tying funding and resources to the implementation of the guidelines

Best Practice examples:

BP4. Provide discussion venues to unite institution management, senior researchers, and more junior researchers

Possible consequences of the guideline

Implementing the guidelines can bring about a number of benefits for the research and the RPO implementing the guidelines. While the full extent of these positive consequences can only be revealed from piloting the guidelines in real RPO settings, participants who helped us design these guidelines in co-creation workshops already mentioned some benefits they believed would incur from a proper implementation of the guidelines. For one, if effective, the guidelines will fulfil their purpose and will help improve research practices and research quality. Increased research quality, in turn, will help foster trust in the research produced and may thereby increase trust in the RPO in which the guidelines are used. Participants also believed that properly implemented guidelines would generate healthier research climates in which researchers feel that they have the room to follow best practices and in which the risks to researchers' wellbeing and mental health would be reduced. In addition, implementing the guidelines would help prioritise research integrity in internal discussions of the RPO and would therefore raise awareness and visibility of the topic. Finally, having guidelines in place would improve the coherence of existing integrity standards and would favour a shared understanding of research integrity between researchers, departments, institutions, and countries.

Nevertheless, participants also explained that the guidelines could have unintended negative consequences. The negative consequence that was most often mentioned was the risk that the guidelines would be perceived as an added burden on researchers, and that they could shift the perceived value of research integrity from an essential value of good science to an added hurdle for research. Some participants also mentioned that those who would need the guidelines most are often those who are most at risk of not being reached by guidelines. This point is important for deciding on whether recommendations, training, and integrity efforts should be mandatory or should remain voluntary. Finally, although it was mentioned sporadically, some participants also explained that increasing the attention on RI will necessarily increase the visibility of the problems that are already present. Although this increased awareness of the issues should be seen as a positive thing, participants explained that it can be a deterrent for RPOs and it may tempt them to conceal the issues or to abandon the guidelines early to avoid reputational damage.

1. **Positive consequences**
   a. Improved research quality and increased trust in research
   b. Healthier research cultures and improved wellbeing
   c. Increased awareness and prioritization of research integrity
   d. Better coherence of integrity standards between departments, institutions, and countries

2. **Negative consequences**
   a. Added bureaucratic burden
      i. Reduced time for other research activities
      ii. Risk of giving research integrity a sense of burden rather than an added value
   b. Lack of effectiveness, especially for researchers, institutions and settings that need it
   c. Reputational damage and reduced interest
      i. Increasing research integrity support will increase the visibility of research integrity problems, which may be perceived as problematic in the short term (see BP1)
      ii. Given the possible increase in RI issues, institutions may be tempted to conceal the problem and abandon the guidelines prematurely

4.2.8.2 RFOs

Requisite for implementation

Different barriers in the phase of the implementation of the guidelines were highlighted. Lack of resources such as time, budget, staff and right expertise within the RFOs were highlighted during the CCWs. In addition, also not adequate infrastructures, IT tools, a clear communication strategy of the guidelines, and the need for trainings and educational material for the internal staff were discussed. Concerning the development of proper trainings for internal staff, the development of trainings, educational material and specific briefing sessions for RFO external evaluators and grant applicant.

Implementing the guidelines within less developed RFOs might be supported by more advanced organizations. It might be possible to pair less and more advanced RFOs to advance with the implementation strategy accordingly.

Since RFO guidelines impact RPOs and researchers, RFOs should guarantee administrative support to not overburden RPOs and researchers, support for vulnerable RPOs and specific categories of researchers. RFOs can support RPOs and researchers by providing examples of best practices or

template concerning administrative issues. RFO support for "vulnerable" RPOs might avoid that the "money goes only to excellent institutions", but also to those institutions that need to improve their structure to make them more competitive.

1. **Sufficient and adequate resources**
    a. Within RFOs, a dedicated budget has to be foreseen for the implementation
        i. Hire personnel dedicated to the implementation
        ii. Foresee budget for adequate infrastructures and proper IT tools
        iii. Foresee budget for a clear communication strategy
    b. Within RFOs, proper educational resources and dedicated training have to be foreseen for the internal staff
    c. Within RFOs, proper educational resources and dedicated training have to be foreseen for the external evaluators and grant applicants
2. **Support from and coordination with more advanced and structured RFOs**
3. **RFO administrative support for vulnerable or less advanced RPOs**

Actor involvement

Concerning RFO-related guidelines, various stakeholders might have the power to influence both the development and the implementation of the guidelines. Politicians and the governments might have the power to drive the development and the implementation of the guidelines at the level of RFOs. Besides, also the RFO management might impact on the development of SOPs and guidance.

Participants involved in the CCWs emphasize the involvement of multiple stakeholders such as RFOs, RPOs, the research community to develop the guidelines first and then in their implementation. Participants emphasized the need for commitment of all involved stakeholders at the European level to increase and to have better adherence to the guidelines.

1. **The guidelines require a top-down involvement for implementation**
    a. The implementation of the guideline needs to be initiated from the government with the management of the RFOs accordingly
2. **The guidelines require the involvement of multiple stakeholders for the implementation**
    a. The implementation of the guideline needs the involvement of the scientific community
    b. The implementation of the guideline needs the involvement of the first users of these guidelines, namely the RFO internal staff, the external evaluators and the grant applicants

Possible consequences of the guideline

The implementation of the guidelines might impact transparency, better adherence, increasing trust and awareness and the research environment. Implementing the guidelines might increase the transparency of all the RFO internal procedures and the proposal evaluation process. Increasing transparency is also related to a need for clarity regarding the different layers of responsibilities within the RFOs and within the RPOs and avoid possible misunderstandings. Also, the implementation of the guidelines might increase trust in the evaluation process for all the stakeholders, public trust in science and might increase science reliability. Implementing the guideline might increase the awareness about all the steps regarding the evaluation process, good research practices, and, consequently, in the research environment.

The implementation of the guidelines might lead to an increase in the research-related bureaucracy. This administrative burden would lead to more administrative work but not to a real change of mentality. The administrative burden might hit RFO internal staff and proposal evaluators in general and applicants (evaluators and applicant fatigue). This extra administrative work might also lead to a more copy and paste or tick-box mentality due to the so-named application fatigue. This extra burden might lead to less interest in the RFO with fewer reviewers, panel member and even applications, consequently. The same administrative extra burden within the granted research project's lifespan might lead to less time to do research that, in combination with strict deadlines, might lead to sloppy science and questionable practices due to increased pressure on the grantees. Moreover, the implementation of new guidelines might lead to useless duplication of rules in those organizations already at an advanced stage.

RFO-related guidelines might impact the work of different categories of stakeholders namely, RFO internal staff, external evaluators, reviewers and panel members, RPOs, individual researchers. The categories mentioned above might be interested in following the development of the SOPs since their daily tasks and workload might change, followed by the implementation of guidelines.

1. **Positive consequences**
    a. Improving transparency, better adherence of all RFO internal procedures
    b. Increasing awareness regarding good research practices
    c. Increasing trust in science
2. **Negative consequences**
    a. Increasing the administrative burden
        i. within RFOs
        ii. for external evaluators
        iii. for grant applicants
        iv. for grant beneficiaries
    b. Less interest in the RFO due to an increase of the administrative burden
    c. Development of a sort of copy and paste or tick-box mentality, due to the so-called application fatigue of the applicant

d. Increasing of the administrative burden might lead grant beneficiaries to have less time to spend in doing research
    i. possible increase in sloppy science

Country/ institutional differences

Implementing a standardized set of RFO-related guidelines might be extremely complicated because of the numerous variables related to the type of RFO. The development and the implementation of the guidelines might depend on the fact that the RFO might be an international, national, regional, a local organization. Another variable might be related to the fact that the RFO might be public, private or a combination of the two; the RFO might be discipline-specific or not; the RFO might be a small organization with a limited number of internal staff or a big and very structured organization.

Cultural background differences and different understanding of the guidelines might lead to difficulties in implementing the guidelines. Each specific guideline might be seen as too restrictive and might influence its acceptance and implementation. The way in which the guidelines might be implemented can depend on the country. In more advanced countries, from an RI point of view, the implementation strategy of the guidelines might be feasible in the short-term or even not needed since the country is already at a more advanced stage. For other countries, the implementation of the guidelines might be a very long and difficult process. For these countries that are lacking even the basic guidelines for RI, the implementation has to be done following a step-by-step process.

Besides differences related to the type of the RFO, implementing SOPs and guidelines for RI might encounter problems related to the different understanding of the term RI and the different approach that different countries or institution might have regarding RI-related issues, training, education and awareness.

The need for national/international cohesiveness and harmonizing or coordinating different funders' policies was highlighted during the CCWs.

1. **The implementation of RFO-related guidelines needs to take into consideration the following:**
    a. if the RFO is an international or national or regional or local agency
    b. if the RFO is public or private or a combination of the two
    c. if the RFO is discipline specific or not
    d. if the RFO is well-structured or not
2. **The implementation of the guidelines needs to take into consideration**
    a. the acceptance of the guideline if seen as too restrictive

b. step-by-step approach defined by a priority list for the RFOs less advanced in these terms
c. different understanding about basic terms such as RI
d. different approaches concerning RI-related issues

3. **National/international cohesiveness and harmonizing or coordinating different funders' policies is needed**

5. NEXT STEPS WITHIN WP4

We assessed the quality of existing best practice documents (e.g. guidelines, codes of conduct, SOPs) that were found in the empirical work in WP3. Based on that work, we have created a list of topics and mapped how far each topic has been addressed by existing resources. Based on this mapping, we show that most topics are already highly developed, either because they are addressed by good quality existing resources or because we developed them in greater depth in the co-creation workshops. This also implies that there remains a list of subtopics that are less developed. We produced SoRs for these underdeveloped topics, but since the quality of existing resources was sometimes poor or lacking, the extent to which we will be able to further improve, expand, and granulate these SoRs depends on the next steps of the project.

First of all, we have to know which topics are still underdeveloped. The tables below show the complete selection of topics and subtopics, the level at which they were addressed in existing resources, whether they were addressed in the co-creation workshops, and whether they remain underdeveloped at this stage of the project. Numerous underdeveloped topics have been addressed in the co-creation workshops, either directly as part of the 21 selected subtopics, or indirectly by being brought up by the co-creation workshop participants (for the latter, refer to '(x)' in the tables below), but a few topics still need some attention in future steps of the project. Many of these remaining underdeveloped topics involve topics that were too legalistic to benefit from the co-creation workshop. For instance, declarations of conflicting interest (in appointments and promotions, research evaluations, and consultancy for RPOs) or procedures on dealing with breaches of research integrity at the different levels within RFOs. These topics, and a few more, still need to be addressed in future steps of the survey (WP6) or more precisely at the institutional level during the pilot testing of the final toolbox (WP7).

Among the underdeveloped topics that were not discussed in the co-creation workshop, some may be more relevant than others in the elaboration of the toolbox. Keeping the large scope of the project and the toolbox into account, topics that are of general relevance will be given priority over topics that address very specific issues or that risk being dependent on local legislation.

Categorization of subtopics for RPOs into four categories. Category 1: high quality existing resources available, no need to discuss in the co-creation workshops; category 2: existing good quality resources, but needs adjustments along the process in WP4; category 3: some low-quality existing resources available; category 4: no existing resources. The column CCW (co-creation workshop) indicates underdeveloped topics that have been addressed in the CCW ('X' means the topic was explicitly discussed in the CCW while '(x)' means the topic was discussed by participants without being introduced directly by the moderators). In the last column, we indicate each sub-topic that remains under-developed (or partly underdeveloped when addressed indirectly in the co-creation workshops).We have markedthe subtopics that are really underdeveloped in ***bold,*** *so it is easy to detect for the reader which subtopic is underdeveloped.*
** The sub-topic of 'plagiarism' was not extensively discussed in resources for RFOs, but considering that it was extensively discussed in resources addressing RPOs, it might not require further attention.*
In the last column, '(Yes)' between brackets, indicates that although this subtopic is potentially underdeveloped, most guidance documents can be used from the topics covered in the RPO topics.

Rank	Topic	Subtopic	Resource category 1	2	3	4	CCW	Under-developed
1	Education and training in RI	a. pre-doctorate		X			X	
		b. post-doctorate		X			X	
		c. training of RI personnel & teachers				X	X	
		d. RI counselling and advice				X	X	
2	Responsible supervision and mentoring	a. PhD guidelines				X	X	
		b. supervision requirements & guidelines			X		X	
		c. building and leading an effective team			X		X	
3	Dealing with breaches of RI	a. RI bodies in the organization	X					
		b. protection of whistleblowers	X					
		c. protection of those accused of misconduct			X			(Yes)
		d. procedures for investigating allegations	X					
		e. sanctions	X					
		f. other actions (including mobility issues)		X				
4	Research ethics structures	a. set-up and tasks of ethics committees	X					
		b. ethics review procedures	X					
5	Data practices and management	a. guidance and support	X					
		b. secure data storage infrastructure	X					
		c. FAIR principles	X					
6		a. in peer review	X					

	Declaration of competing interests	b. in the conduct of research	X						
		c. in appointments and promotions			X				Yes
		d. in research evaluations			X				Yes
		e. in consultancy			X				Yes
7	Research environment	a. fair procedures for appointments, promotions and numeration	X						
		b. adequate education and skills training					X	X	
		c. culture building			X			X	
		d. managing competition & publication pressure			X			X	
		e. conflict management		X					
		f. diversity issues			X			X	
		g. supporting a responsible research process (transparency, quality assurance, requirements)	X						
8	Publication and communication	a. publication statement	X						
		b. authorship	X						
		c. open science		X				(x)	Partly
		d. use of reporting guidelines	X						
		e. peer review	X						
		f. predatory publishing					X		Yes
		g. communicating with the public	X						
9	Collaborative research among RPOs	a. among RPOs inside/outside the EU		X				(x)	Partly
		b. with countries with different R&D infrastructures		X					
		c. between public and private RPOs		X					

Categorization of subtopics for RFOs into four categories. Category 1: high quality existing resources available, no need to discuss in the co-creation workshops; category 2: existing good quality resources, but needs adjustments along the process in WP4; category 3: some low-quality existing resources available; category 4: no existing resources.
The column CCW (co-creation workshop) indicates underdeveloped topics that have been addressed in the CCW ('X' means the topic was explicitly discussed in the CCW while '(x)' means the topic was discussed by participants without being introduced directly by the moderators). In the last column, we indicate each sub-topic that remains under-developed (or partly underdeveloped when addressed indirectly in the co-creation workshops).
*We have made the subtopics that are really underdeveloped **bold,** so it is easy to detect for the reader which subtopic is underdeveloped.*

** The sub-topic of 'plagiarism' was not extensively discussed in resources for RFOs, but considering that it was extensively discussed in resources addressing RPOs, it might not require further attention.*
() If the last column answer is between brackets, the means that although this subtopic is potentially underdeveloped, most guidance documents can be used from the topics covered in the RPO topics.

Rank	Topic	Subtopic	Resource category 1	2	3	4	CCW	Under-developed
1	Dealing with breaches of RI	a. RI bodies in the organization	X				(x)	
		b. procedures for breaches by funded researchers			X		(x)	Partly
		c. by review committee members				X		Yes
		d. by reviewers				X		Yes
		e. by staff members				X		Yes
		f. protection of whistleblowers and the accused		X				Partly
		g. sanctions/other actions		X				Partly
		h. communicating with the public	X					
2	Declaration of competing interests	a. among review committee members	X					
		b. among reviewers			X		(x)	Partly
		c. among staff members				X	(x)	Partly
3	Funders' expectations of RPOs	a. Codes of Conduct				X		(Yes)
		b. assessment of researchers				X		(Yes)
		c. education and training for RI				X	(x)	Partly
		d. processes for investigating allegations of research misconduct			X		(x)	Partly
4	Selection & evaluation of proposals	a. RI plan				X	X	Yes*
		b. methodological requirements				X	X	
		c. plagiarism				X		
		d. diversity issues				X	X	
5	Research ethics structures	a. research ethics requirements			X		(x)	(Partly)
		b. ethics reporting requirements				X		(Yes)
6		a. expectations on collaborative research				X	(x)	Partly

	Collaboration within funded projects	**b. research that is co-financed by multiple funders**	X		Yes
7	Monitoring of funded applications	a. financial monitoring	X	X	
		b. monitoring of execution of research grant	X	X	
		c. monitoring of compliance with RI requirements	X	X	
8	Independence	a. What counts as an unjustifiable interference?	X	X	
		b. preventing unjustifiable interference by the funder	X	X	
		c. preventing unjustifiable interference by political or other external influences		X	
		d. preventing unjustifiable interference by commercial influences	X	X	
9	Publication and communication	a. publication requirements	X		
		b. expectations on authorship	X	(x)	
		c. open science (open access, open data, transparency)	X		
10	Intellectual property issues	*NONE*	*X*		No

It will not be possible to address all under-developed topics in the survey. Therefore, WP4 and WP6 will work in collaboration to select the most important topics to be addressed in the survey. Some of the topics addressed in the co-creation workshops will also need to be addressed in the survey to explore country and discipline differences on a greater scale. In fact, co-creation workshop participants often raised distinctions between countries when discussing the co-created recommendations and guidelines. In this regard, the survey will serve as an important vector to consider the level at which different countries currently stand on the topics addressed to better inform us on the next steps in implementing our recommendations and guidance.

The survey will also serve to address possible implementation issues, such as unintended consequences and barriers to implementation to provide information on the implementation of the guidelines and on its cost-benefit. Some interesting points to address include the determination of the actors that are most important in changing and influencing research integrity policy, the identification of barriers and of the willingness of researchers to engage with the guidelines, and the

identification of the communities, institutions or countries where these barriers are mostly encountered.

Finally, the format of the toolbox itself requires further efforts before it can be consolidated. The CCW already provided ideas on the formats that would be most helpful to users, and future steps of the project will need to ensure that these ideas are duly considered. For example, CCW participants mentioned that the toolbox should contain a step-by-step approach with several layers of achievement that can be adapted to institutions with different starting points. Some countries may be more advanced in implementing RI policy than others that are still in its infancy in developing these policies. This idea should be explored further in WP7, possibly by providing priority lists and different layers of achievement in the toolbox. CCW participants also suggested that the toolbox would benefit from accompanying videos. Following this suggestion, we started the production of several research integrity-related videos together with SAGE Publishing where SOPs4RI partners and Advisory Board members will share their experiences and best practices on methods used and on specific research integrity topics, related to their work in SOPs4RI. These videos will raise awareness on the iterative and extensive methodological steps used in developing the toolbox and will help bring the toolbox to life. These recommendations are a good starting point, but directed questions in the survey, and especially feedback from the piloting of the toolbox will be essential in ensuring that the format of the toolbox upholds its aim of being truly helpful to end-users.

5.1 Co-creation workshop items of interest for the survey (WP6)

Selected general implementation points:

- What kind of rewards motivate researchers? Is recognition/awards enough or do they want tangible rewards or career advancement opportunities?
- What is most important and effective to researchers, bottom-up or top-down initiatives? Would they feel more entitled to initiatives if they take part in the decisions and guideline implementation?
- What would researchers find most convincing of the utility of a guideline? Seeing its success in different settings; knowing the guideline is built with strict methods and evidence based; being introduced to the guideline by a close colleague; being introduced to the guideline by a scientific society they associate with; etc.
- What is the current attitude of researchers towards the scientific system they work in? Is it acceptable as it is, does it need to change?

RPOs: Education and training in RI – Selected Points

HIGH RELEVANCE

- **Evaluate training programs (subjective measures like participant perceptions + objective measures like enrollment)**
    - *A lot of input on the difficulty to measure effectiveness of training programs, so what makes training meaningful?*
- Post-doctorate and senior researchers – **6. Motivate trainees to actively participate in training (attractive terms, binding funding, promotions, etc. to training)**
    - *Some interesting discussion on this point about labelling of RI training, with participants maintaining that 'masterclass' sounded more appealing than 'training' and that labelling the course with terms of 'Research integrity' may sound too normative..*
- Pre-doctorate – All pre-doctorate level – **1. Employ respected, enthusiastic and qualified trainers (internal when possible, and involve the faculty in delivering the courses)**
    - *There were some discussions on what a good trainer is. Someone internal? Someone you know? Someone formally trained to teach RI? Someone who also does research?*

MEDIUM RELEVANCE

- Research integrity training for post-doctorate and senior researchers – **4. Encourage and support the organization of informal discussions at departments or units to supplement formal training**
- Pre-doctorate: PhD level – **2. Follow up with elective specialized courses throughout the PhD**
    - *Participants mentioned that there were country differences where some institutions may not yet be able to provide RI training.*
- Training of research integrity personnel & teachers (but also explore at pre-doc and post-doctoral levels) – **3. Provide multidisciplinary trainings where disciplinary considerations can be discussed**
    - *Repeatedly, participants talked about how, on the one hand, there are so many differences between disciplines, but on the other hand, multidisciplinary training is beneficial. What is preferred?*
- Training of research integrity personnel & teachers – **7. Reward RI teachers and support personnel for their work**
    - *As stated in the 'general points: What is a meaningful reward? Some mentioned award and recognitions, while others mentioned tangible rewards such as career advancement, financial reward, etc.*

- Post-doctorate and senior researchers – **5. Teach post-doctorate and senior researchers about research integrity by asking them to teach about the topic at the pre-doctorate level**
    - *There was some discussion here where 'participants were afraid that if post-doctorate researchers are not sufficiently trained in RI and enthusiastic about it to begin with, it would be risky to ask them to train more impressionable junior researchers'*
- General implementation issues — Support from **the executive board** is needed for the implementation of the guideline. Despite the importance of the previous point, to ensure that researchers make use of counseling and advice services offered at the institution, counseling and advice **should not just be seen as an extension of the executive board but rather as something that meets the needs of researchers**.
    - *There is a delicate balance between the need to involve research support services in executive boards of the universities, and the need to keep support services grounded at the researcher level*
- **Additional considerations mentioned as implementation issues:**
    - *Should faculty researchers be involved in training students about RI?*
    - *What is the purpose of RI training? (Awareness, empowerment, compliance)*
    - *Mandatory training vs voluntary training, discussion on what is more appropriate (including risk of mandatory training to lead to box-ticking mentality and the risk of optional training to only reach those who don't need it)*
    - *In some countries, confidential counselors have a legal duty to report on misconduct cases, the survey could help identify where this is the case.*
- **Training focus on young vs senior researchers? (mentioned in several points)**

<u>RPOs: Responsible supervision and mentoring – Selected Points</u>

HIGH RELEVANCE

- PhD Guidelines (sentence 1) – 3**. Provide an independent body, students and supervisors can turn to in case of problems.**
    - *To obtain a general understanding of counselling in research education topics. For instance, when are researchers willing to go to a counselor? Is it only for cases of reporting misconduct or do they go more often to counselors when they have doubts about their research (e.g. while just thinking about a 'mundane day-to-day' issue).*
    - *In some countries, there is an obligation to report integrity issues, and confidential advisers may therefore not be able to keep confidentiality. It would be interesting to investigate this in the survey.*
- PhD Guidelines (sentence 2) – **1. Require supervisors and PhD students to sign agreements regarding supervision in an early stage of the career trajectory**

    - *This raised a lot of disagreement, with some saying it would make the interaction too formal and create conflicts, and others stating it was necessary. It may be useful to capture what respondents think.*
- Supervision requirements and guidelines — **6. *Set requirements for responsible supervision*** & **Evaluation structures for supervision**
    - *What is good supervision? The guidelines highlight these, but we might find more: Familiarity with PhD procedures; Ensuring that supervisees are aware of PhD procedures; Provide support and personal guidance to the supervisee; Knowledge of the institutional support structures, when there is a need to refer the supervisee to other personnel (e.g. for psycho-social support or mental health issues); Acting as exemplars; The skills necessary to communicate effectively with supervisees from different cultures; Be able to balance between supporting supervisees and allowing them to grow as independent researchers; Taking the time to explain decisions to the supervisee to engage the supervisee in the decision process*
- Sub points in supervision requirements and guidelines 7. & Building an effective team 6. **— Allow good researchers who do not wish to supervise to progress in their academic career without the need to supervise** & **Allow good researchers who are not suitable research leaders to progress in their career without the need to take on research leader tasks**
    - *There was controversy about these points, and it may be interesting to obtain opinions in the survey about them.*

MEDIUM RELEVANCE

- PhD Guidelines **– 1.** Develop a document for PhD students containing essential information about the PhD trajectory, including institutional rules, the rights and responsibilities of the PhD student to **Communicate the expected workload of a PhD.**
    - *CCW participants mentioned that there must be big differences in the workload expected from PhD students between countries.*
- Supervision requirements and guidelines — 2. Provide supervisors with the necessary support structures needed to supervise (e.g., supervisors peer-to-peer structures, **provision of co-supervisors**, etc.)
    - Co-supervisors are not always allowed, where is this the case?
- Supervision requirements and guideline — **9. Reward and recognize good supervision**
    - There was some discussion around the kind of rewards that would make a change. Recognition vs. tangible rewards.

<u>RPOs: Research environment – Selected Points</u>

HIGH RELEVANCE

- Community building for positive research culture — **3. Ensure responsible performance management, assessment and evaluation** & Managing competition and publication pressure – Rewarding and valuing: **1. Provide rewards and incentives for research, non-research, and non-publication related activities (e.g., Teaching, Peer review, Editorship, Supervision, Dissemination, Outreach, Impact in society)**
    - *What would researchers like to see considered in their assessments*
- Managing competition and publication pressure — **4. Share responsibility between the institution and individuals for funding and contracts**
    - *This is an interesting point that is quite new – but how should it be understood?*
- Diversity and inclusion — **12. Implement recruitment sensitive to diversity and inclusion (e.g., including the wording, format, and advertisement of job adverts, also considering the context of applicants in recruitment, such as caring duties, past settings, etc.)**
    - *This point is interesting for two reasons: 1) The example of 'jobs.ac.uk' was mentioned and the fact that most European countries do not have such a website was mentioned as an important problem for open opportunities. 2) The consideration of different profiles was also interesting, raising the point of invisible issues that also need inclusion.*

MEDIUM RELEVANCE

- Community building for positive research culture — 10. Pay sufficient attention to the psychological health and well-being of research group members and the people who lead them.
    - *Here a point was raised about the true confidentiality of such channels, for example in bullying and harassment issues. Would researchers prefer discussing such issues with internal support or with independent support outside the institution?*
- Managing competition and publication pressure — Research environment: 1. **Ensure that researchers have the freedom of setting their own research agenda**
    - *Research freedom is a basic right of researchers, but some participants stated it was not always the case.*
- Managing competition and publication pressure — Publications and workload: Ensure that published research is open and transparent
- Diversity and inclusion — **6. Encourage and respect researchers' personal decisions to foster diversity issues even if they limit or reduce researchers' activities**
    - *Do researchers hold such standards or do they feel pressure from their institution to notabide diversity and inclusion standards, if it makes them miss academic opportunities?*

Note: the points raised in the RFOs may be better suited to address in a survey with funders and RPO leaders and management.

RFOs: Monitoring of funded projects – Selected Points

MEDIUM RELEVANCE

- Execution of research grants **— 2. RFOs should monitor: f. Societal impact only to certain extent**
    - To what extent should RFOs monitor societal impact? This was noted by the RFO team as problematic
- Execution of research grants **— 2. RFOs should not monitor: d. Subcontractors (except in case of misconduct or where marginal monitoring is needed**
    - This was noted by the RFO team as a topic that could benefit from input in the survey
- Compliance with RI requirements — **3. RFOs should support a better RI culture and infrastructures**
    - This comment was noted as imprecise and problematic since RI culture is not defined. How can this be done, and what is a better RI culture?
- Execution of research grants — **3. RFOs should not monitor international/national legislation, internal rules of each single institution, RPOs/PIs relations with the sub-contractors (except in case of misconduct and where marginal monitoring if needed).**
    - This topic may go against EU regulations.
- Compliance with RI requirements — **4. RFOs should monitor if investigation procedures in case of RI breaches are in place in the RPO that is hosting the funded project**
    - Possible country difference on this

RFOs: Selection and evaluation of proposals – Selected Points

HIGH RELEVANCE

- Diversity issues — **3. The RFO will undertake action towards eliminating the pay gap and monitor progress, examining bias as a contributing factor to pay gap.**
    - *This point raised a controversy, as can be seen in the more specific points:*
        - *(a) The RFO will monitor precarious contracts and part-time positions for any gender-based differences and correct any inequalities. RPOs should examine conditions for part- time positions for researchers and their gendered division.*
        - *(b) Pay gap measures are NOT the responsibility of RFOs*

    More specifically, it was noted that "There is some disagreement between first set of workshops (point a) and second set of workshops (points b to d) concerning the degree of responsibility for RFOs concerning the pay gap which is normally a national/RPO responsibility" as a result, it may be important to question the views of

RFOs and researchers on this question, and to also investigate in which settings this pay gap is most problematic

RFOs: Independence – Selected Points

HIGH RELEVANCE

- Preventing interferences from political/other external influences — **3. The committee members of research funding programs should be regularly screened for potential political interference**
    - *The points raised disagreement between CCW participants and may benefit from a second look in the survey*
- Preventing interferences from political/other external influences — **5. RFOs should (ideally) allocate their money freely without political/external/commercial interference unless specific research priorities have been already set, specific calls or specific allocation of money depending on disciplines**
    - *This might not be realistic since the EU is a political union and their decision on the funding programmes is political.*
    - **MEDIUM RELEVANCE**
- What counts as unjustifiable inference — **4. RFOs should take into account diverse considerations/differences when developing a definition of unjustifiable interference**

  Point c goes on to say RFOs should take into consideration institutional, national, cultural, institutional and local differences differences.

6. APPENDIX

6.1 Information about the workshops

Information about the workshop

About the project

In the Standard Operating Procedures for Research Integrity Project (SOPs4RI, www.sops4RI.eu), we aim to develop a publicly available toolbox containing standard operating procedures (SOPs) and guidelines for research integrity targeted at research performing and funding organizations. The organizations can use our toolbox to develop their own institutionally tailored research integrity promotion plans.

Purpose of the workshop

Based on insights gained during earlier empirical work conducted in the project, one of the topics we would like to include in our toolbox is the topic (and subtopics) addressed in your session. For a description of what we mean with the topic and the subtopics, please see:

- https://osf.io/jc6u2/ (RPOs)
- https://osf.io/82dwk/ (RFOs)

We have already looked into existing resources on this topic and its subtopics, but there are still gaps in our knowledge of how to address this topic.
During the co-creation workshop, we would like to work together with you and other experts to co-create content on the guidelines/SOPs for this topic in our toolbox.

What you can expect during the workshop

We have prepared a set of co-creation exercises to complete together during the workshop, with the goal of creating content on the guidelines/SOPs for your topic. We will be using Zoom to connect to each other and the collaborative whiteboard software MIRO to complete the exercises.

We would like to audio and video record the entire workshop using Zoom, and will handle all data in line with the EU's GDPR. To read more about our privacy policy, please read here: https://osf.io/5zjkg/

What you can expect before the workshop

To familiarize you with the software we are using for the workshop, we will email you to schedule a short one-on-one call with you of maximum 30 minutes. One of the members of the co-creation team will provide you with the opportunity to ask any questions about the session and its practicalities.

Additionally, we are sending you some inspirational material for the session based on earlier empirical work done in the SOPs4RI project. **We would appreciate if you would have a look at the inspirations and complete a short assignment based on your first impressions**. We would advise you to complete the assignment before the date of the workshop.

6.2 Information letter - SOPs4RI Co-creation workshops

Name + contact details of researchers:

Centre for Biomedical ethics and law – University of Leuven

Prof. Dr. Kris Dierickx (kris.dierickx@kuleuven.be)

Drs Daniel Pizzolato (daniel.pizzolato@kuleuven.be)

Kapucijnenvoer 35, Blok D, Box 7001 3000 Leuven/Belgium

Amsterdam University Medical Centers, Location VUmc

Department of Medical Humanities

Dr. Joeri Tijdink (j.k.tijdink@amsterdamumc.nl)

Drs. Krishma Labib (k.labib@amsterdamumc.nl)

MF-F037, De Boelelaan 1089a (ingang Uilenplein) Amsterdam, Netherlands

Dear Sir, Dear Madam,

The co-creation workshops are part of SOPs4RI, an international research project funded by the European Commission in the H2020 program. The goal of SOPs4RI is to create a publicly available toolbox for research integrity (RI) containing standard operating procedures (SOPs) and guidelines for research performing and funding organizations (RPOs and RFOs). RPOs and RFOs can use the toolbox to design and implement their own institutional research integrity promotion plans.

This letter contains details about the co-creation workshops, so you can make an informed decision whether you would like to participate.

1. Aim of the workshops

The SOPs4R co-creation workshops have two main aims:

1. Generate content for SOPs and guidelines for research integrity (RI) on topics/subtopics that will be addressed in the SOPs4RI toolbox, that are not already covered by existing resources (or high-quality existing resources).
2. Analyze and improve content for SOPs and guidelines for RI on topics/subtopics that are already covered by good existing resources, taking into account implementation issues.

2. What is involved?

If you would like to participate, we will invite you to participate in one or more workshops. The workshops will last two half days, the afternoon of the first day and the morning of the second one, or a full day.

3. Benefits and risks of participating

The direct benefits of participating in the research are that participants can share experiences and opinions about RI related guidance and SOPs. Moreover, the participants can contribute to the development of new and implemented guidelines and SOPs. However, the benefits are indirect; the research community as a whole will accrue them. One risk associated with the workshops is other people knowing the details about your personal input. Efforts to minimize this risk include asking all participants a confidentiality agreement and to avoid the use of identifying characteristics.

4. If you do not want to join or want to stop participation in the co-creation workshops.

Participation is voluntary. If you do not want to participate, you do not have to do anything, and you are not required to let us know. If you decide to participate, you must sign the attached informed consent form and return it via email prior to the workshop. If you have agreed to participate but change your mind, you can of course without any consequences, withdraw participation at any point

without providing any reasons. We ask you kindly to inform us if you would like to stop participation at any point.

5. Use of data and dissemination of research findings to participants

The workshop will be recorded, and written notes will be taken; all data will be anonymized Informed consent forms will be stored separately from the discussion transcripts. The audio recordings will be destroyed whereas the notes of the workshop will be kept for up to 5 years after the end of the study on Aarhus University's Sharepoint servers. Moreover, pictures of materials produced by participants (i.e. not pictures of the participants themselves) will be taken during the workshops. Each workshop will be video recorded in order to complement the information collected during each session. The video recording will be destroyed after the analysis of the related co-creation workshop. The findings from the co-creation workshops will also be analyzed, published and made publically available on the Project's page on the European Commission research information portal: https://cordis.europa.eu/project/rcn/221389/factsheet/en.

6. Financial aspects

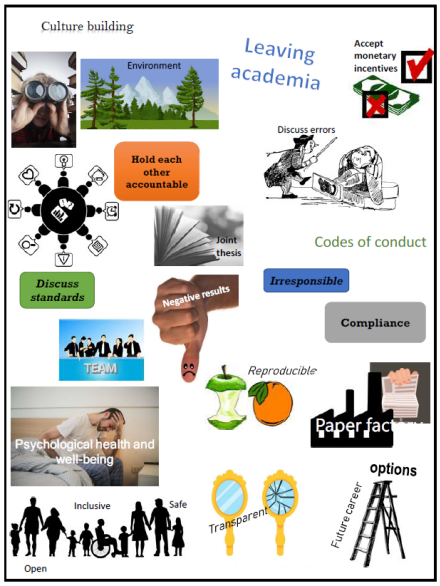
There is no fee paid for participation. The project will pay for travel and accommodation of the participants

7. Do you have any questions/complaints?

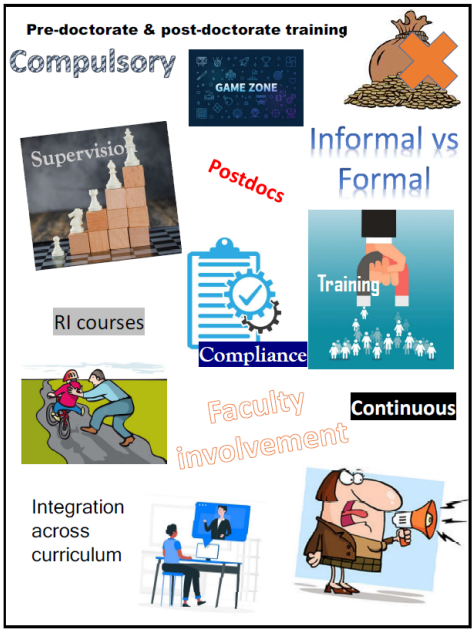
Please do not hesitate to contact us if you have any questions.
For any complaints or other concerns regarding this study, You can contact the Social-Ethics Committee of KU Leuven: smec@kuleuven.be

6.3 Sets of inspirations

6.3.1 Research Environment



6.3.2 Education and training in RI



6.3.3 Responsible supervision and mentoring

6.3.4 Independence

6.3.5 Selection and evaluation of proposals

6.3.6 Monitoring of funded project

6.4 Instructions for facilitators and co-facilitators (SET 1)

6.4.1 Example of instructions for facilitators

Facilitator instructions for SOPs4RI workshops on 'Research environment

- **Introduction**

Duration: 20 minutes (15 minutes introduction by the facilitator, 5 minutes introduction of participants)

Objective: To introduce the workshop, make participants feel comfortable, and get them familiarized with the inspirations

- **Steps**

Before the session starts: both the facilitator and co-facilitator open MIRO on a separate window on their laptop and start recording the screen using Xbox Game Bar (Once the MIRO window is open, open Xbox Game bar, and click on record with the sound muted)

1. Start the ZOOM session with the co-facilitator as a Host. **The co-facilitator starts recording on Zoom.**
2. **Ask all participants who arrive early in the zoom session to read each other's' inspirations**
3. Welcome the group to the SOPs4RI co-creation workshop and mention that the Zoom call is being recorded, and that we will transcribe the recordings and process all the data in line with the GDPR.

Briefly introduce SOPs4RI, yourself and the co-facilitator.

- Explain that the facilitator is there to help structure the process, but that the participants are the experts.
- Mention that the co-facilitator is there to help out with technical issues. If there are any technical questions/issues, participants can use the Zoom chat to talk to the co-facilitator. The Zoom chat should only be used to communicate with the co-facilitator.

4. Ask the co-facilitator to provide the participants with the link to the MIRO board in the Zoom chat. Invite participants to follow the link.
5. Tell participants that they can minimize their screens so that they have MIRO open on half the screen and Zoom on the other half. Alternatively, they can also just work on MIRO (and do 'speaker view' on ZOOM), and the facilitator will ask them to come back to Zoom from time to time.

6. Show the participants the MIRO board & the agenda for the day (Use the 'Bring everyone to me' feature on MIRO).
    - Show them that they can find information about MIRO & the SOPs4RI project at the bottom
    - Show them the inspirations which we would like them to look at when completing the exercises
    - Show them that we have a set of exercises including breaks in between
    - Mention to them that if they are overwhelmed by everyone's cursors on the screen, they can click on 'Hilde collaborator's cursors' on the arrow on the top of the board.
    - Zoom in on the introduction board (Use 'Bring everyone to me' feature again)
7. Introduce the topic of this workshop: Research environment. This topic has to do with what institutions need to do in order to nurture a supportive research environment. The topic comprises of a few subtopics, the following of which we will cover during the workshop:
    - Culture building – How institutions can build a responsible research culture at the institution.
    - Managing competition & publication pressure – How can institutions reduce these burdens for researchers and deal with their negative consequences?
    - Adequate education & skills trainings – This is not about RI education, as we have a separate topic on that. This is about the measures research institutions should take to ensure that their researchers have the necessary qualifications and skills.
    - Diversity issues – How can research institutions build an inclusive research environment that respects diversity?
8. Mention that we have selected this as an important topic in our prior empirical work of the project (reviews, Delphi, interviews, focus groups), but that the topic is quite underdeveloped.
9. Introduce the goals of the workshop: generating ideas for skeleton guidelines per subtopic.

"By skeleton guidelines, we mean rough version drafts of a guideline. They have to form the backbone of the guidelines. They do not have to be comprehensive yet, as we will add on more details to them in the course of the project. For example, it would be good if after the workshop, we have a set of items (e.g. 5-10) in the form of a list or a flowchart or recommendations that can form the 'skeleton guideline', or in other words, the backbone of the full guideline."

10. Mention the approach to the workshop (and go towards the introduction on the board to show the approach, and 'bring everyone to me'):
    - Participants should use the sticky notes to put their thoughts down, and organize them. They have already selected a sticky note color in the sensitization exercise, and they should continue to use that sticky note color throughout the workshop. Ask

participants to use keywords on the sticky notes which are easy to read, and not paragraphs.

- Mention that each exercise will consist of an individual part, followed by a group part.
    - For the individual exercises, the focus is on creating many ideas using the sticky notes. The quality of the ideas doesn't matter, because we can refine the ideas during group discussions.
    - During the discussion part of the exercise, mention that you will ask the group to come back to Zoom to discuss the individual ideas they put down. If necessary, the co-facilitator can help here to make notes. When doing the exercises together in the group, discussion is very much encouraged.

11. Explain that participant should not put any personal/institutional material on the MIRO board, because the privacy settings on MIRO are not compatible with our privacy policy.
12. Mention that we are also recording the MIRO board.
13. Invite the participants to take turns and introduce themselves. Ask each participant to keep their introduction short, by only using one sentence to present each of the following points (5 minutes):
    - Their name and affiliation
    - The three inspirations they selected as striking during the sensitization exercise
    - One reason for selecting one of the inspirations.

- **Building culture**

Duration: 30 minutes

Objective: Generate ideas for skeleton guidelines on 'Building culture"

Steps:

1. Take participants to the board on 'Building culture' ('Bring everyone to me'). Zoom in to the inspirations above the board and tell participants to look there, and then zoom in to the board afterwards.
2. Invite participants to take two minutes to write down at least 2 things that come to mind when they think of a good research culture (3 minutes).
3. Read out the participants' responses and ask them to keep that in mind for the next part of the exercise. Move down the board. (2 minutes)
4. Ask participants to individually think of about ~3 measures (more is welcome!) that research performing organizations should take to build a good research culture (3 minutes).

5. Ask the group to cluster the measures mentioned in the sticky notes inductively based on similarities and differences (10 minutes). The following procedure might be helpful here:
    a. Ask one participant to start by explaining one sticky note and moving it to the top right-hand corner of the board.
    b. Ask the other participants with sticky notes that are similar to also move their sticky notes close to that one, in order to form a cluster.
    c. Ask the next participant to explain a different sticky note and move it to a different part of the board.
    d. Ask the other participants with sticky note that are similar to also move their sticky notes close to that one, in order to form a second cluster.
    e. Repeat until all the sticky notes have been clustered.
6. Ask the participants to move back to Zoom now and ask the co-facilitator to share their MIRO screen on Zoom. Ask participants to think of a label for each cluster. The co-facilitator should help with writing down the cluster labels and moving them to the right location on the board (5 minutes).
7. Ask participants whether any additional clusters or measures should be added and whether they are satisfied with the current clusters (4 minutes). The co-facilitator will help to make notes of any additional points/clusters mentioned here.
8. The facilitator will read the cluster labels mentioned by the participants to summarize the exercise outcomes. (1 minute)

- **Managing competition and publication pressure**

Duration: 25 minutes

Objective: Generate ideas for skeleton guidelines on 'Managing competition and publication pressure"

Steps:

1. Take participants to the board on 'Managing competition and publication pressure' ('Bring everyone to me'). Zoom in to the inspirations above the board and tell participants to look there, and then zoom in to the board afterwards.
2. Ask participants to individually think of about ~3 measures (more is welcome!) that research performing organizations should take to manage competition and publication pressure. Ask them to write these down on the left of the board (3 minutes).
3. Ask the group to cluster the measures mentioned in the sticky notes inductively based on similarities and differences (10 minutes). The following procedure might be helpful here:

   a. Ask one participant to start by explaining one sticky note and moving it to the top right-hand corner of the board.
   b. Ask the other participants with sticky notes that are similar to also move their sticky notes close to that one, in order to form a cluster.
   c. Ask the next participant to explain a different sticky note and move it to a different part of the board.
   d. Ask the other participants with sticky note that are similar to also move their sticky notes close to that one, in order to form a second cluster.
   e. Repeat until all the sticky notes have been clustered.
4. Ask the participants to move back to Zoom now and ask the co-facilitator to share their MIRO screen on Zoom. Ask participants to think of a label for each cluster. The co-facilitator should help with writing down the cluster labels and moving them to the right location on the board (5 minutes).
5. Ask participants whether any additional clusters or measures should be added and whether they are satisfied with the current clusters (4 minutes). The co-facilitator will help to make notes of any additional points/clusters mentioned here.
6. The facilitator will read the cluster labels mentioned by the participants to summarize the exercise outcomes. (1 minute)

- **Adequate education and skills training**

Duration: 25 minutes

Objective: Generate ideas for skeleton guidelines on 'Adequate education and skills training'

Steps:

1. Take participants to the board on 'Adequate education and skills training' ('Bring everyone to me'). Zoom in to the inspirations above the board and tell participants to look there, and then zoom in to the board afterwards.
2. Ask participants to write down what hard and soft skills/virtues they think that researchers should have (3 minutes):
   - Focus on early and mid-career researchers in the morning session
   - Focus on more established researchers in the afternoon session
3. Read through all the skills mentioned on the board (2 minutes)
4. Ask participants to vote for the skill they find most important, by copy and pasting the dot on the right which matches their sticky note color on the idea they would like to vote for (3 minutes). The co-facilitator should help participants here by ensuring that the dots appear in front of other objects (either by cut and pasting them, or right-clicking on the object and selecting 'Send to back').

5. Ask the co-facilitator to copy and paste the skills that have been voted for under 'Skills' in the blue box in the middle of the board.
6. Ask participants to come back to Zoom and ask the co-facilitator to share their MIRO screen on Zoom. Follow the following procedure to fill in the blue box on the board (10 minutes):
    a) Ask the first participant to pitch what they voted for (1 sentence)
    b) Ask the participant which measure a research institution can take ensuring that skill under the section 'What research institutions can do to ensure that researchers have this skill'. The co-facilitator writes this on their sticky note.
    c) Ask the next participant to first comment on the previous participant step b. The co-faciltator writes down their comments. General comments from other particpants can also be added.
    d) Repeat steps until the circle is complete
    - The co-facilitator should ensure that they make notes using the participants' own words, rather than summarizing what was said in other words.
    - Once the final participant has spoken, invite the first participant to comment on what the final participant mentioned (1 sentence).
7. Ask each participant to pitch in one minute what their takeaway message from this exercise is. As they share their ideas, the co-facilitator makes notes of this on the bottom of the board, under 'What are the takeaway messages' (5 minutes).
8. The facilitator should double check whether what is written down matches what the participants had in mind by reading through the list of points at the end (and hence, providing a summary).

- **Diversity issues**

Duration: 30 minutes

Objective: Generate ideas for skeleton guidelines on 'Diversity issues'

Steps:

1. Take participants to the board on 'Diversity issues' ('Bring everyone to me'). Zoom in to the inspirations above the board and tell participants to look there, and then zoom in to the board afterwards.
2. Invite participants to take two minutes to fill in at least one idea in each of the boxes on the top on (2 minutes):
    - What a diverse and inclusive research environment entails
    - What the challenges to a diverse research environment are
3. Read out the participants' responses and ask them to keep that in mind for the next part of the exercise. Move down the board. (2 minutes)

4. Ask participants to individually think of about ~3 measures (more is welcome!) that research performing organizations should take to create an inclusive research environment that respects diversity (3 minutes)
5. Ask the group to cluster the measures mentioned in the sticky notes inductively based on similarities and differences (10 minutes). The following procedure might be helpful here:
    - Ask one participant to start by explaining one sticky note and moving it to the top right-hand corner of the board.
    - Ask the other participants with sticky notes that are similar to also move their sticky notes close to that one, in order to form a cluster.
    - Ask the next participant to explain a different sticky note and move it to a different part of the board.
    - Ask the other participants with sticky note that are similar to also move their sticky notes close to that one, in order to form a second cluster.
    - Repeat until all the sticky notes have been clustered.
6. Ask the participants to move back to Zoom now and ask the co-facilitator to share their MIRO screen on Zoom. Ask participants to think of a label for each cluster. The co-facilitator should help with writing down the cluster labels and moving them to the right location on the board (5 minutes).
7. Ask participants whether any additional clusters or measures should be added and whether they are satisfied with the current clusters (4 minutes). The co-facilitator will help to make notes of any additional points/clusters mentioned here.
8. The facilitator will read the cluster labels mentioned by the participants to summarize the exercise outcomes. (1 minute)

- **Guidelines format**

Duration: 15 minutes

Objective: To explore which guideline formats participants prefer.

Steps:

1. Take participants to the board using the option 'Bring everyone to me'. Zoom in to the inspirations above the board and tell participants to look there, and then zoom in to the board afterwards.
2. Mention to participants that guidelines can take different formats. For instance, they can be prescriptive or advisory, detailed or general, PDFs or PPTs, etc.
3. Mention that in this exercise, we would like to explore which types of guideline formats could be suitable for this topic.

4. Introduce participants to the 3 example guidelines shown on the board:
    a. COPE's guidelines on ethical editing to new editors – short guidelines with 3 points
    b. TENK's guidelines on dealing with breaches – flowchart showing a procedure
    c. ORI's tips for plagiarism, with the main points summarized colorfully in a poster and some details on the side.
5. Ask each participant to individually write down their main impression of each guideline format, keeping in mind the questions (3 minutes):
    a. Would such a guideline format be appropriate for this topic?
    b. Is there another guideline format that would be more appropriate?
6. Ask each participant to share what they've written, and invite the next participant to add a different type of insight. (5 minutes)
7. Ask all participant to come back to Zoom. Ask the co-facilitator to share their MIRO screen on Zoom.
8. Have each present pitch what they think the most important consideration is when it comes to the guideline format for this topic.
    a. The co-facilitator should make notes of the discussion by adding sticky notes to the 'Conclusion' part of the board. The co-facilitator should make sure that the notes only represent the participants' own words.
    b. The facilitator should double check whether what is written down matches what the participants had in mind by reading through the list of points at the end (and hence, providing a summary).

- **Conclusion and evaluations**

Duration: 20 minutes

Objective: Wrap up the discussion & evaluate the session

Steps:

1. Thank the participants for their time and contribution.
2. Let them know what the next steps are:
    - Use their inputs to create V1 guidelines for the subtopics discussed
    - Participants have the chance to add additional input either during the next co-creation workshops, or later via email.
    - In terms of privacy, we will delete all the video footage, and store the audio recordings and transcriptions in line with the GDPR.
    - Anonymized data will be used for publications; we will ask for permission to acknowledge participants in the publications.

- Mention to participants that we would also like to do a short (max. 30 min) informal follow up interview to evaluate the workshop with one of the participants. Ask if anyone would like to volunteer for this, in which case we will approach them later with more information. If no one volunteers, mention that we will send a follow up email with this information. à after the workshop, send Krishma info on who volunteered.

3. Invite participants to engage in one last exercise before leaving, by selecting one or two of the pictures on the board (or they can search for another picture), which can represent:
    - How participants experienced the session
    - Their takeaway message from the workshop
4. Ask them to copy and paste the image into the box with their sticky note on it, and mention that they can also add sticky notes to explain their thoughts. Provide them with 3 minutes to do this.
5. Ask each participant to pitch what pictures they have selected and why. Let them end by having a loose discussion and ask them to turn away from the MIRO board, back to Zoom, to share their thoughts and experiences.

- **Optional additional discussion**

Duration: max. 60 minutes

Objective: To provide participants the opportunity to provide additional input.

If participants would like to stay longer to discuss the topic, use the following questions to guide a discussion:

Morning session: We are conducting the same workshop again this afternoon, with different participants. Is there something from the morning session that you would like us to share with the afternoon group (e.g. conclusions of an exercise)?

Afternoon session: We conducted the same workshop with different participants this morning. Here is a screenshot of the morning group's results (the co-facilitator pastes the board of the morning session). Let's compare the morning and afternoon session's results. Can you help us to sort out the differences and similarities?

Questions for both sessions:

- What did you think about the session?
- What did you think about the content we created?
- Is there anything we missed?
- Would such guidelines be helpful for you? For your institution?

- What new insights have you gained today from the workshop?
- Do you have any advice for the SOPs4RI project?
- What do you think is the biggest challenge for 'Research environment'?

Also, consider going back to the filled in boards, and identifying any areas which can be developed further.

- **After the session**

Stop the Zoom and MIRO screen recordings. Save the files on a secure drive, to be transferred to SharePoint later.

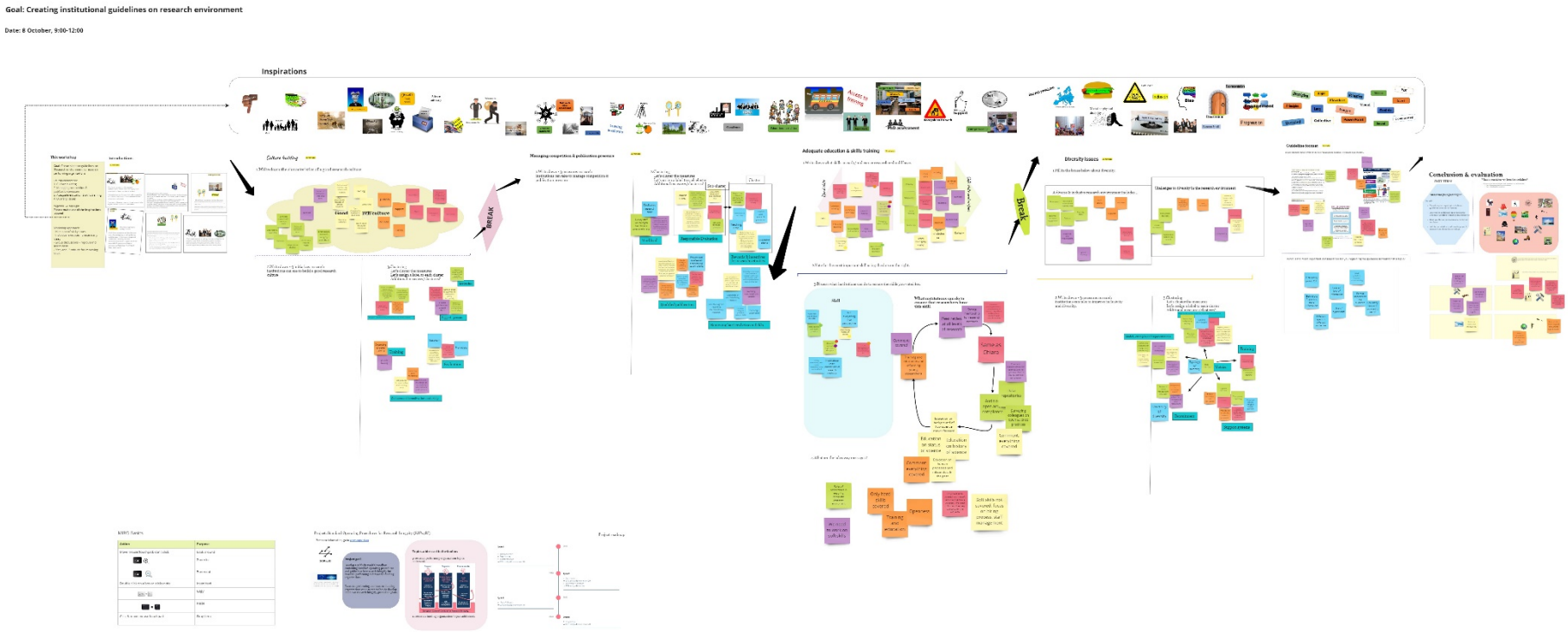
1. After the morning session, consider if/when/how the outcomes of the morning session should be presented to the participants in the afternoon workshop.
2. Send Krishma the info on who volunteers to take part in the follow up interview.
3. Discuss which participants would be good to invite to the November workshop. Inform Daniel about this by mid-October.
4. Save the data files (Zoom, MIRO, screenshots) on Sharepoint under the file WP4 à co-creation workshops à data à October 21 à topic à morning/afternoon.

6.4.2 Instruction for co-facilitators

- Make sure that the participants' sensitization exercise (the inspirations they've selected in the 'striking inspirations' exercise and reasoning about it) is copy and pasted to the session introduction board and looks nice.
- Add the names of the session participants to the sticky notes on the session board.
- Meet up shortly before the session with the facilitator to discuss how to split the responsibilities between the facilitator and co-facilitator (i.e. if the facilitator needs help with any additional items than what can be found below).
- Provide participants with the correct MIRO link in Zoom chat.
- Take care of the chat (both on MIRO & Zoom)
- When participants are lost on the board, use the 'Bring everyone to me' option to show them the right screen

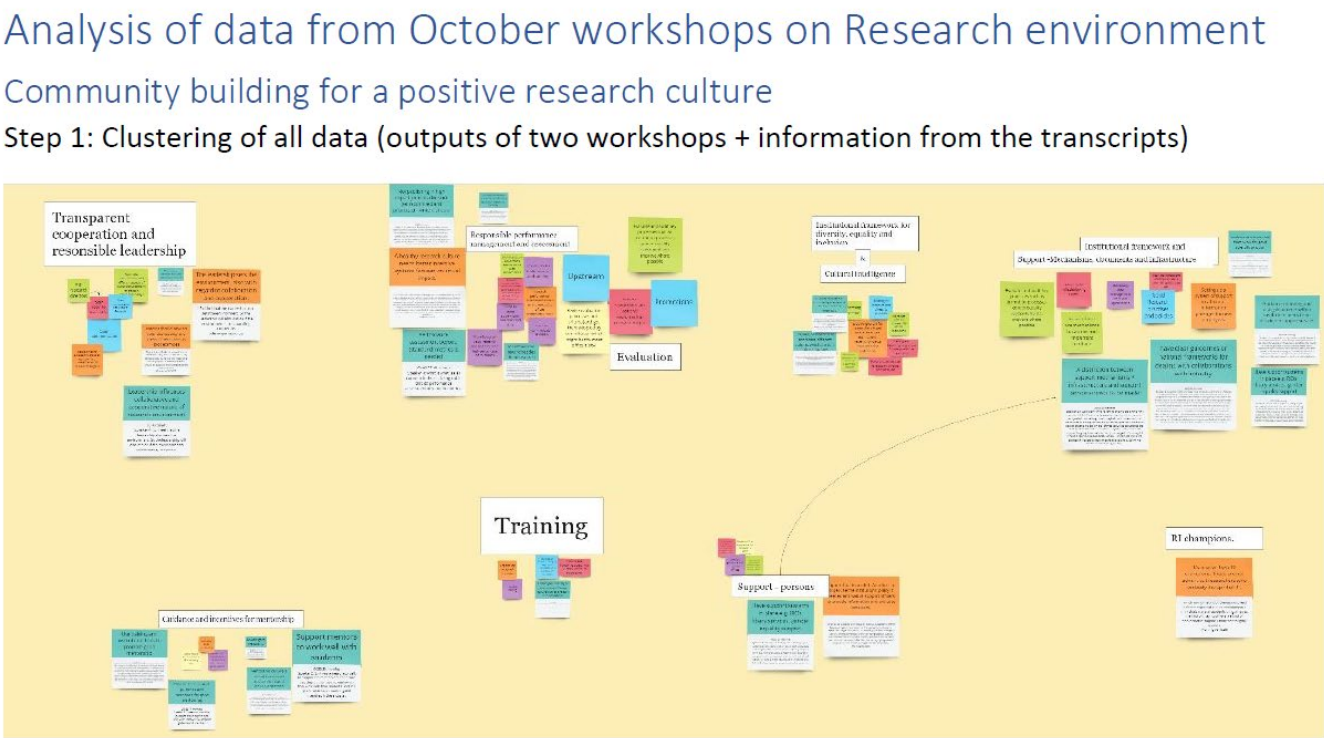
- Help the facilitator keep track of the time. Don't use the the timer on the bottom of the MIRO board; communicate how much time is left on the Zoom chat with the facilitator (privately).
- When things get moved/deleted from the board, recover the board by bringing things back to the place they should be.
- Take regular screenshots of the workshop process
- After each exercise is complete, save the board as a PDF.
- Ensure that when participants are placing sticky notes and dots on the board, that they don't get hid behind other objects (by right clicking on the other objects and selecting 'Bring to back; or cutting and pasting the sticky note/dot).
- When the participants are asked by the facilitator to come back to Zoom and not use the MIRO board, make notes of the discussion on separate sticky notes at the bottom right of the respective board. Make sure to use the actual words that participants use and to **not interpret** their points. In case of doubts, ask participants whether what you've written represents what they have in mind well.

6.5 Example of Final MIRO boards SET 1 CCWs session boards



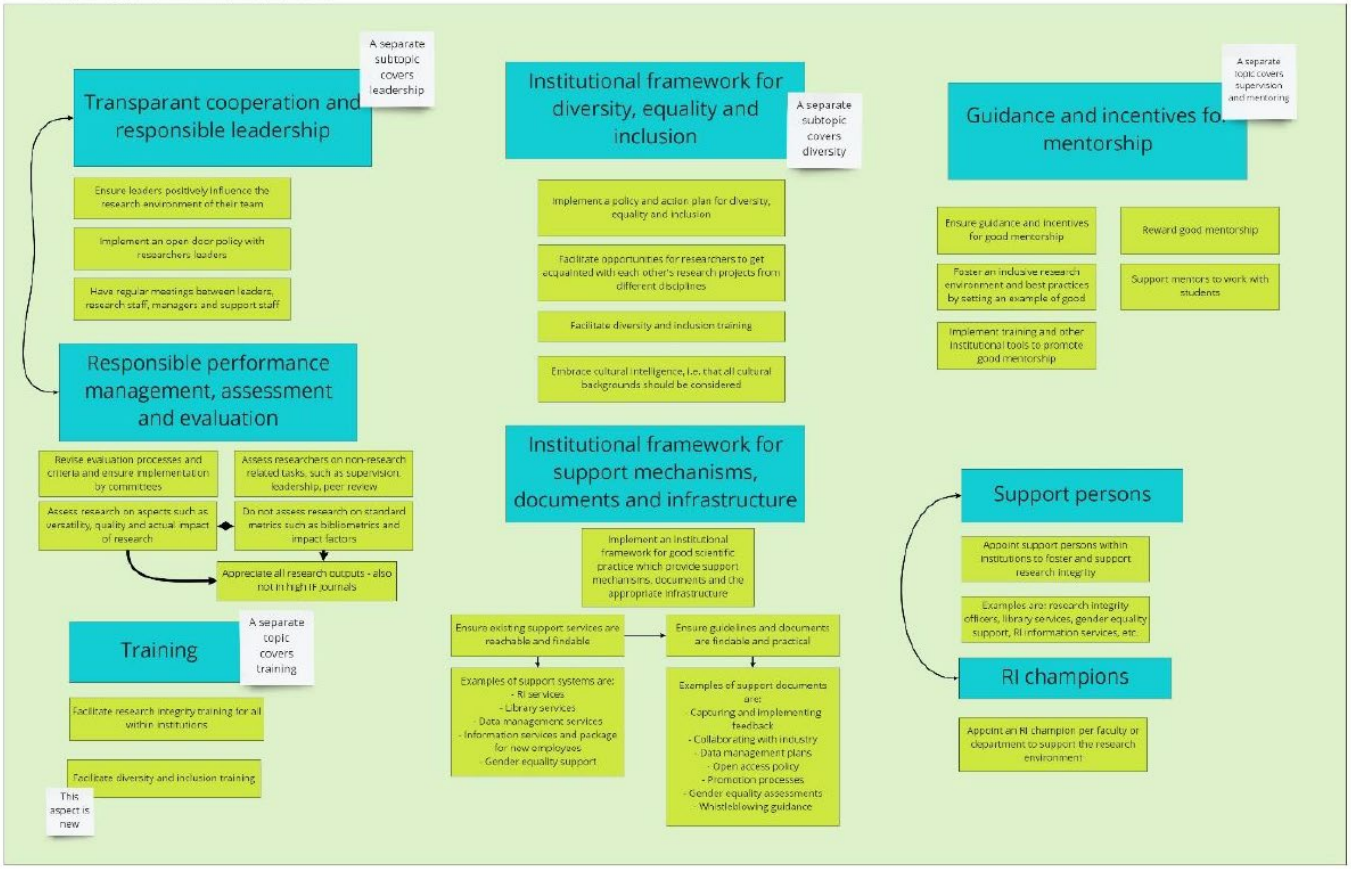
6.6 Analysis posters SET 1 CCWs session boards

6.6.1 Research environment



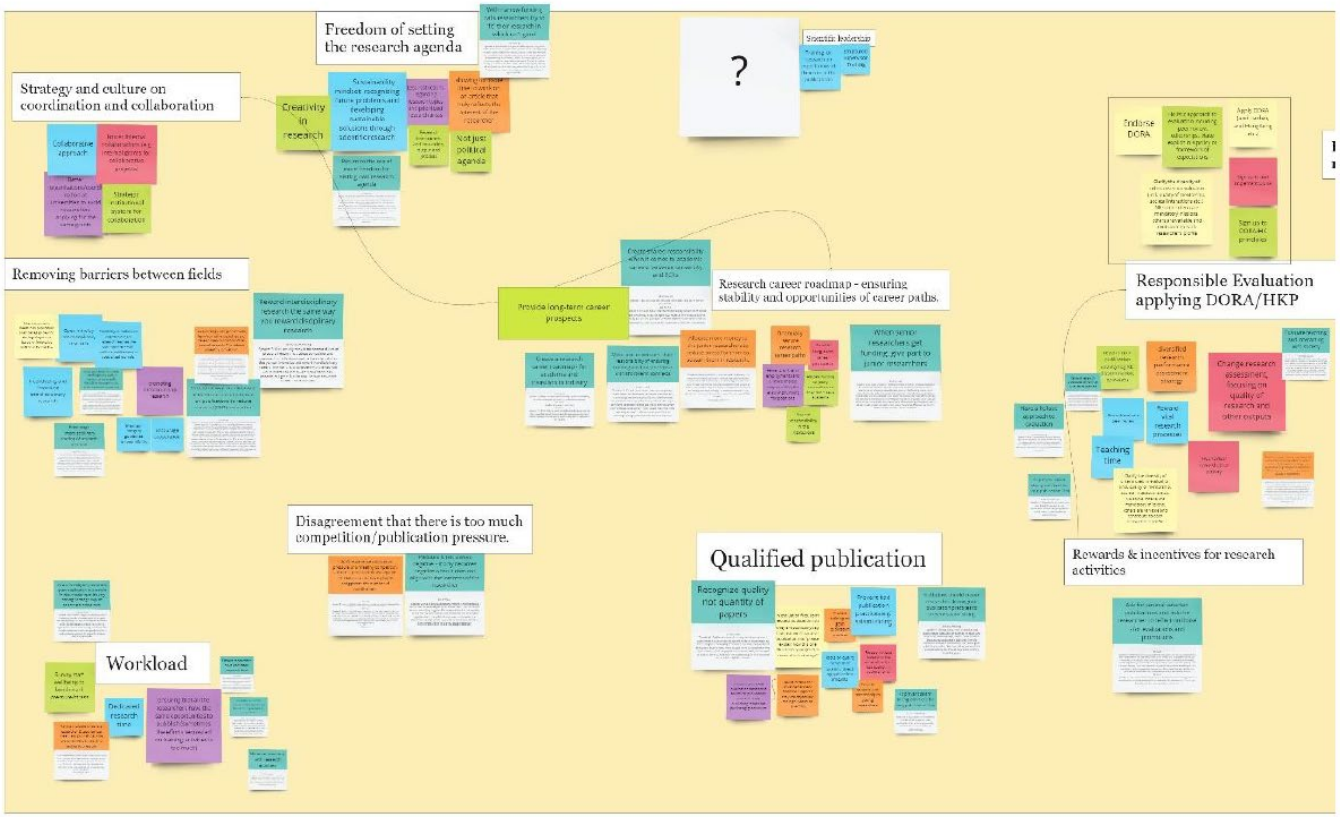
Step 2: Exploring the relationships between the clusters & presenting the results

b. Add pictures/graphics/visuals which help to explain the ideas



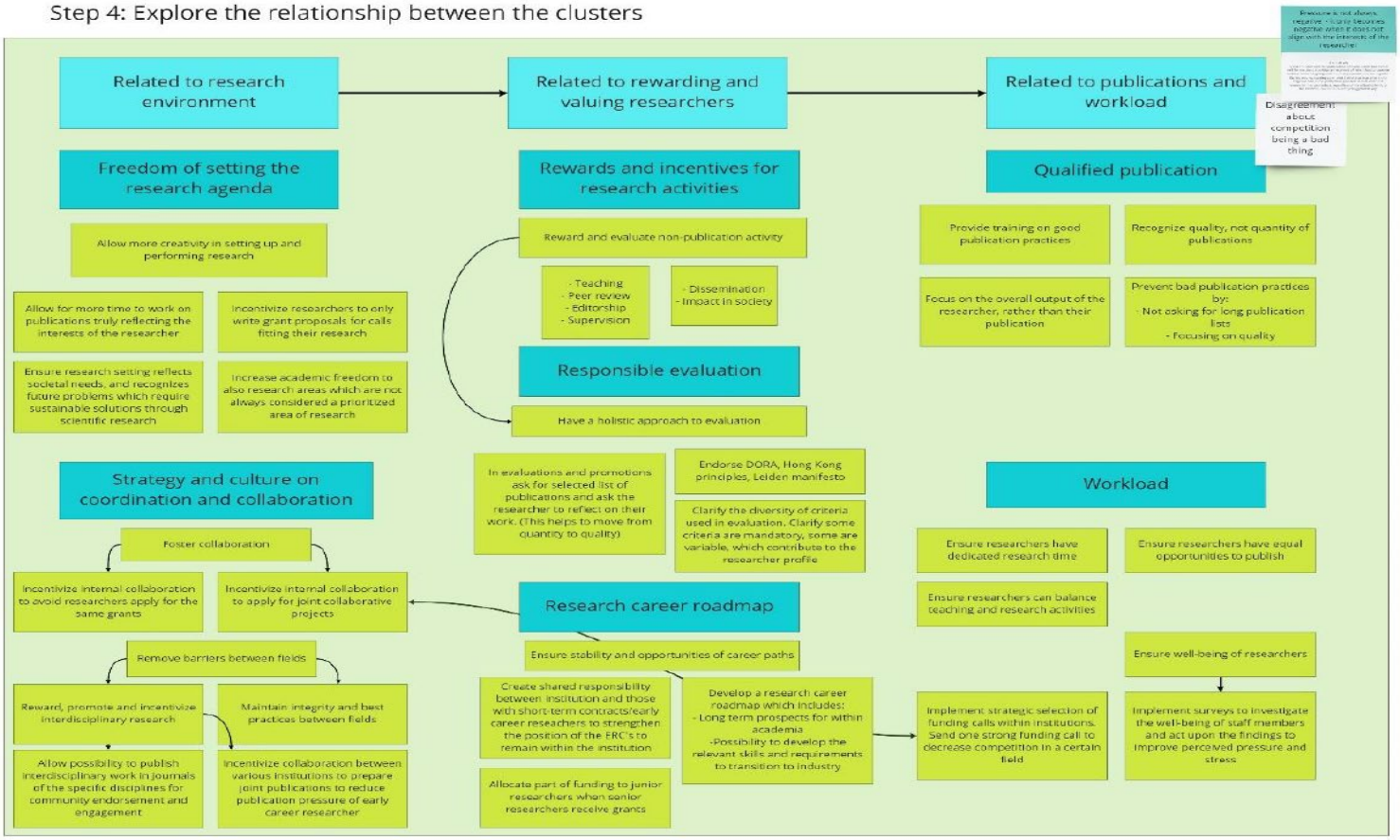
Managing competition and publication pressure

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)



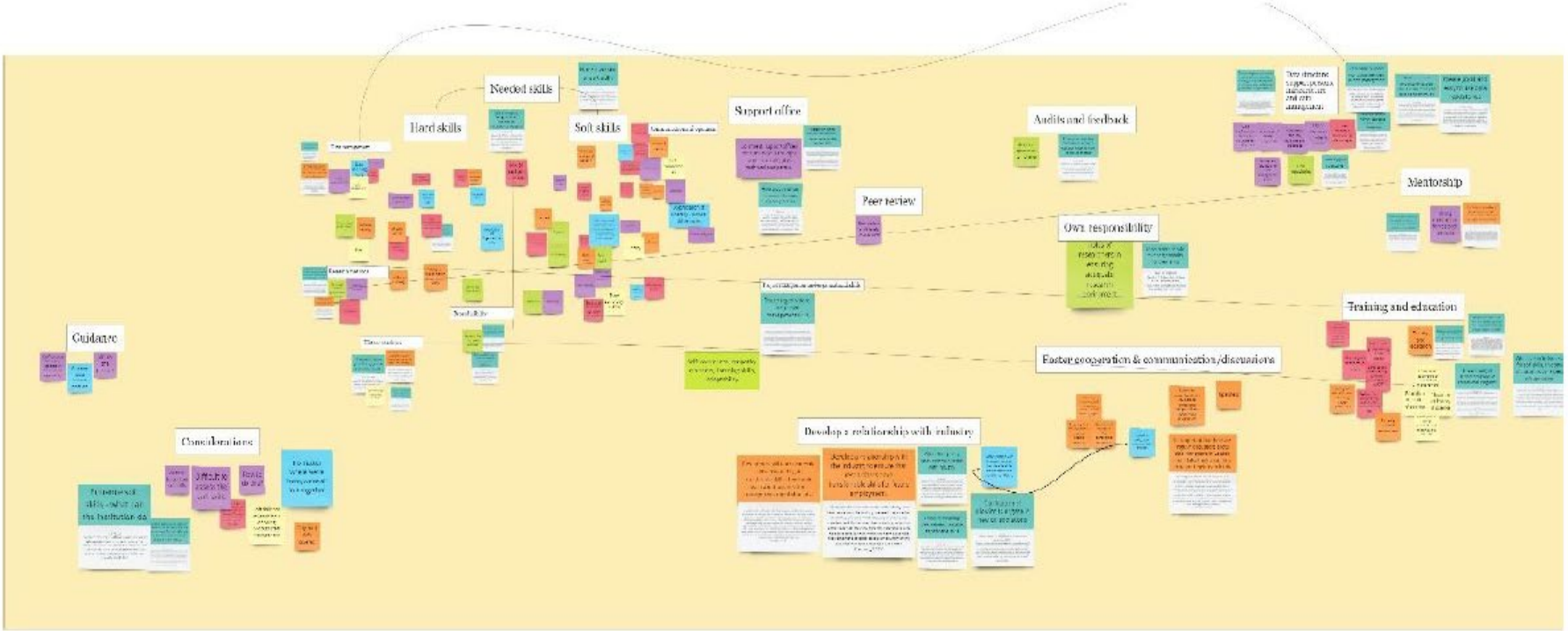
Step 2: Exploring the relationships between the clusters & presenting the results

Step 4: Explore the relationship between the clusters

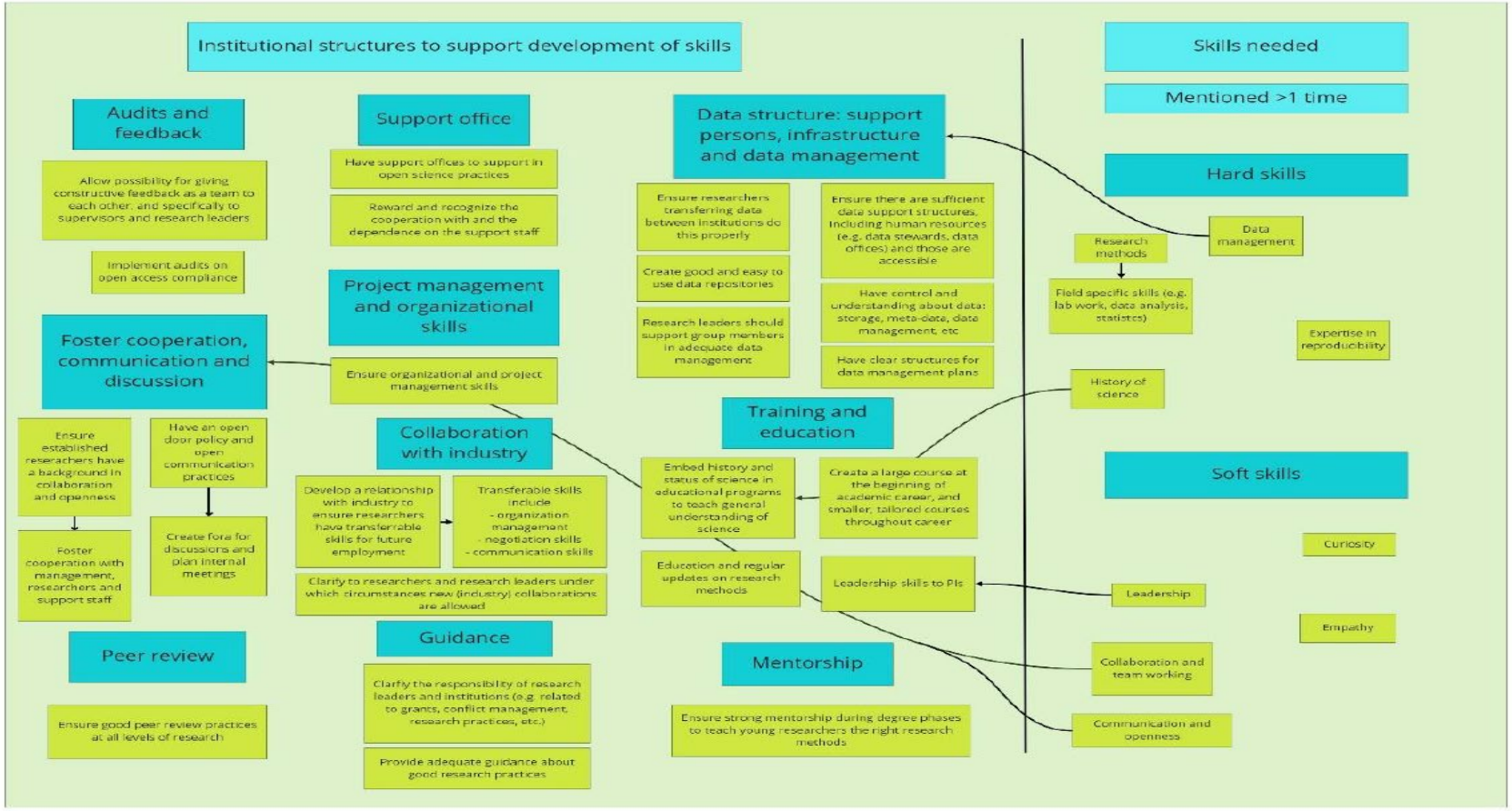


Adequate education and skills training

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)

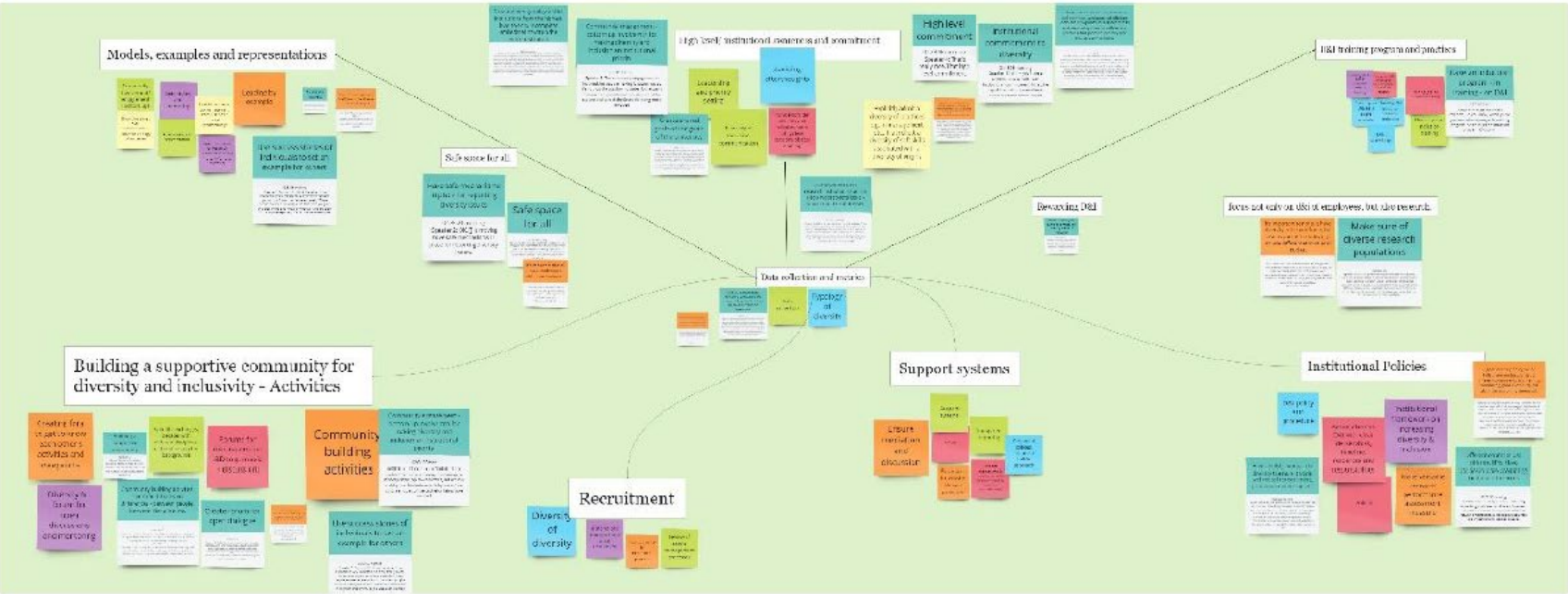


Step 2: Exploring the relationships between the clusters & presenting the results

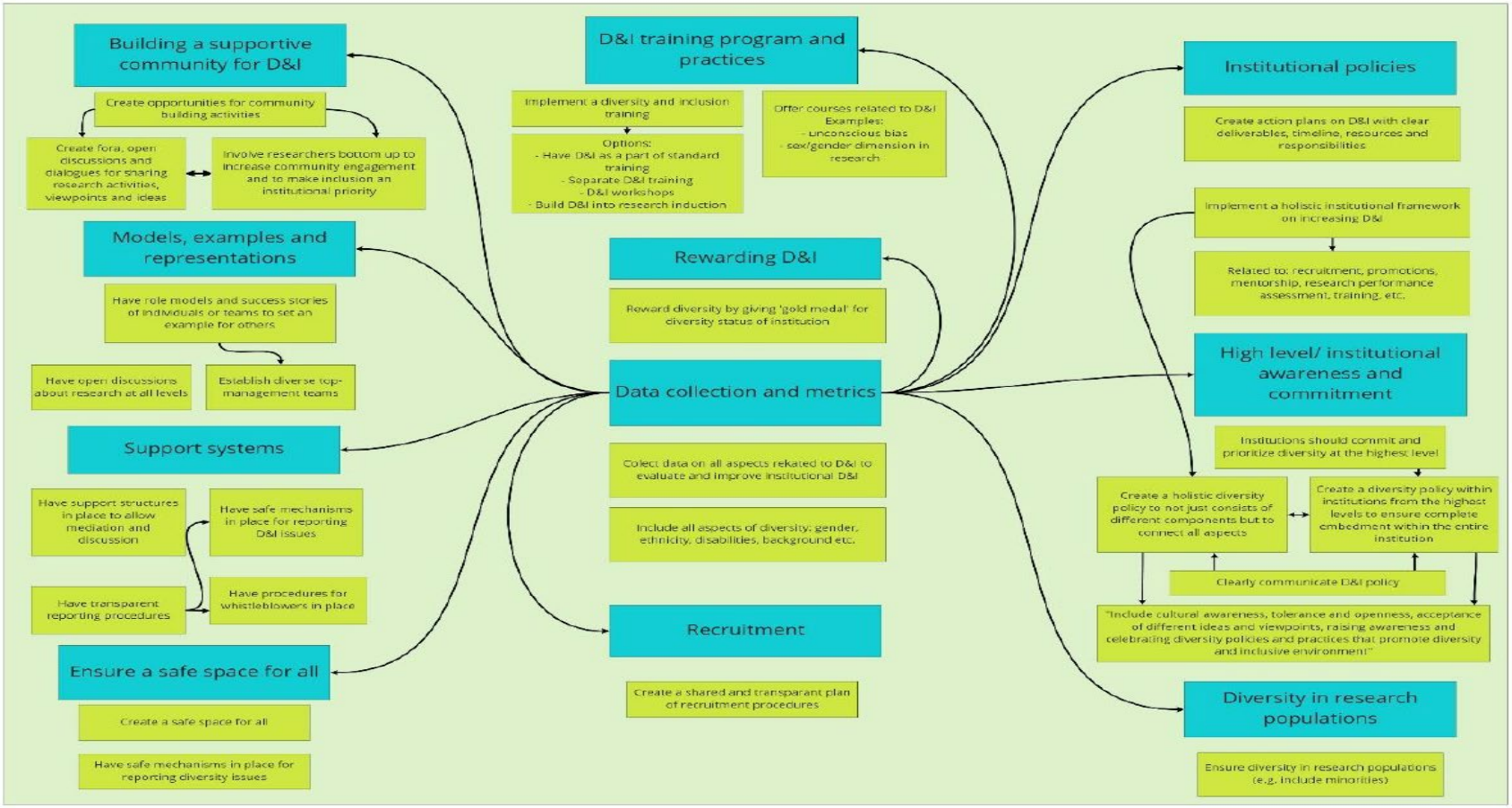


Diversity issues

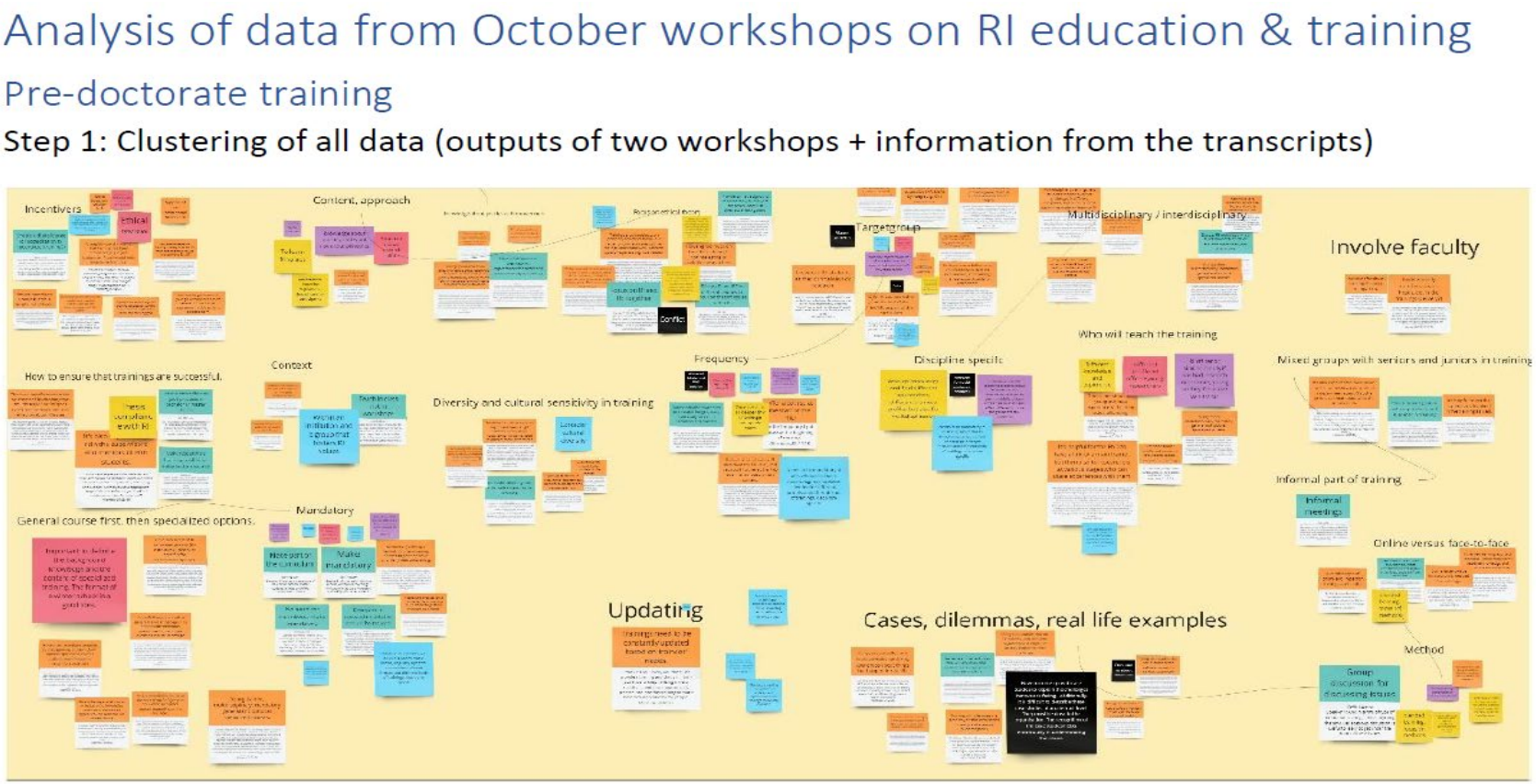
Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)



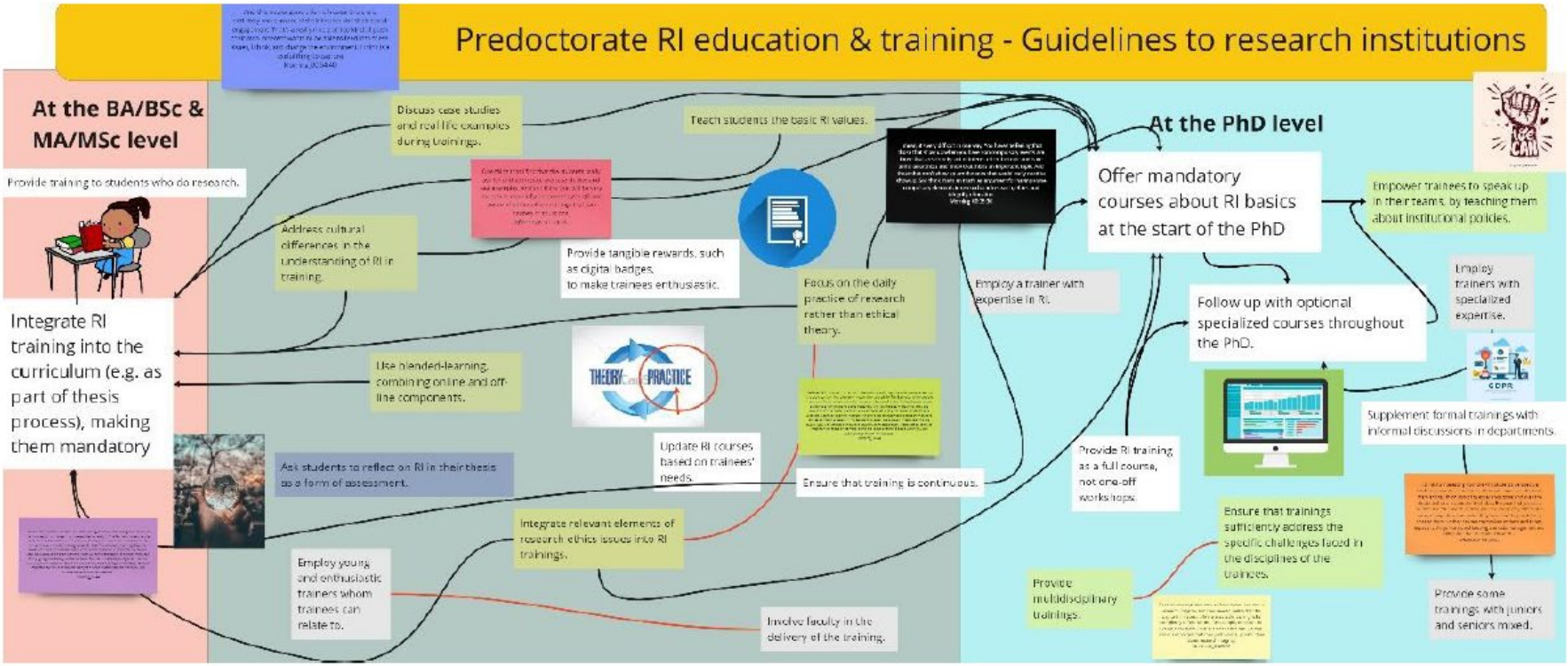
Step 2: Exploring the relationships between the clusters & presenting the results



6.6.2 Education and training in RI



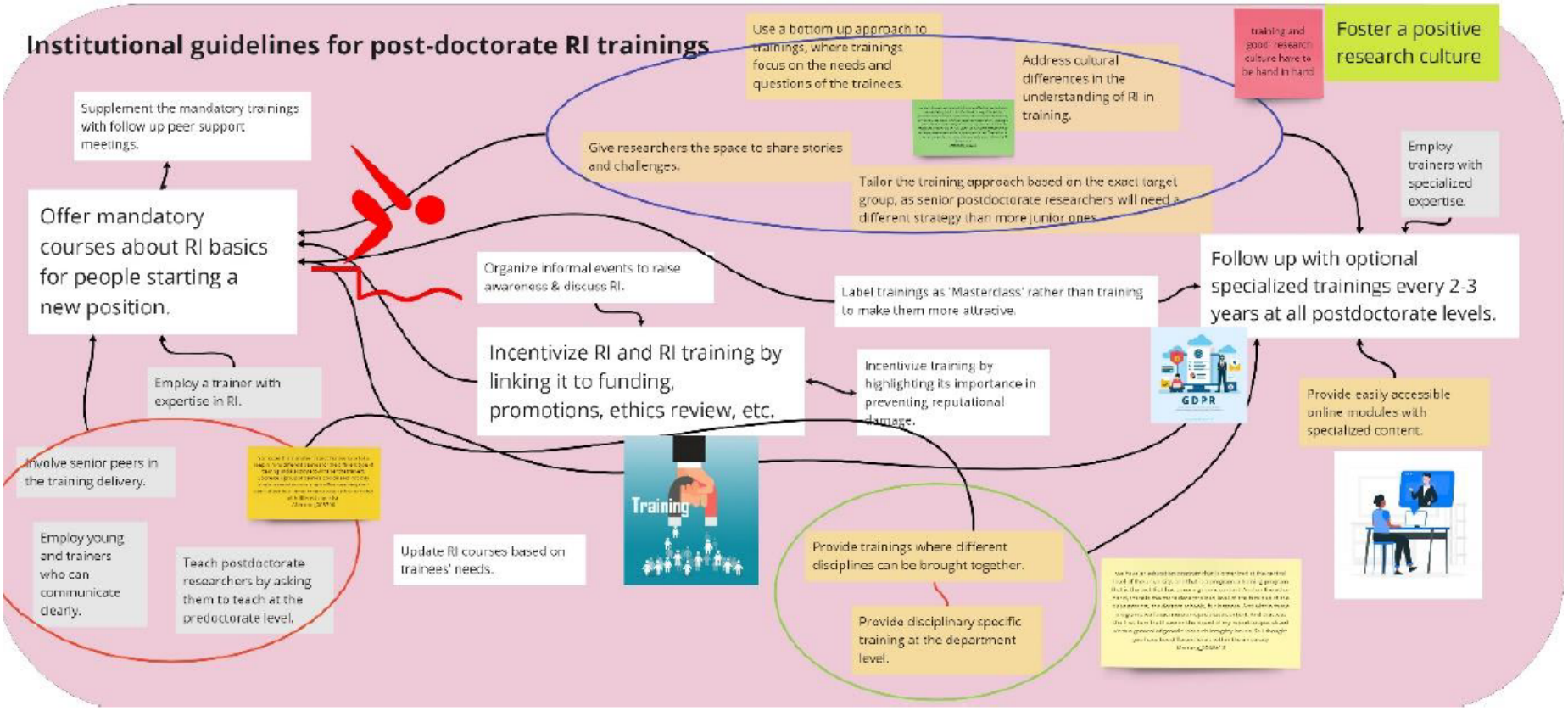
Step 2: Exploring the relationships between the clusters & presenting the results



Post-doctorate training

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)

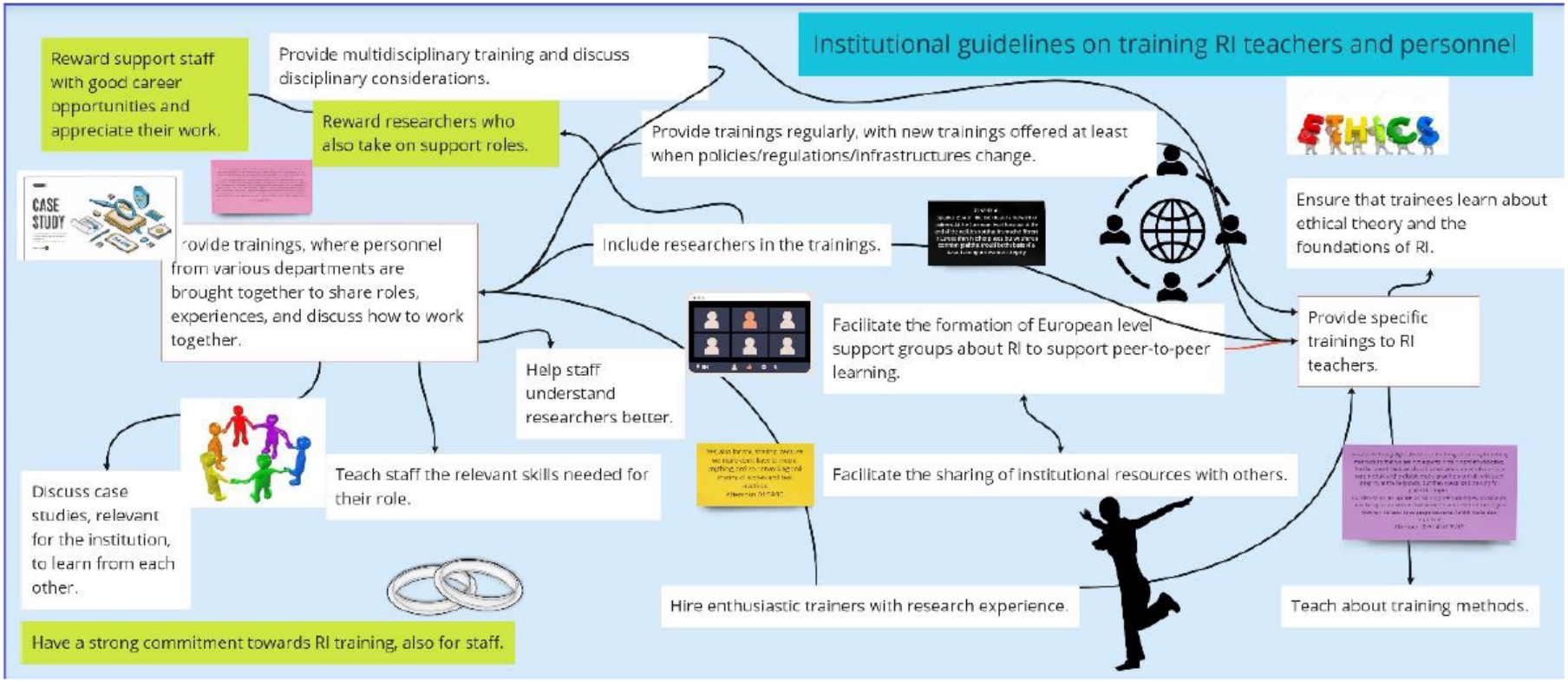
Step 2: Exploring the relationships between the clusters & presenting the results



Training of RI personnel & teachers

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)

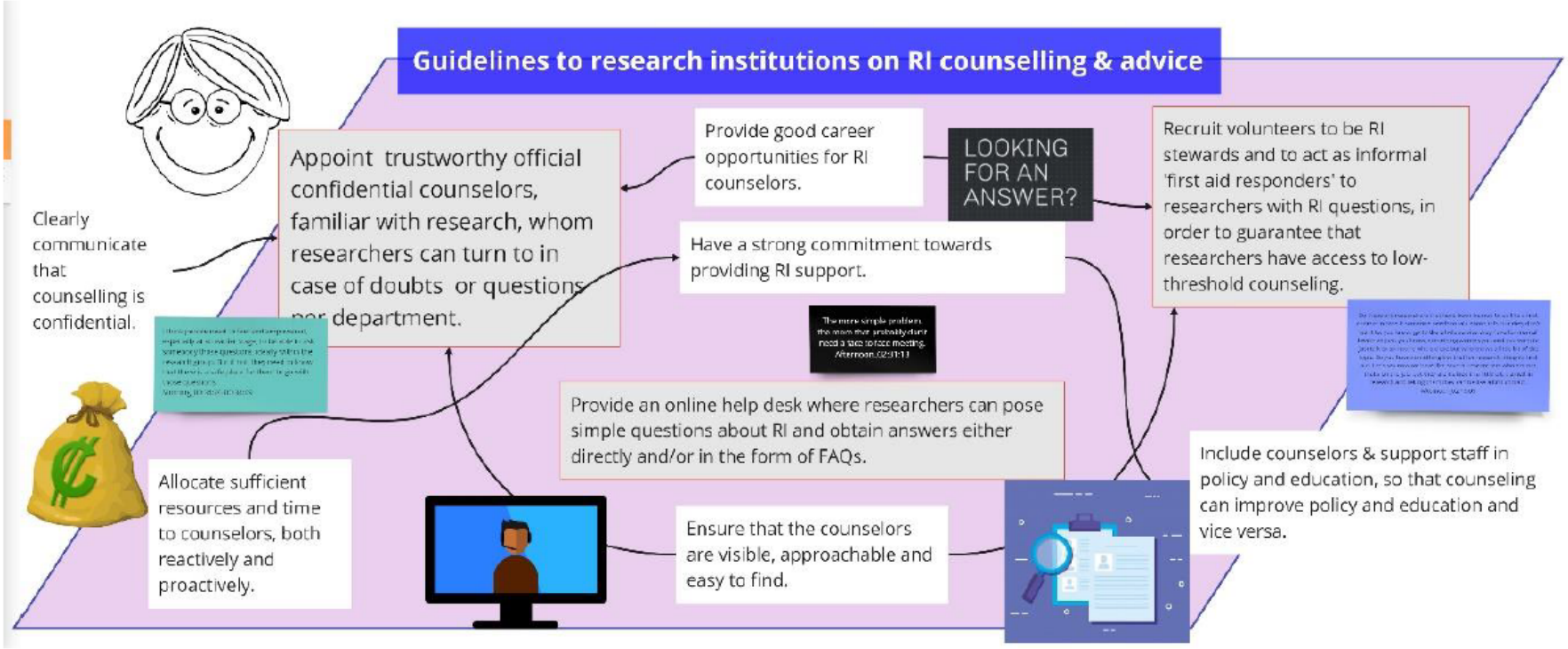
Step 2: Exploring the relationships between the clusters & presenting the results



RI counseling & advice

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)

Step 2: Exploring the relationships between the clusters & presenting the results

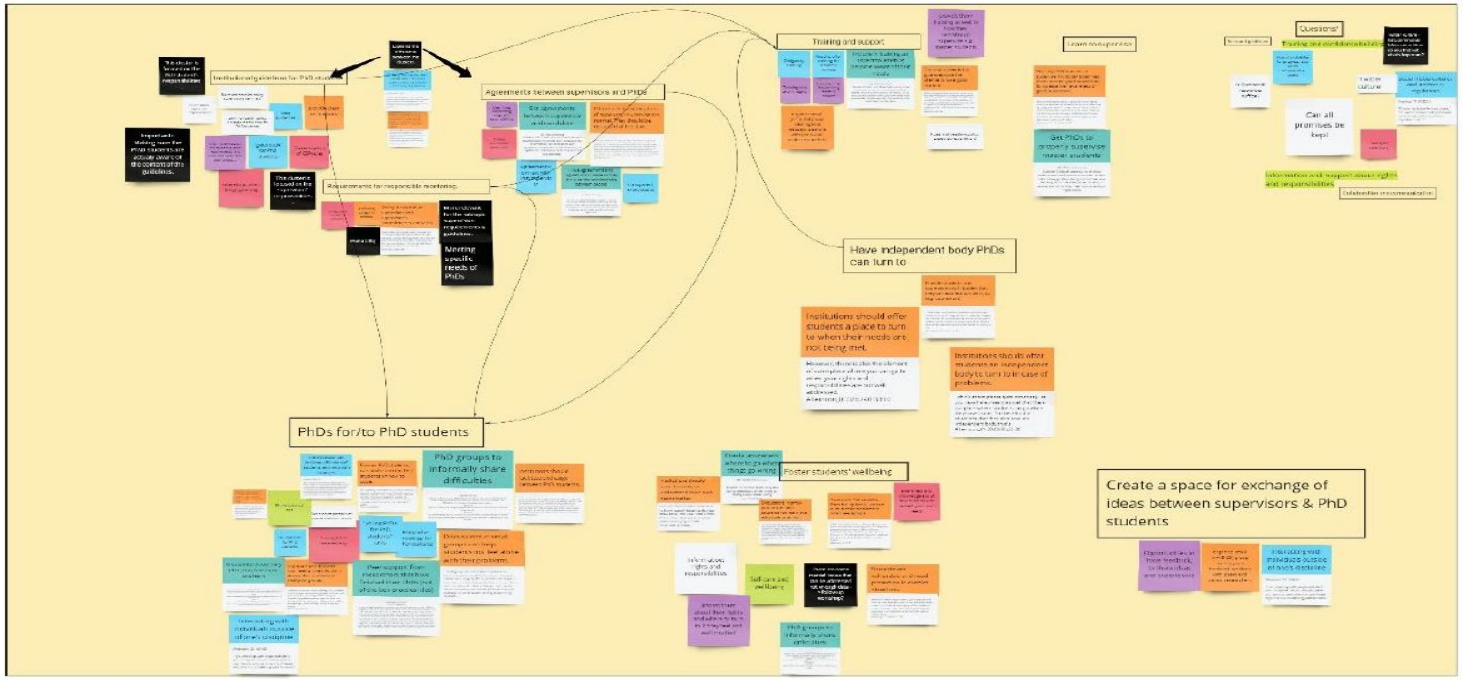


6.6.3 Responsible supervision and mentoring

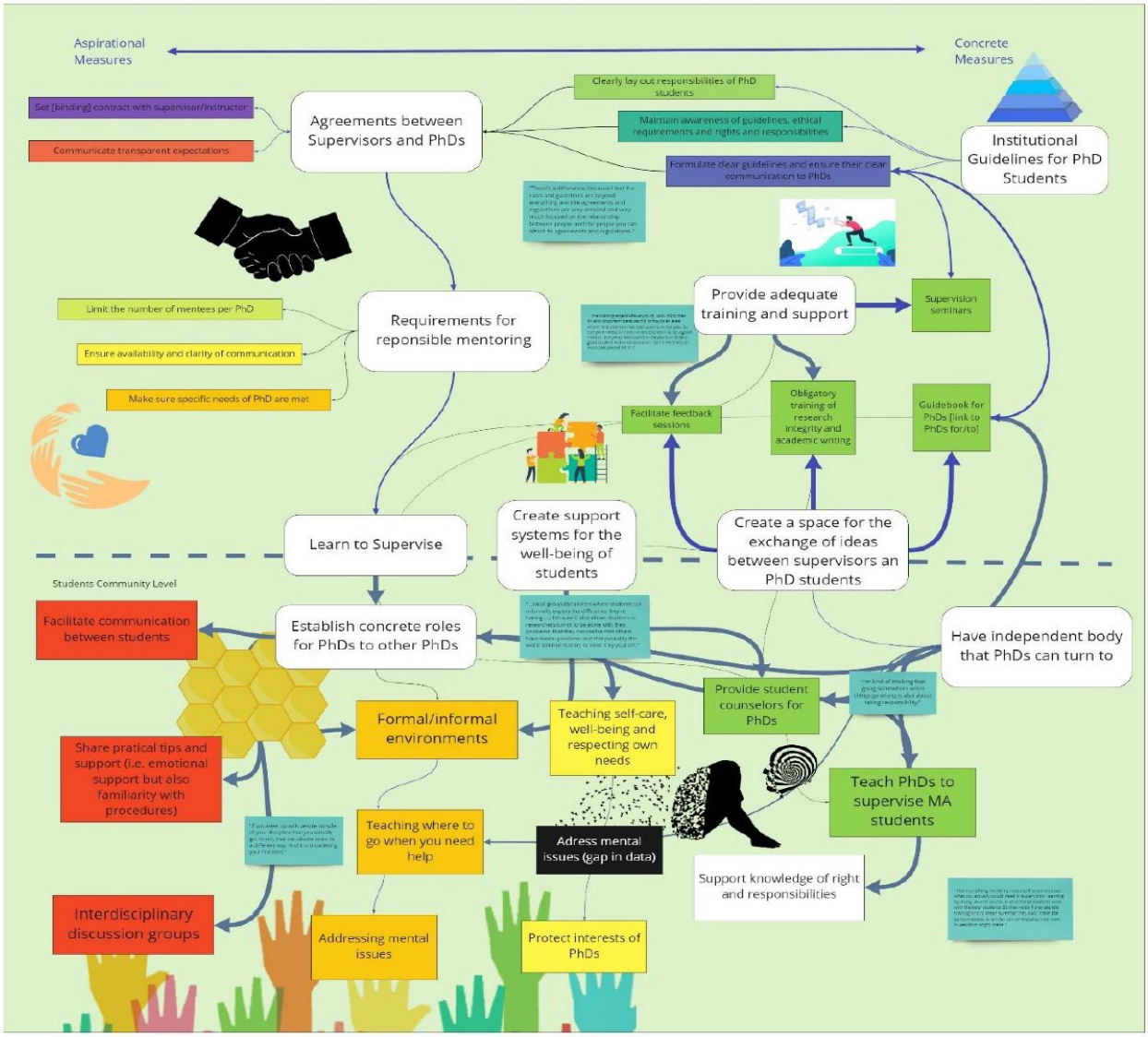
PhD guidelines

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)

Group exercise



Step 2: Exploring the relationships between the clusters & presenting the results

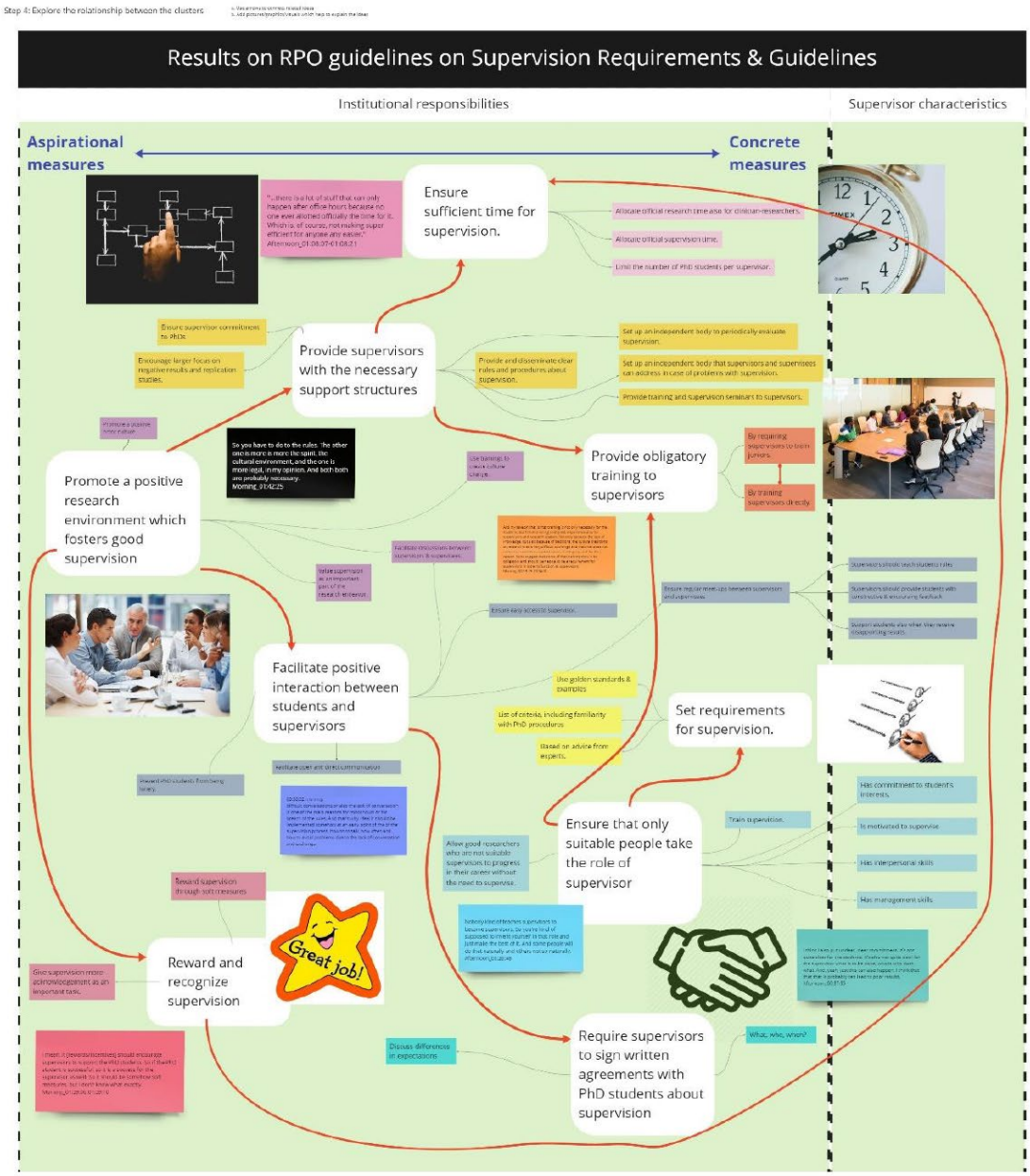


Supervision requirements and guidelines

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)

Group exercise

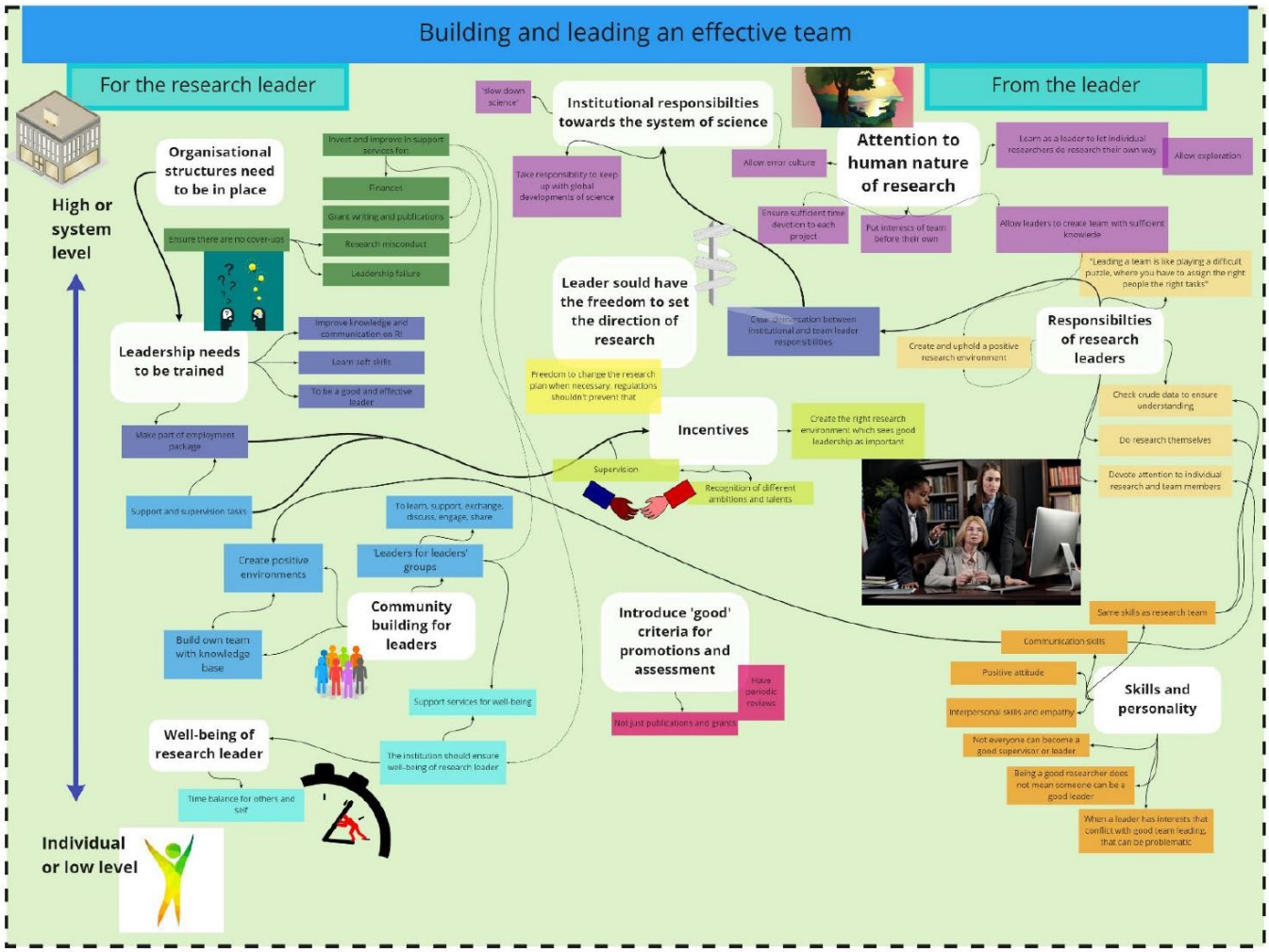
Step 2: Exploring the relationships between the clusters & presenting the results



Building and leading an effective team

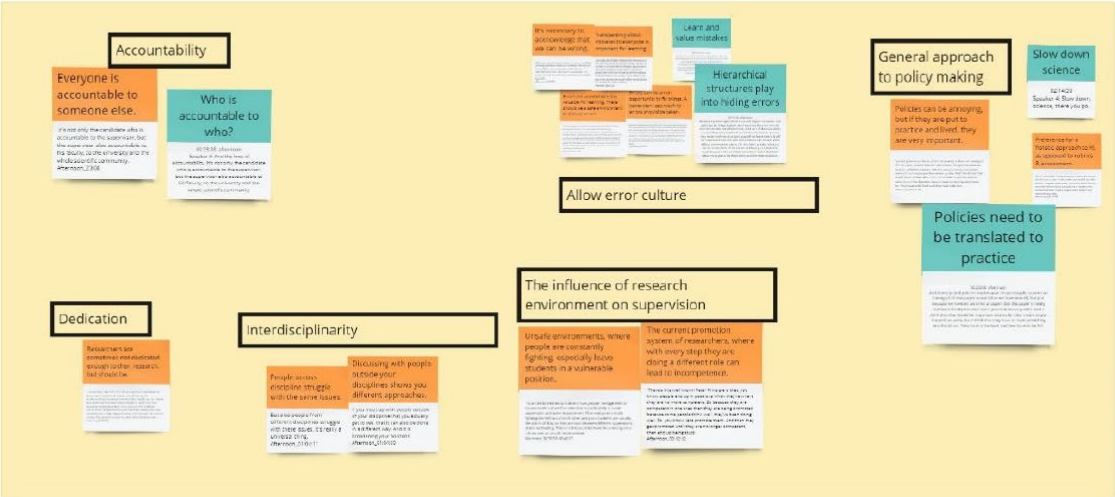
Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)

Step 2: Exploring the relationships between the clusters & presenting the results

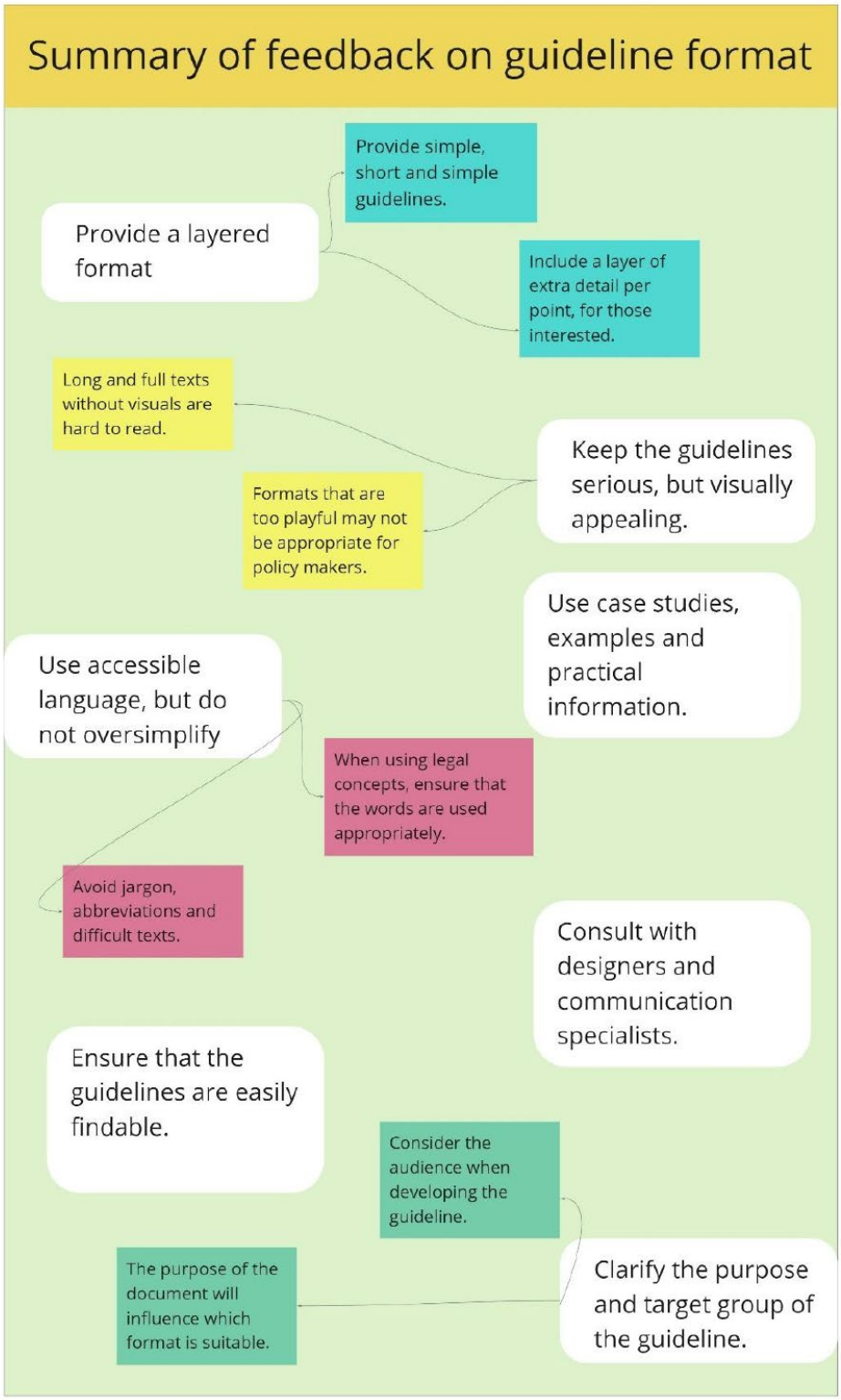


Guideline format and overall considerations

Step 1: Clustering of all data (outputs of two workshops + information from the transcripts)



Step 2: Exploring the relationships between the clusters & presenting the results

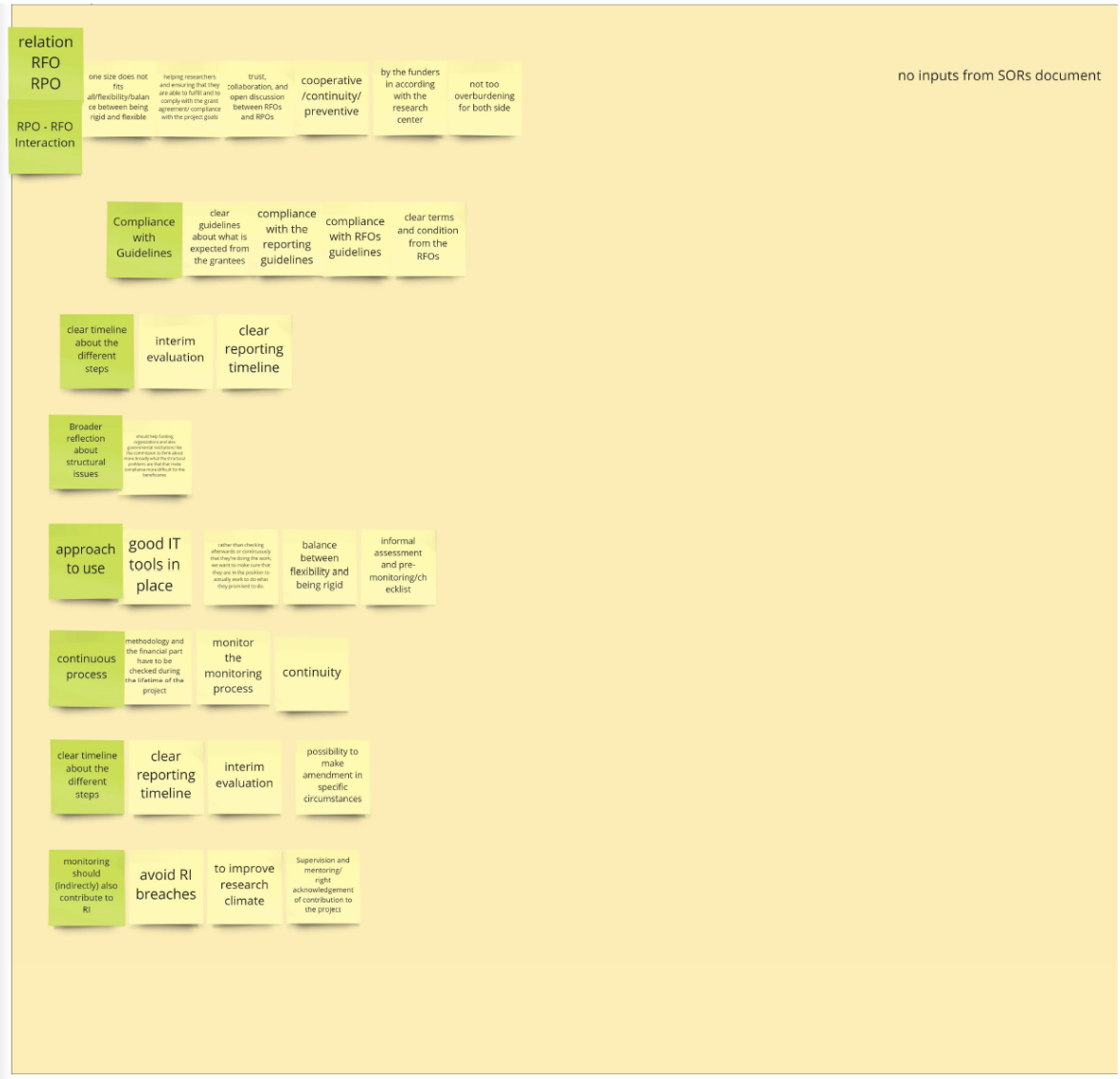


6.6.4 Monitoring of funded project

Analysis of data from October workshops on Responsible supervision and mentoring

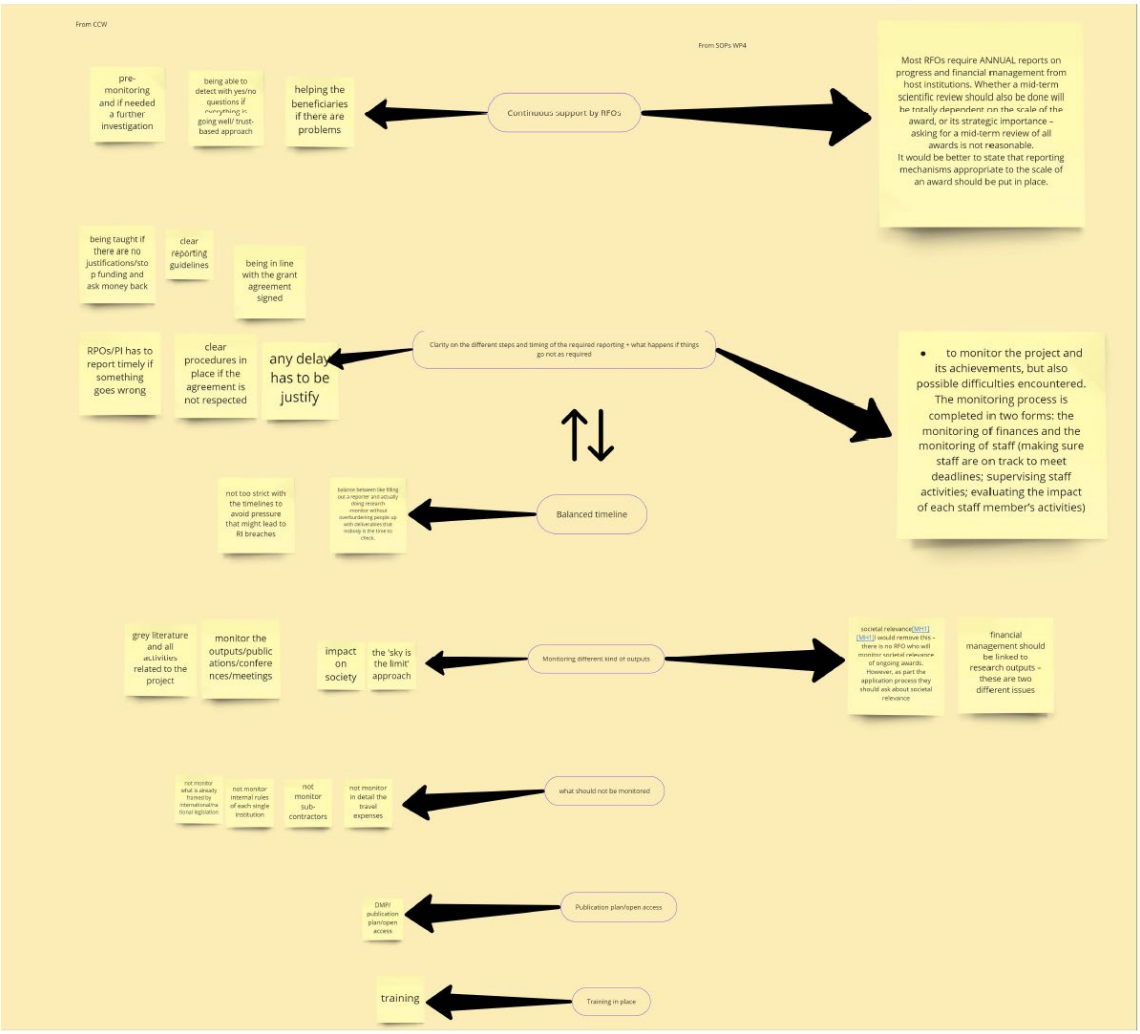
Monitoring overall approach

Clustering of all data (outputs of two workshops + information from the transcripts+ early draft)



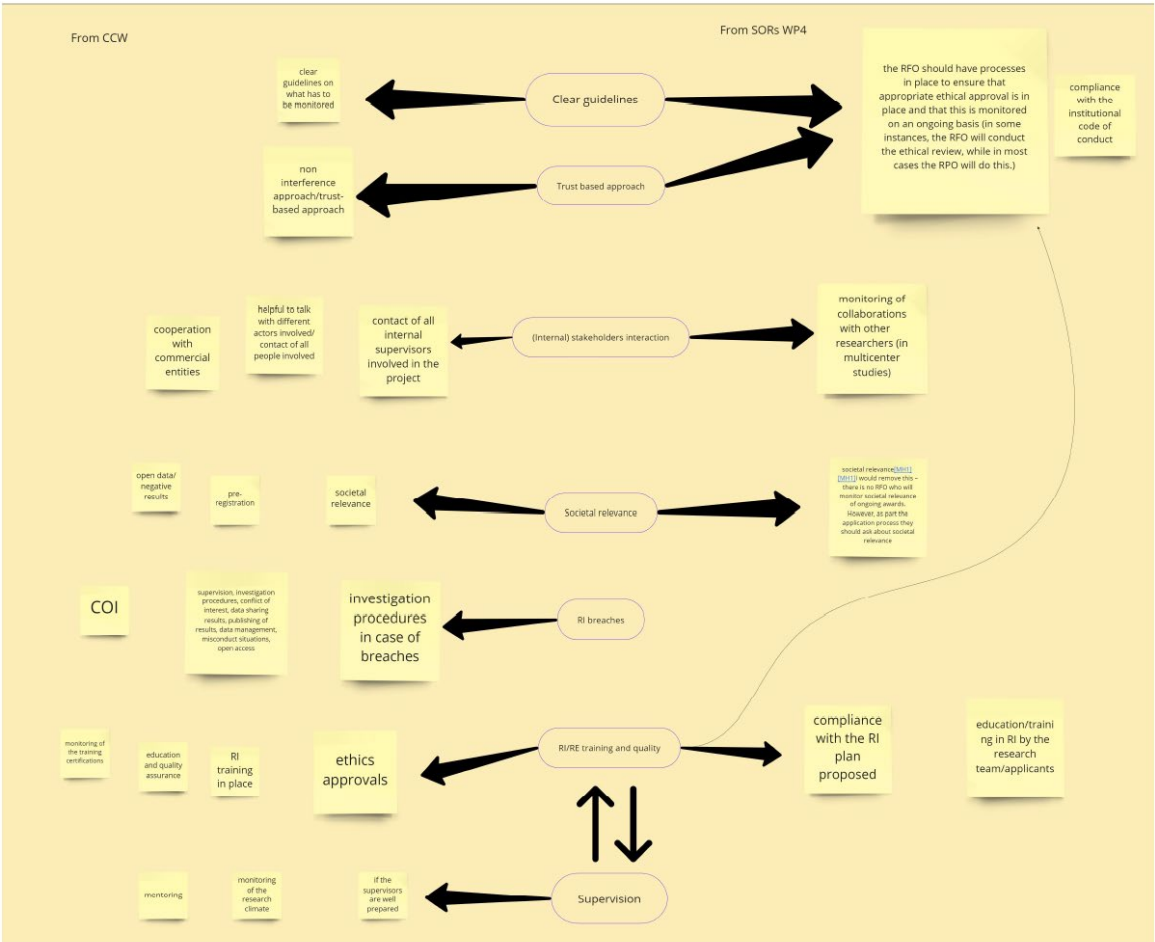
Execution of research grants

Clustering of all data (outputs of two workshops + information from the transcripts+ early draft)



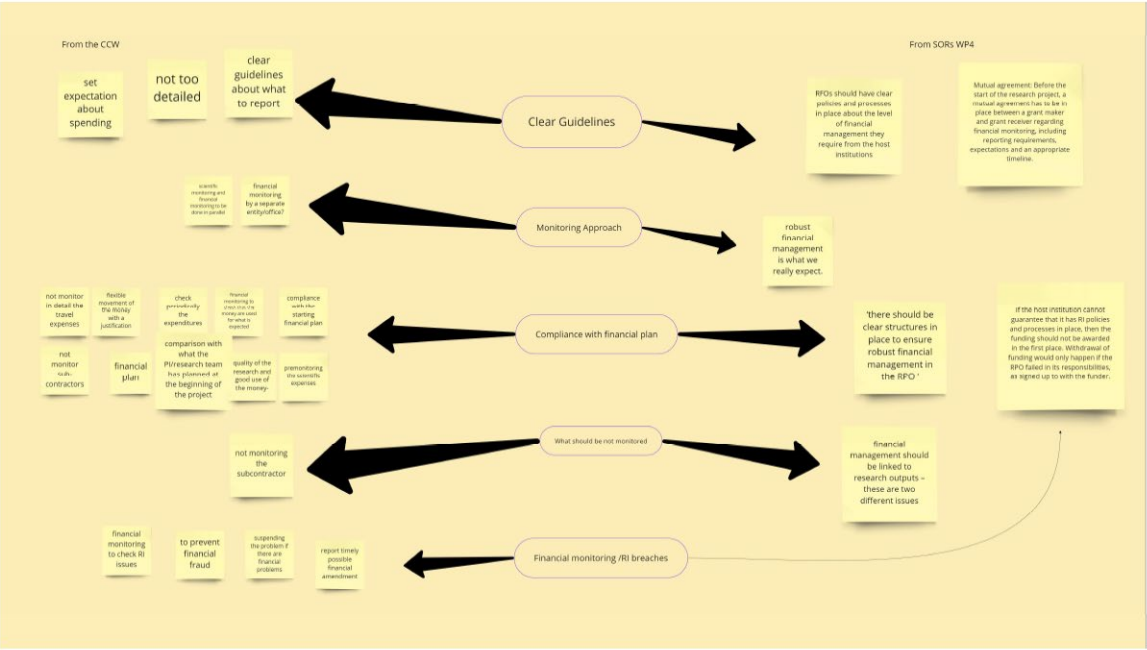
Compliance with RI requirements

Clustering of all data (outputs of two workshops + information from the transcripts+ early draft)



Financial monitoring

Clustering of all data (outputs of two workshops + information from the transcripts+ early draft)



6.7 Instructions for facilitators and co-facilitators (SET 2)

6.7.1 Example of instruction for facilitators

Facilitator instructions for SOPs4RI workshops on 'RI education & training'

Make sure that you have read the guidelines carefully and have them with you so that you can share them with the participants during the session if needed (e.g. via screen sharing).

- **Introduction**

Duration: 10 minutes

Objective: To introduce the workshop and participants

Steps:

Before the session starts: make sure that someone has an extra laptop on which they can record the MIRO screen using Xbox Game Bar.

14. Start the ZOOM session with the co-facilitator as a Host. **The co-facilitator starts recording on Zoom.**
15. Welcome the group to the SOPs4RI co-creation workshop and mention that the Zoom call is being recorded, and that we will transcribe the recordings and process all the data in line with the GDPR.
16. Briefly introduce SOPs4RI, yourself and the co-facilitator.
    a. SOPs4RI is funded by the Horizon 2020 framework of the European Commission. Its aim is to develop a toolbox containing guidelines on research integrity targeted at research institutions.
    - Explain that the facilitator is there to help structure the process, but that the participants are the experts.
    - Mention that the co-facilitator is there to help out with technical issues. If there are any technical questions/issues, participants can use the Zoom chat to talk to the co-facilitator. The Zoom chat should only be used to communicate with the co-facilitator.
17. Ask the participants to introduce themselves briefly two sentences:
    - Where do you work?
    - What do you do in your job?
18. Mention that you will now present the aims and procedures for today's session.

a. Inform participants that you will first show them the MIRO board on Zoom, and then they will have the chance to go to MIRO themselves.
b. Share your screen with the MIRO board on it. Show participants some MIRO basics:
    - How to zoom in and out
    - How to write on a sticky note

- Tell participants that they can minimize their screens so that they have MIRO open on half the screen and Zoom on the other half. Alternatively, they can also just work on MIRO (and do 'speaker view' on ZOOM), and the facilitator will ask them to come back to Zoom from time to time.
- Show the participants the MIRO board
    - Show them that they can find information about MIRO & the SOPs4RI project at the bottom
    - Show them that we have a set of exercises including breaks in between
    - Show that that we have a parking space below the exercises, where participants can write down any ideas that come up that are not related to the specific exercise. We will come back to the parking space in the last hour of the workshop, to address any ideas there.
    - Mention to them that if they are overwhelmed by everyone's cursors on the screen, they can click on 'Hide collaborator's cursors' on the arrow on the top of the board.

19. Zoom in on the introduction board (using screen sharing still on Zoom)
    - Introduce the subgroup to the topic of this workshop: RI education & training.
    - State the goal of the workshop:
        - We held workshops in October to generate ideas for three different guidelines on this topic. More specifically, the guidelines address:
            - RI training of pre-doctorate researchers. This includes bachelor, master and PhD students.
            - RI training of post-doctorate researchers. This includes all researchers who already have a PhD degree.
            - Training of RI personnel & teachers
            - RI counseling & advice
        - Stress that these guidelines target research institutions, and not individual researchers.
        - **<u>Workshop goal:</u> After formulating the guidelines based on the results of those October workshops, we now need your help to discuss the guidelines further and explore what implementations issues might be important for these guidelines. We will use the insights gained about implementations issues to further develop the guidelines and in further stages of the project.**

a. Mention that we have a few exercises planned to reach this goal
b. Mention the approach to the workshop:
    - Participants should use the sticky notes to put their thoughts down, and organize them. They have already selected a sticky note color in the sensitization exercise, and they should continue to use that sticky note color throughout the workshop. Ask participants to use keywords on the sticky notes which are easy to read, rather than paragraphs.
    - Mention that each exercise will consist of an individual part, followed by a group part.
        - For the individual exercises, the focus is on creating many ideas using the sticky notes. The quality of the ideas doesn't matter, because we can refine the ideas during group discussions.
        - During the discussion part of the exercise, mention that you will ask the group to come back to Zoom to discuss the individual ideas they put down. If necessary, the co-facilitator can help here to make notes. When doing the exercises together in the group, discussion is very much encouraged.
        - Refer again to the possibility to put any ideas not related to a specific exercise in the parking spot. We will come back to these ideas in the last hour of the session.

20. Explain that participant should not put any personal/institutional material on the MIRO board, because the privacy settings on MIRO are not compatible with our privacy policy.
21. Mention that we are also recording the MIRO board.
22. Ask the co-facilitator to provide the participants with the link to the MIRO board in the Zoom chat. Invite participants to follow the link.

- **Stakeholders mapping**

Duration: 15 minutes

Objective:

- To warm participants up and get them used to MIRO.
- Generate ideas on stakeholders, which can later be used to enrich the implementations exercise.

Steps:

1. Zoom in on the Stakeholder mapping exercise and 'Bring everyone to me'
2. Introduce the stakeholder mapping exercise and state the aim of the exercise:

- Get comfortable with MIRO.
- Identify who we should consider when writing the 4 guidelines.
    - Mention that we need this information for exploring implementation issues in more detail in a later step in the workshop.

3. Ask participants to spend 2 minutes writing down two stakeholders they can think of that are relevant for the guidelines at hand, and place them on the axis:
    - The x-axis 'Interest' refers to how much interest this stakeholder actually has in the guidelines
    - The y-axis 'Power' refers to whether the person is being influenced by the guideline (low power) or is influencing/implementing the guidelines (high power).
4. Stop the individual work. Ask each participant to share their idea in one sentence.
5. Ask everyone to vote on the stakeholder they find most important, by copying and pasting the dots (that match their color) available on the board on the sticky note that they would like to vote for (2 minutes). The co-facilitator should help participants by making sure that the dots appear in front of the sticky notes (right click on sticky note and click on 'Bring to back'; or cut and paste dots).
6. Ask everyone to come back to Zoom and discuss things together, and state that the co-facilitator can make notes of the discussion. Ask the co-facilitator to share their screen on Zoom and start making notes on a black sticky note.
7. Ask each person to briefly state their rationale for their vote in one sentence.
8. Ask the participants to summarize, in one or two words, what their main take-away from this exercise is. The co-facilitator should make a note of these, and the facilitator should end the exercise by reading through them (thereby providing a summary).

- **RI training of pre-doctorate researchers?**

Duration: 20 minutes

Objective: Obtain additional input and ideas (incl. best practices) on the skeleton guidelines for this topic.

<u>Steps:</u>

1. Ask participants to come back to MIRO.
2. Zoom in to the exercise board and 'Bring everyone to me'
3. Mention that we combined the insights from the two workshops we held about this topic in October to create some skeleton guidelines. We also included some additional points based on insights from other stages of the SOPs4RI project, which we marked in blue in the full skeleton guidelines we sent out to the participants as preparation material.

4. Briefly take the participants up to the hidden board on top of this exercise (the poster!) and stop hiding the poster (drag the white box on top away); use the 'Bring everyone to me' option. Mention that this poster gives the participants an impression of how we analyzed the data, although the aim is not to have them to look at this poster in detail now but rather to get a feel for how we prepared the guidelines.
5. Go back down to the exercise board and 'Bring everyone to me' again.
6. State the aim of this exercise: to obtain additional input on the skeleton guidelines for this topic.
    - Emphasize that we can only discuss major comments about the guidelines in this exercise.
    - Any detailed comments about the guidelines and their formulations are welcome via email, or in the Zoom chat.
7. Invite the participants to have a look at the main items in the guidelines, which are presented in white boxes on the board. Give them 2 minutes to read these, or read them out loud yourself.
8. Invite participants to write down their ideas on the board:
    - They should write down what their major comments are per main item in the guideline using sticky notes on the left-hand box.
    - They should each also write down one best practice example that they know of related to the guideline, which we could add to the guideline.
9. Stop the individual work. Ask everyone to come back to Zoom for the discussion, and state that the co-facilitator can make notes of the discussion. Ask the co-facilitator to share their screen on Zoom and start making notes on a black sticky note.
10. Start with the 'major comments' (10 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.
11. Move on to the 'best practice example' box (5 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.
12. Ask the participants to summarize, in one or two words, what their main take-away from this exercise is (2 minutes).
    - As the co-facilitator makes notes, they should make sure that the notes only represent the participants' own words.
    - The facilitator should double check whether what is written down matches what the participants had in mind by reading through the list of points at the end (thereby providing a summary)

BREAK

Duration: 10 minutes

Copy and paste the sticky notes with votes on them (from 'Stakeholder mapping') to the board on top of the 'implementation issues' exercise.

- **RI training of post-doctorate researchers**

Duration: 20 minutes

Objective: Obtain additional input and ideas (incl. best practices) on the skeleton guidelines for this topic.

Steps:

1. Ask participants to come back to MIRO.
2. Zoom in to the exercise board and 'Bring everyone to me'
3. Mention that we combined the insights from the two workshops we held about this topic in October to create some skeleton guidelines. We also included some additional points based on insights from other stages of the SOPs4RI project, which we marked in blue in the full skeleton guidelines we sent out to the participants as preparation material.
4. Briefly take the participants up to the hidden board on top of this exercise (the poster!) and stop hiding the poster (drag the white box on top away); use the 'Bring everyone to me' option. Mention that this poster gives the participants an impression of how we analyzed the data, although the aim is not to have them to look at this poster in detail now but rather to get a feel for how we prepared the guidelines.
5. Go back down to the exercise board and 'Bring everyone to me' again.
6. State the aim of this exercise: to obtain additional input on the skeleton guidelines for this topic.
    - Emphasize that we can only discuss major comments about the guidelines in this exercise.
    - Any detailed comments about the guidelines and their formulations are welcome via email, or in the Zoom chat.
7. Invite the participants to have a look at the main items in the guidelines, which are presented in white boxes on the board. Give them 2 minutes to read these, or read them out loud yourself.
8. Invite participants to write down their ideas on the board:
    - They should write down what their major comments are per main item in the guideline using sticky notes on the left-hand box.

- They should each also write down one best practice example that they know of related to the guideline, which we could add to the guideline.

9. Stop the individual work. Ask everyone to come back to Zoom for the discussion, and state that the co-facilitator can make notes of the discussion. Ask the co-facilitator to share their screen on Zoom and start making notes on a black sticky note.
10. Start with the 'major comments' (10 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.
11. Move on to the 'best practice example' box (5 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.
12. Ask the participants to summarize, in one or two words, what their main take-away from this exercise is (2 minutes).
    - As the co-facilitator makes notes, they should make sure that the notes only represent the participants' own words.
    - The facilitator should double check whether what is written down matches what the participants had in mind by reading through the list of points at the end (thereby providing a summary)

- **Training of RI personnel & teachers**

Duration: 20 minutes

Objective: Obtain additional input and ideas (incl. best practices) on the skeleton guidelines for this topic.

<u>Steps:</u>

1. Ask participants to come back to MIRO.
2. Zoom in to the exercise board and 'Bring everyone to me'
3. Mention that we combined the insights from the two workshops we held about this topic in October to create some skeleton guidelines. We also included some additional points based on insights from other stages of the SOPs4RI project, which we marked in blue in the full skeleton guidelines we sent out to the participants as preparation material.
4. Briefly take the participants up to the hidden board on top of this exercise (the poster!) and stop hiding the poster (drag the white box on top away); use the 'Bring everyone to me' option. Mention that this poster gives the participants an impression of how we analyzed the

data, although the aim is not to have them to look at this poster in detail now but rather to get a feel for how we prepared the guidelines.

5. Go back down to the exercise board and 'Bring everyone to me' again.
6. State the aim of this exercise: to obtain additional input on the skeleton guidelines for this topic.
    - Emphasize that we can only discuss major comments about the guidelines in this exercise.
    - Any detailed comments about the guidelines and their formulations are welcome via email, or in the Zoom chat.
7. Invite the participants to have a look at the main items in the guidelines, which are presented in white boxes on the board. Give them 2 minutes to read these, or read them out loud yourself.
8. Invite participants to write down their ideas on the board:
    - They should write down what their major comments are per main item in the guideline using sticky notes on the left-hand box.
    - They should each also write down one best practice example that they know of related to the guideline, which we could add to the guideline.
9. Stop the individual work. Ask everyone to come back to Zoom for the discussion, and state that the co-facilitator can make notes of the discussion. Ask the co-facilitator to share their screen on Zoom and start making notes on a black sticky note.
10. Start with the 'major comments' (10 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.
11. Move on to the 'best practice example' box (5 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.
12. Ask the participants to summarize, in one or two words, what their main take-away from this exercise is (2 minutes).
    - As the co-facilitator makes notes, they should make sure that the notes only represent the participants' own words.
    - The facilitator should double check whether what is written down matches what the participants had in mind by reading through the list of points at the end (thereby providing a summary)

- **RI counseling and advice**

Duration: 20 minutes

Objective: Obtain additional input and ideas (incl. best practices) on the skeleton guidelines for this topic.

Steps:

1. Ask participants to come back to MIRO.
2. Zoom in to the exercise board and 'Bring everyone to me'
3. Mention that we combined the insights from the two workshops we held about this topic in October to create some skeleton guidelines. We also included some additional points based on insights from other stages of the SOPs4RI project, which we marked in blue in the full skeleton guidelines we sent out to the participants as preparation material.
4. Briefly take the participants up to the hidden board on top of this exercise (the poster!) and stop hiding the poster (drag the white box on top away); use the 'Bring everyone to me' option. Mention that this poster gives the participants an impression of how we analyzed the data, although the aim is not to have them to look at this poster in detail now but rather to get a feel for how we prepared the guidelines.
5. Go back down to the exercise board and 'Bring everyone to me' again.
6. State the aim of this exercise: to obtain additional input on the skeleton guidelines for this topic.
    - Emphasize that we can only discuss major comments about the guidelines in this exercise.
    - Any detailed comments about the guidelines and their formulations are welcome via email, or in the Zoom chat.
7. Invite the participants to have a look at the main items in the guidelines, which are presented in white boxes on the board. Give them 2 minutes to read these, or read them out loud yourself.
8. Invite participants to write down their ideas on the board:
    - They should write down what their major comments are per main item in the guideline using sticky notes on the left-hand box.
    - They should each also write down one best practice example that they know of related to the guideline, which we could add to the guideline.
9. Stop the individual work. Ask everyone to come back to Zoom for the discussion, and state that the co-facilitator can make notes of the discussion. Ask the co-facilitator to share their screen on Zoom and start making notes on a black sticky note.
10. Start with the 'major comments' (10 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.

11. Move on to the 'best practice example' box (5 minutes):
    - Ask one participant to present what they've written down in the box using two sentences max.
    - Repeat until all participants have spoken.
12. Ask the participants to summarize, in one or two words, what their main take-away from this exercise is (2 minutes).
    - As the co-facilitator makes notes, they should make sure that the notes only represent the participants' own words.
    - The facilitator should double check whether what is written down matches what the participants had in mind by reading through the list of points at the end (thereby providing a summary)

BREAK

Duration: 10 minutes

Copy and paste the sticky notes in the parking spot to the 'other' box in the Implementations issue exercise

- **Implementation issues**

Duration: 45 minutes

Objective: Explore implementations issues relevant for the guidelines.

Steps:

1. Tell participants that we will now move on to exploring the implementation issues that are relevant for the guidelines discussed in the workshop.
2. Ask participants to come back to MIRO.
3. Stop hiding the board above the implementation issues board, zoom in to it, and 'Bring everyone to me'.
    - Mention that the left-hand side of this board includes the stakeholder which participants voted on earlier in the session.
    - Mention that the right-hand side of the board includes the outputs of the sensitization exercise, where participants were asked to write down 2 ways in which these guidelines would affect their own work.

4. Urge participants to consider the information on this board when we are doing the 'Implementation issues' exercise
5. Zoom in to the 'Implementations issues' exercise and 'Bring everyone to me'. Show participants the board.
6. In case they wrote in the parking spot: Mention to participants that you've moved the sticky notes they placed in the parking spot to the 'other' box in the exercise. Let them know that they can feel free to move it elsewhere.
7. Give participants 5-10 minutes to write down at least one idea in each of the boxes below on:
    - What the expected impact of the guidelines can be
    - What resources (both tangible and intangible) would be needed to implement the guidelines
    - What factors could facilitate the implementation of the guidelines
    - What could be a barrier for implementation
    - What possible unintended consequences might follow from implementing the guidelines.
    - Other implementation issues
8. When there are enough ideas per box, stop the individual work. Ask everyone to come back to Zoom and state that the co-facilitator can make any notes of the discussion. Ask the co-facilitator to share their screen on Zoom and start making notes of any additional points raised in the discussion on black sticky notes.
9. Per box, follow this procedure (5 minutes per box):
    - Ask each participant to explain what they've put down on the board.
    - Continue until there are no new points in that box
10. Ask participants to go back to MIRO.
11. Ask participants to vote for what they consider to be the most important implementation issue, by copying and pasting the dots (that match their color) available on the board on the sticky note that they would like to vote for (2 minutes). The co-facilitator should help participants by making sure that the dots appear in front of the sticky notes (right click on sticky note and click on 'Bring to back'; or cut and paste dots).
9. Ask everyone to come back to Zoom and discuss things together, and state that the co-facilitator can make notes of the discussion. Ask the co-facilitator to share their screen on Zoom and start making notes on a black sticky note.
    - Ask each person to briefly state their rationale for their vote in one sentence.
    - As the co-facilitator makes notes, they should make sure that the notes only represent the participants' own words.
    - The facilitator should double check whether what is written down matches what the participants had in mind by reading through the list of points at the end.

10. Ask the participants to summarize, in one or two words, what their main take-away from this exercise is. The co-facilitator should make a note of these, and the facilitator should end the exercise by reading through them (thereby providing a summary).

- **Conclusion & evaluation**

Duration: 10 minutes

Objective: Wrap up the discussion & evaluate the session

Steps:

6. Thank the participants for their time and contribution.
7. Let them know what the next steps are:
    - Use their inputs to create V2 guidelines for the subtopics discussed
    - We will send them V2 of the guidelines as a member check.
    - Participants have the chance to add additional input on V1 of the exercises already now if they would like via email.
    - In terms of privacy, we will delete all the video footage, and store the audio recordings and transcriptions in line with the GDPR.
    - Anonymized data will be used for publications; we will ask for permission to acknowledge participants in the publications.
    - Mention to participants that we would also like to do a short (max. 30 min) informal follow up interview to evaluate the workshop with one of the participants. Ask if anyone would like to volunteer for this, in which case we will approach them later with more information. If no one volunteers, mention that we will send a follow up email with this information. à after the workshop, send Krishma info on who volunteered.
8. Invite participants to engage in one last exercise before leaving (2 minutes):
    - Ask them to place their sticky note on the emotion wheel to show how they feel about the workshop.
    - Ask them to each write down one piece of advice they have for us at the SOPs4RI project in the green box on the right.
9. Ask each participant to pitch what they've put on the board. Let them end by having a loose discussion and ask them to turn away from the MIRO board, back to Zoom, to share their thoughts and experiences.

- **Optional open discussion**

Duration: max. 60 minutes

Objective: To provide participants the opportunity to provide additional input.

Steps:

If participants would like to stay longer to discuss the topic, use the following questions to guide a discussion:

Morning session: We are conducting the same workshop again this afternoon, with different participants. Is there something from the morning session that you would like us to share with the afternoon group (e.g. conclusions of an exercise)?

Afternoon session: We conducted the same workshop with different participants this morning. Here is a screenshot of the morning group's results (the co-facilitator pastes the board of the morning session). Let's compare the morning and afternoon session's results. Can you help us to sort out the differences and similarities?

Questions for both sessions:

- What did you think about the session?
- What did you think about the content we created?
- Is there anything we missed?
- What new insights have you gained today from the workshop?
- Do you have any additional advice for the SOPs4RI project?
- What do you think is the biggest challenge for this topic?

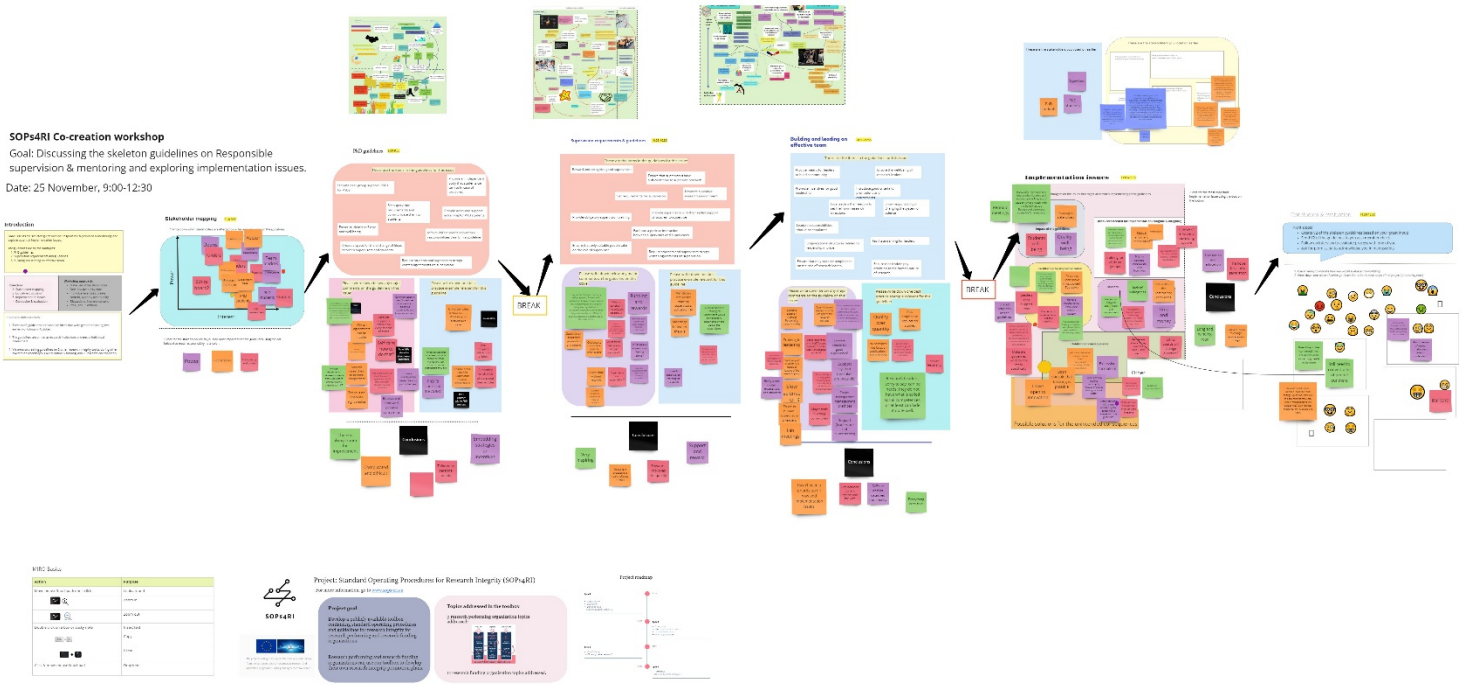
Also, consider going back to the filled in canvasses, and identifying any areas which can be developed developed further.

- **After the sessions**

Stop the Zoom and MIRO screen recordings. Save the files on a secure drive, to be transferred to SharePoint later.

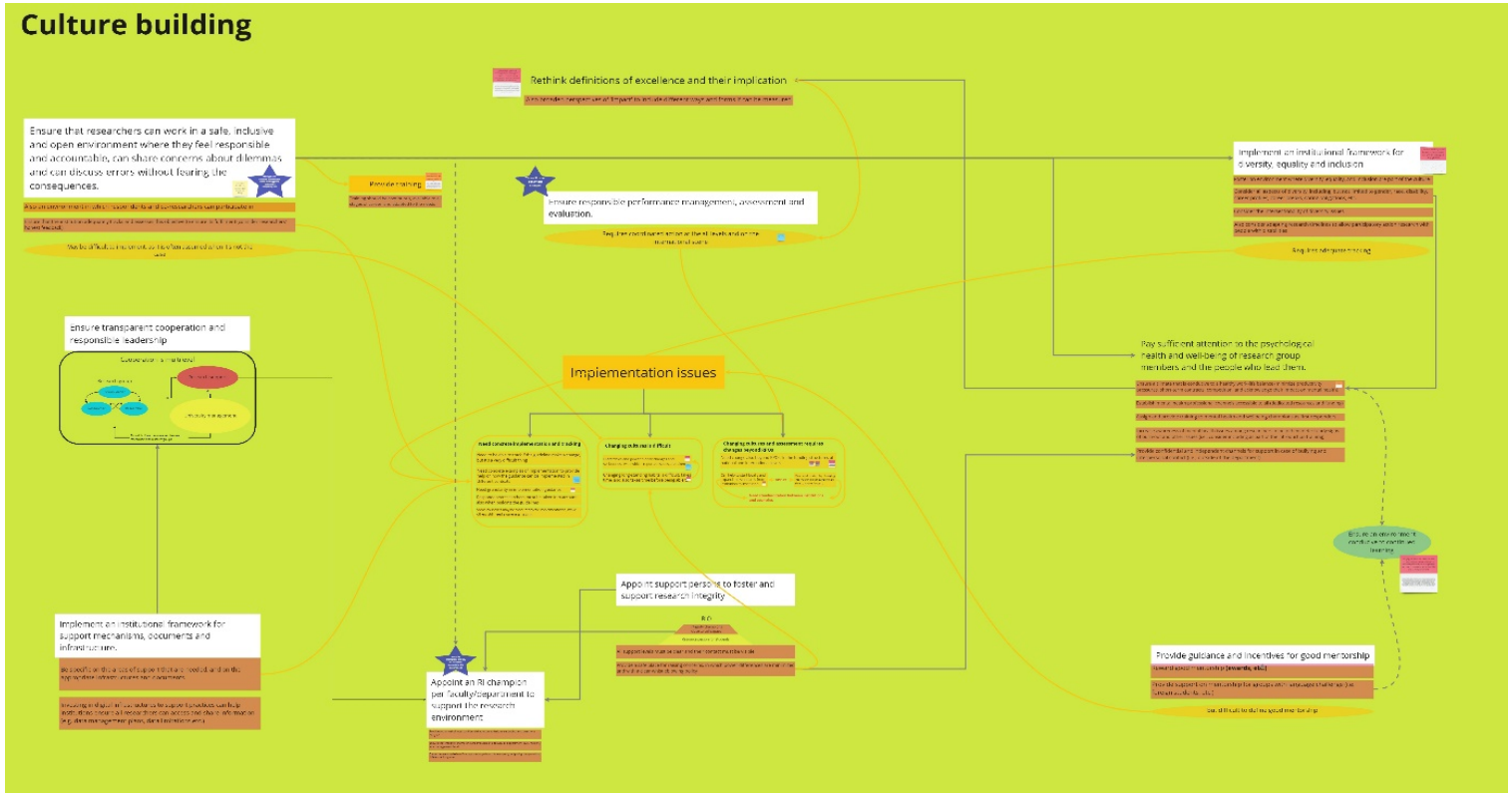
5. After the morning session, consider whether there is anything from the results that should be shared with the afternoon session.
6. Send Krishma the info on who volunteers to take part in the follow up interview.

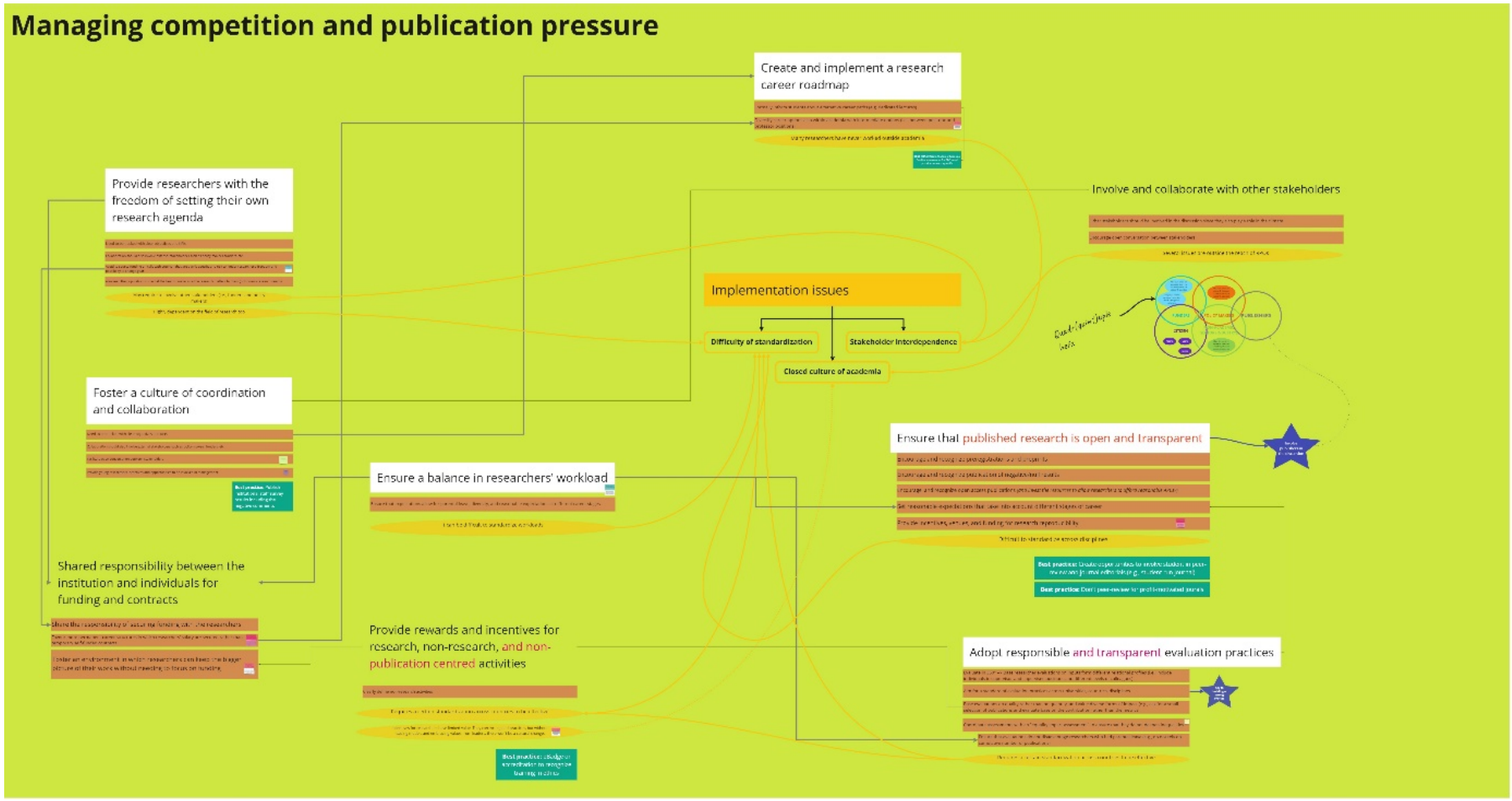
6.8 Example of final MIRO boards SET 2 CCWs session boards

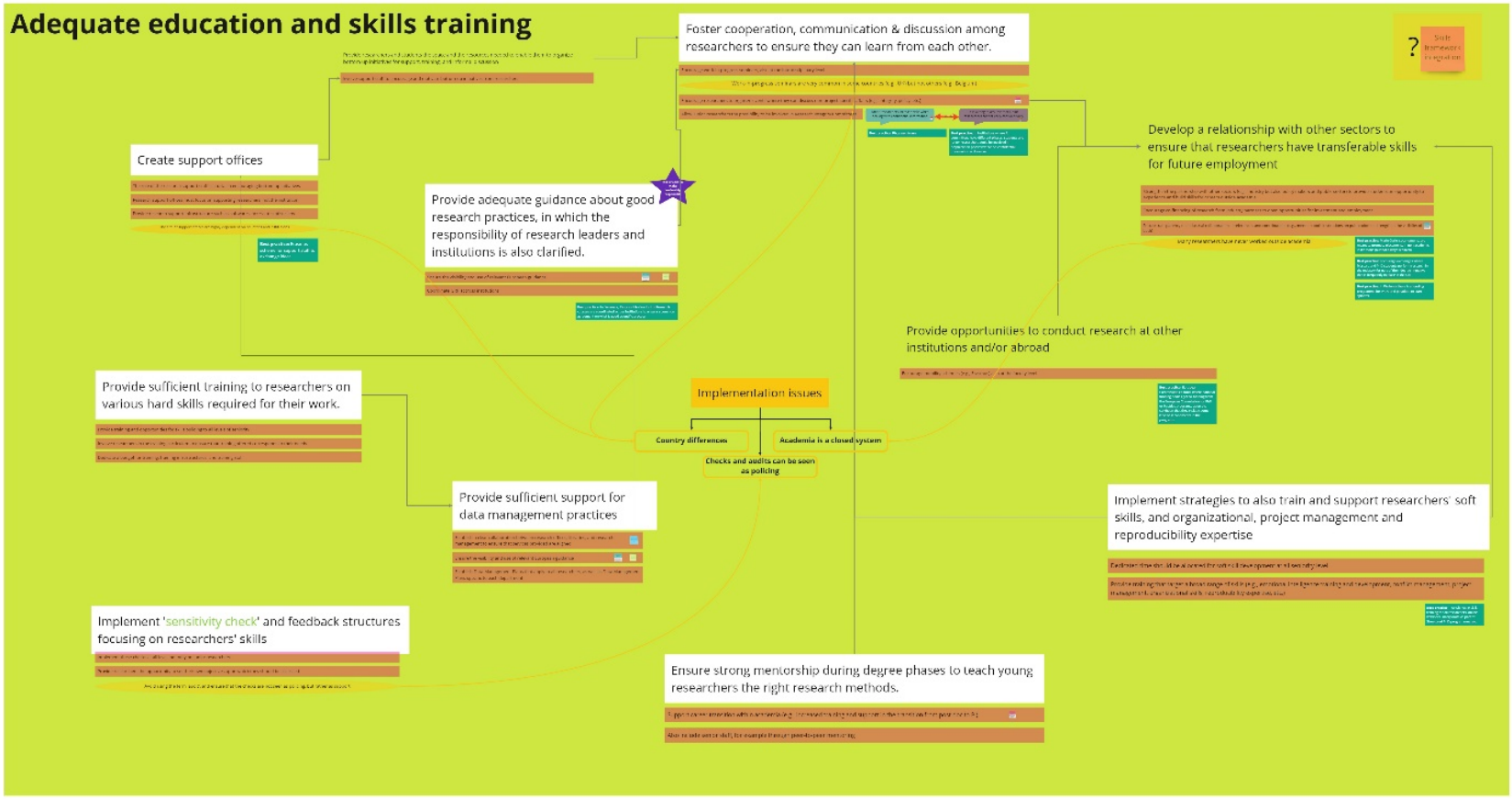


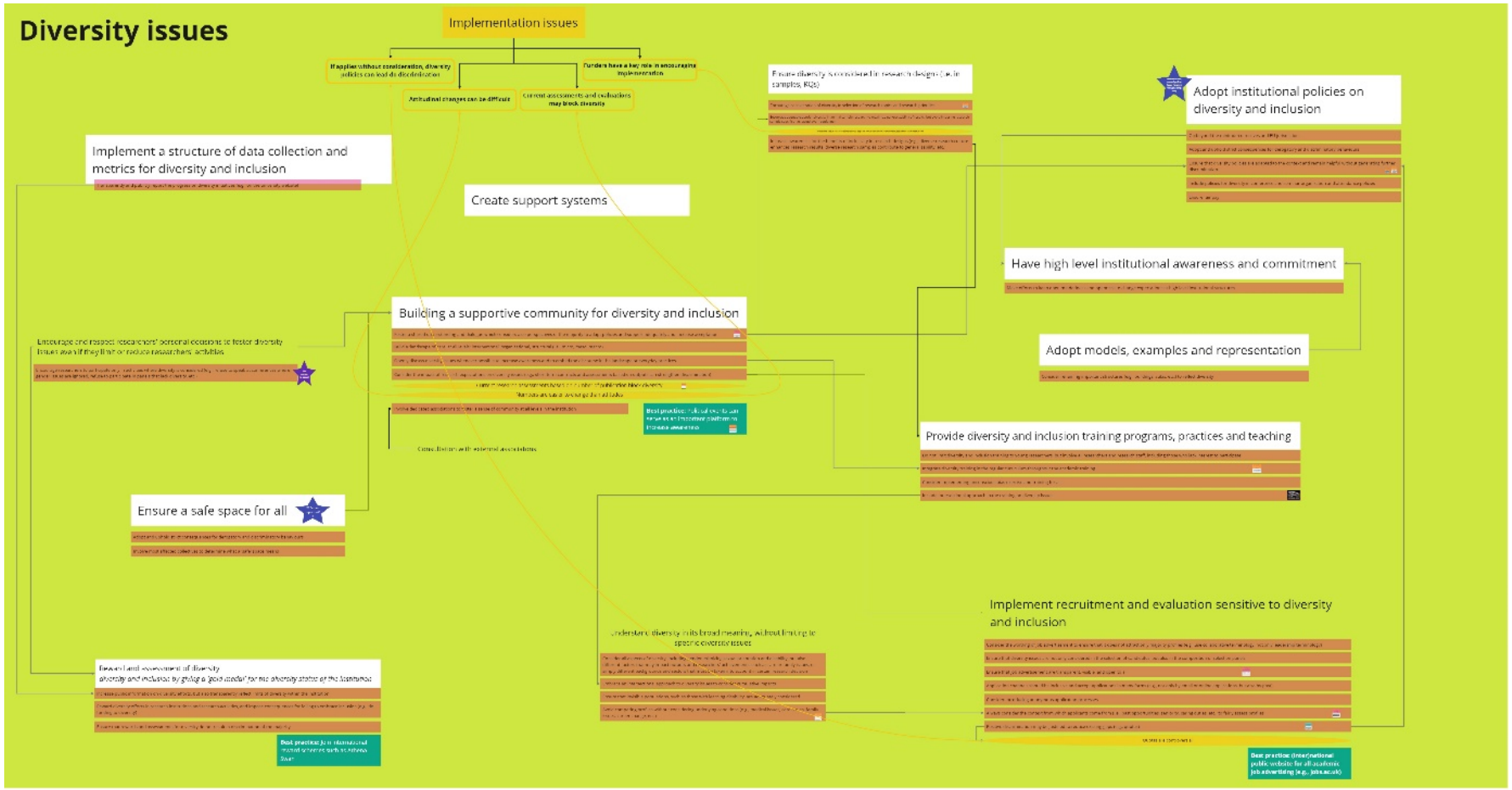
6.9 Analysis posters SET 2 CCWs session boards

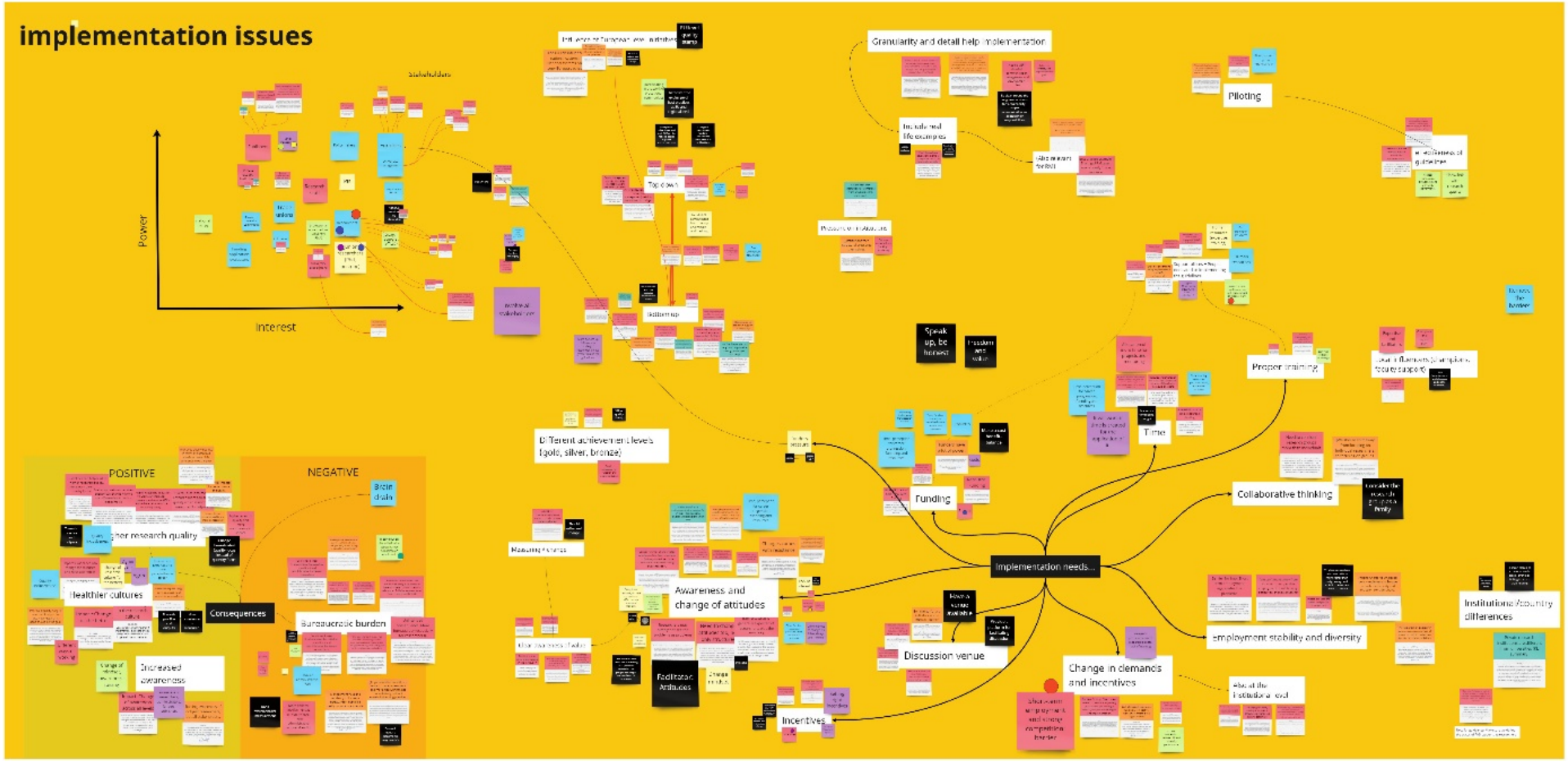
6.9.1 Research environment



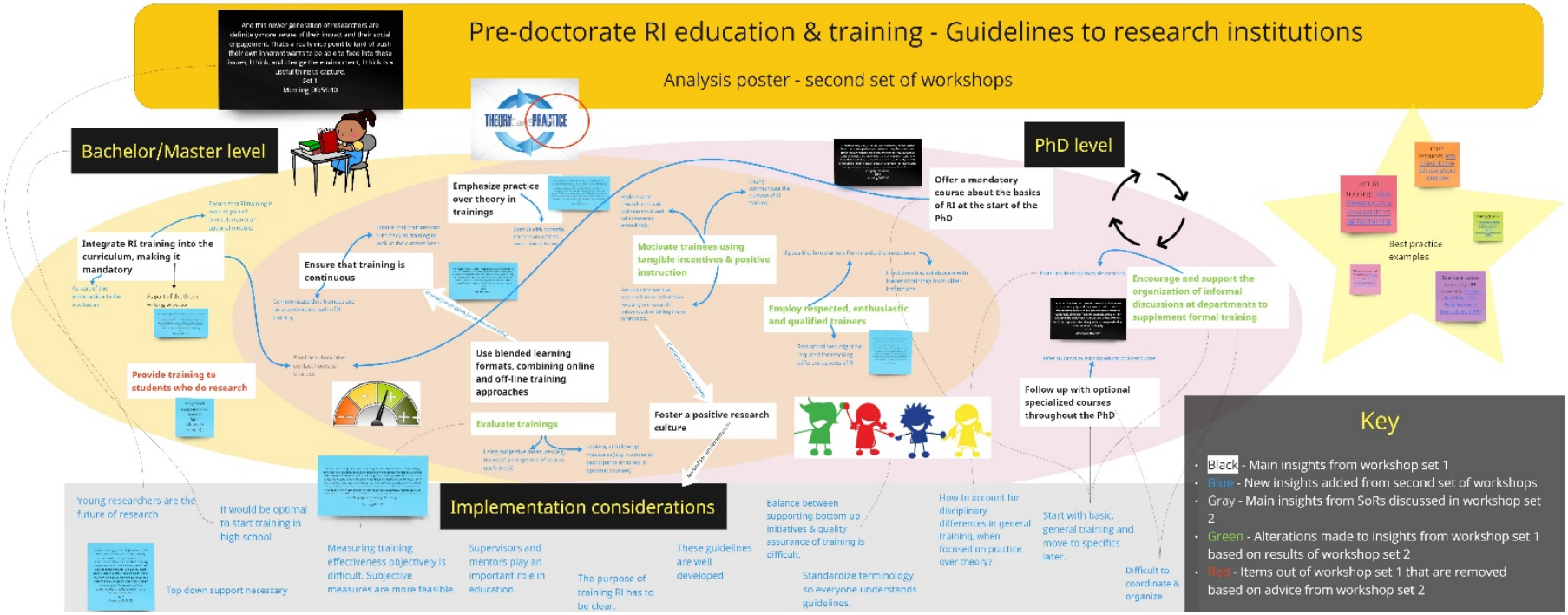

Managing competition and publication pressure
Create and implement a research career roadmap
Provide researchers with the freedom of setting their own research agenda
Involve and collaborate with other stakeholders
Implementation issues
Difficulty of standardization
Stakeholder interdependence
Closed culture of academia
Foster a culture of coordination and collaboration
Ensure that published research is open and transparent
Ensure a balance in researchers' workload
Shared responsibility between the institution and individuals for funding and contracts
Provide rewards and incentives for research, non-research, and non-publication centred activities
Adopt responsible and transparent evaluation practices

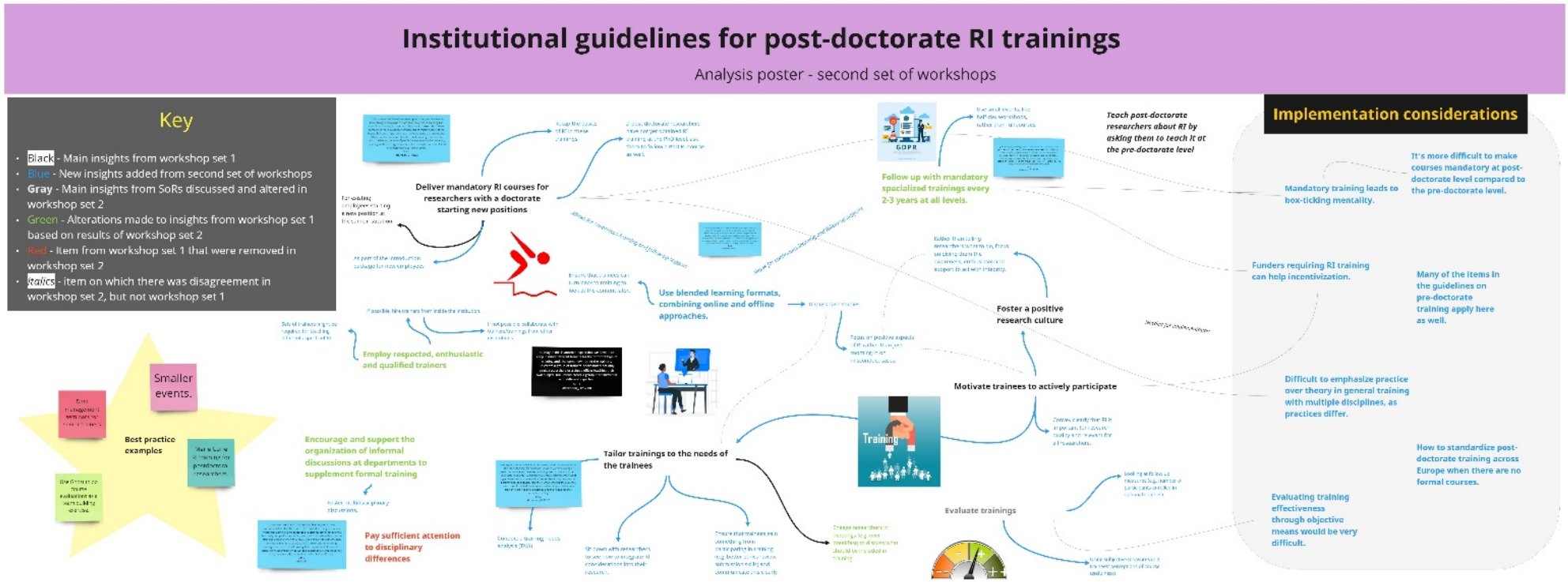

Adequate education and skills training
Foster cooperation, communication & discussion among researchers to ensure they can learn from each other.
Create support offices
Provide adequate guidance about good research practices, in which the responsibility of research leaders and institutions is also clarified.
Develop a relationship with other sectors to ensure that researchers have transferable skills for future employment
Provide opportunities to conduct research at other institutions and/or abroad
Provide sufficient training to researchers on various hard skills required for their work.
Implementation issues
Country differences
Academia is a closed system
Checks and audits can be seen as policing
Provide sufficient support for data management practices
Implement strategies to also train and support researchers' soft skills, and organizational, project management and reproducibility expertise
Implement 'sensitivity check' and feedback structures focusing on researchers' skills
Ensure strong mentorship during degree phases to teach young researchers the right research methods.


Diversity issues
Implementation issues
Implement a structure of data collection and metrics for diversity and inclusion
Create support systems
Adopt institutional policies on diversity and inclusion
Have high level institutional awareness and commitment
Building a supportive community for diversity and inclusion
Adopt models, examples and representation
Provide diversity and inclusion training programs, practices and teaching
Ensure a safe space for all
Implement recruitment and evaluation sensitive to diversity and inclusion

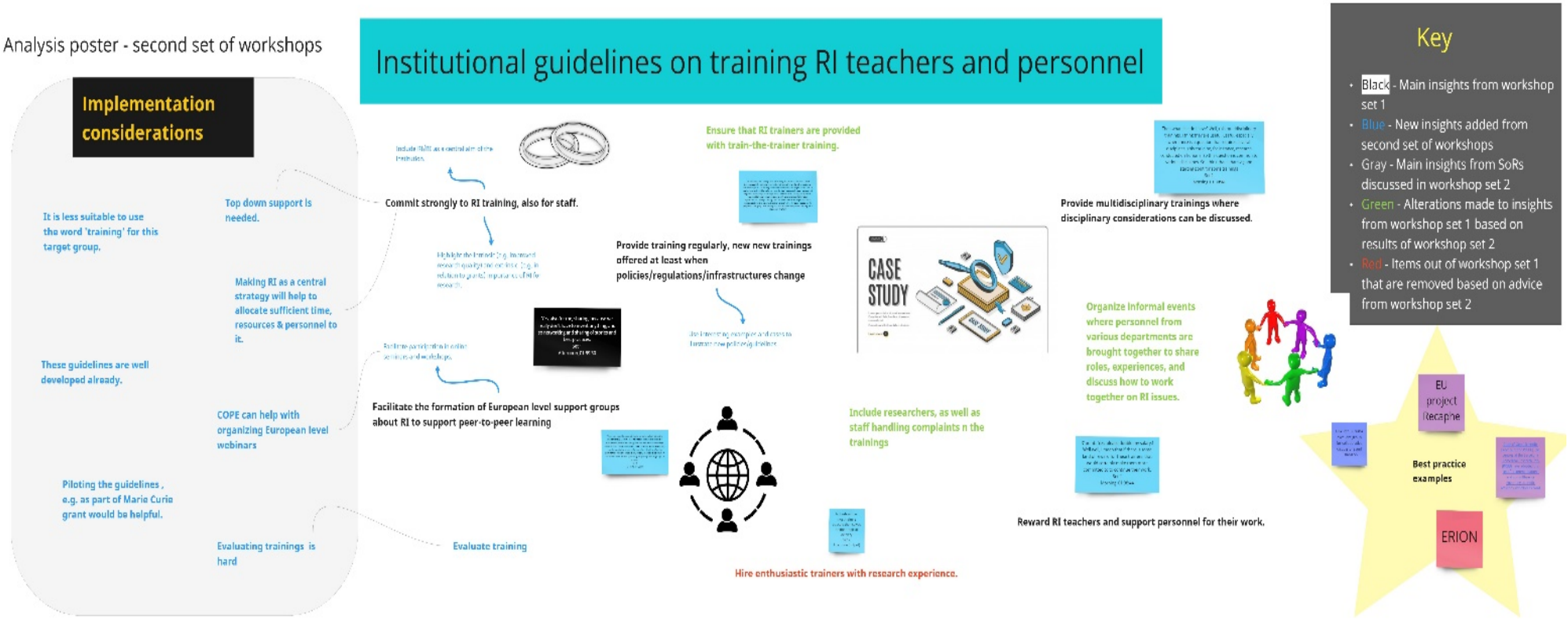

implementation issues
Stakeholders
Power
Interest
Top-down
Bottom-up
Granularity and detail help implementation
Piloting
Speak up, be honest
Proper training
Time
Funding
Collaborative thinking
Different achievement levels (gold, silver, bronze)
POSITIVE
NEGATIVE
Brain drain
Healthier cultures
Consequences
Bureaucratic burden
Increased awareness
Awareness and change of attitudes
Facilitator, Attitudes
Incentives
Discussion venue
Implementation needs...
Change in demands and incentives
employment stability and diversity
Institutional/Country differences

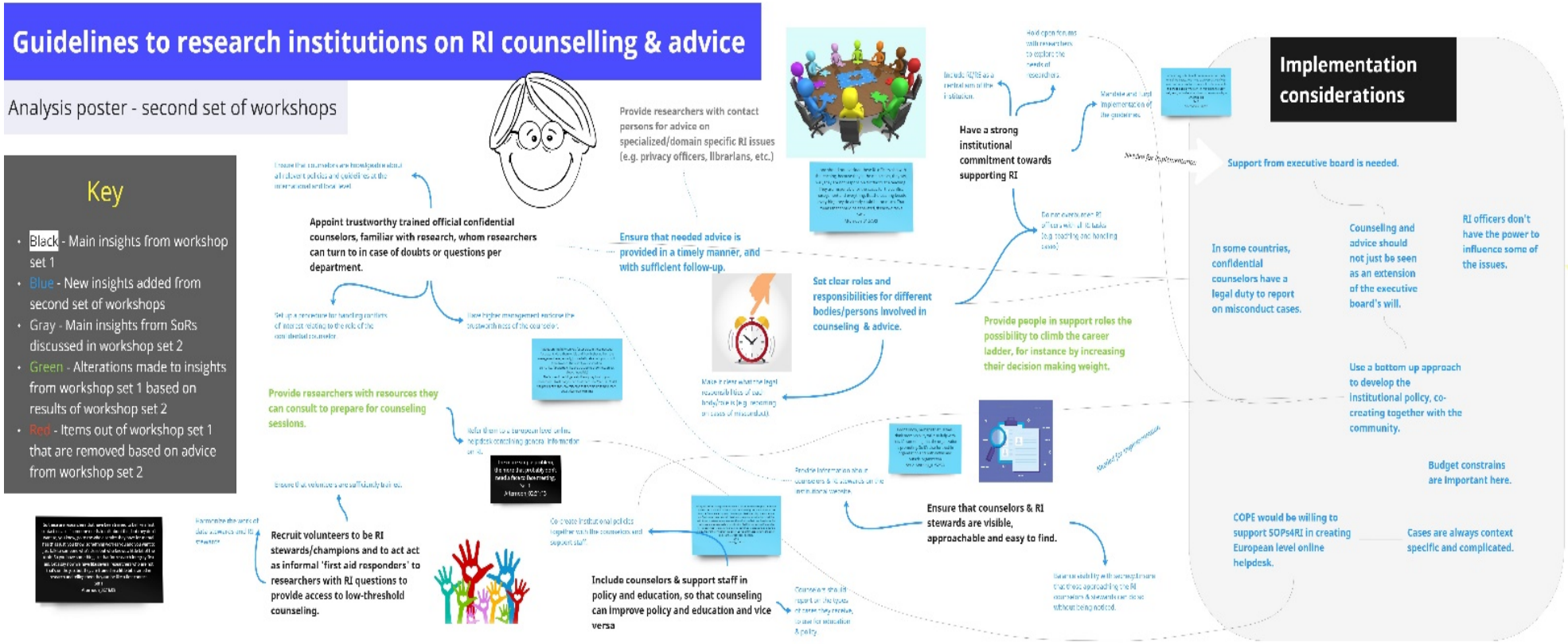
6.9.2 Education and training in RI

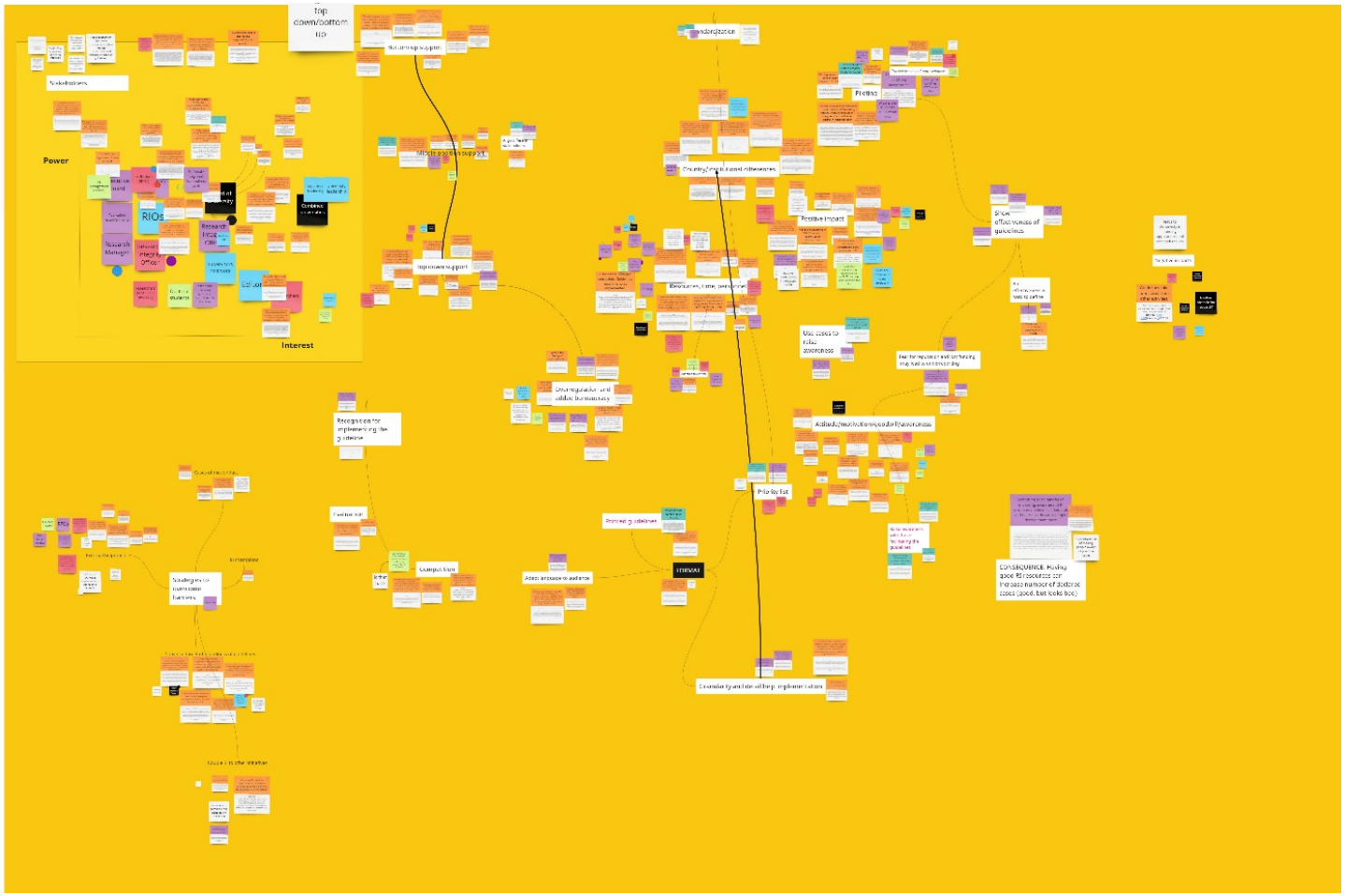



Institutional guidelines for post-doctorate RI trainings
Analysis poster - second set of workshops
Key
Black - Main insights from workshop set 1
Blue - New insights added from second set of workshops
Gray - Main insights from SoRs discussed and altered in workshop set 2
Green - Alterations made to insights from workshop set 1 based on results of workshop set 2
Red - Item from workshop set 1 that were removed in workshop set 2
Italics - item on which there was disagreement in workshop set 2, but not workshop set 1
Implementation considerations
Deliver mandatory RI courses for researchers with a doctorate starting new positions
Teach post-doctorate researchers about RI by asking them to teach it at the pre-doctorate level
Follow up with mandatory specialized trainings every 2-3 years at all levels.
Use blended learning formats, combining online and offline approaches.
Foster a positive research culture
Employ respected, enthusiastic and qualified trainers
Smaller events.
Best practice examples
Encourage and support the organization of informal discussions at departments to supplement formal training
Pay sufficient attention to disciplinary differences
Tailor trainings to the needs of the trainees
Motivate trainees to actively participate
Evaluate trainings
Mandatory training leads to box-ticking mentality.
It's more difficult to make courses mandatory at post-doctorate level compared to the pre-doctorate level.
Funders requiring RI training can help incentivization.
Many of the items in the guidelines on pre-doctorate training apply here as well.
Difficult to emphasize practice over theory in general training with multiple disciplines, as practices differ.
How to standardize post-doctorate training across Europe when there are no formal courses.
Evaluating training effectiveness through objective means would be very difficult.

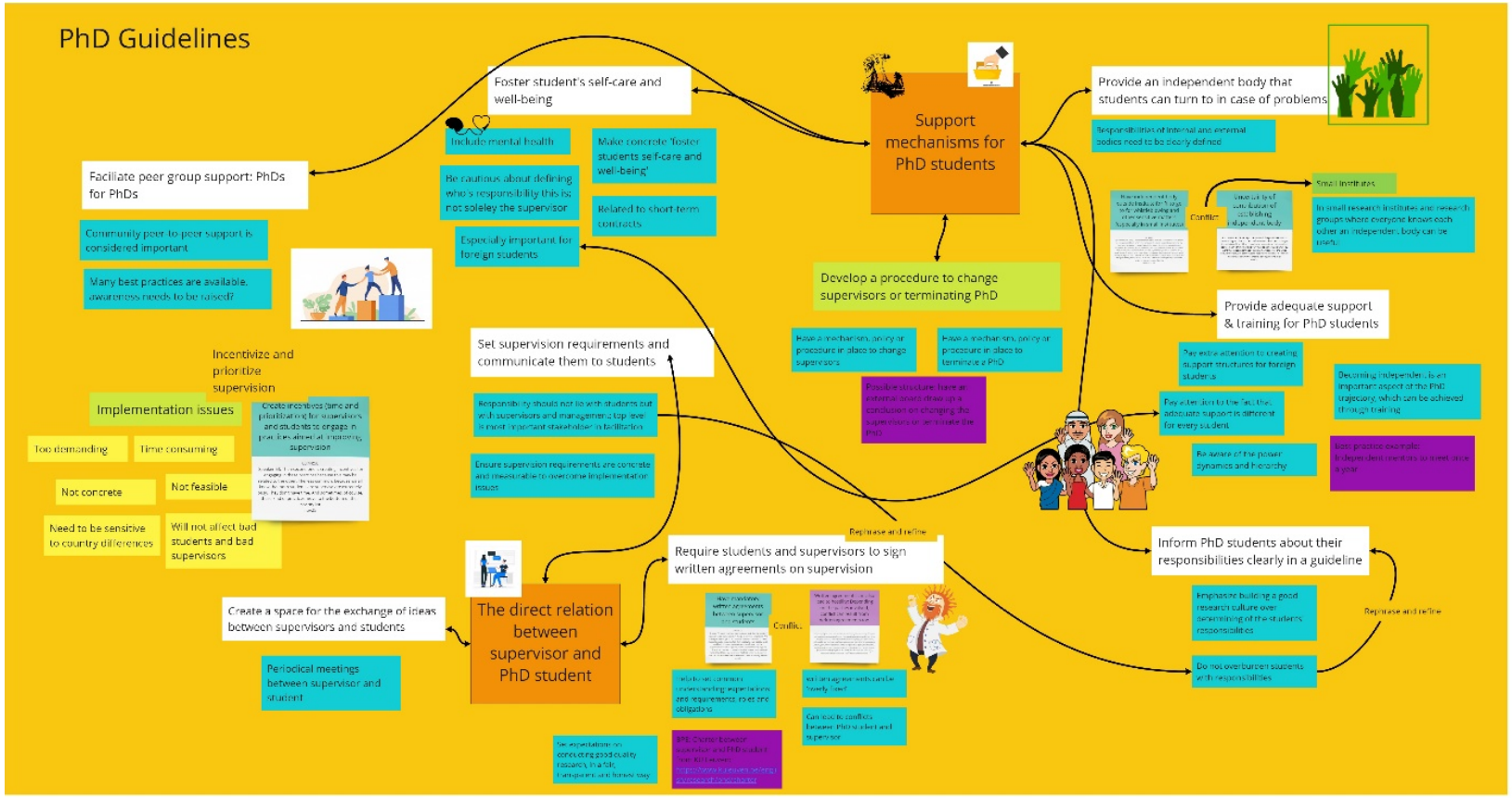
Analysis poster - second set of workshops

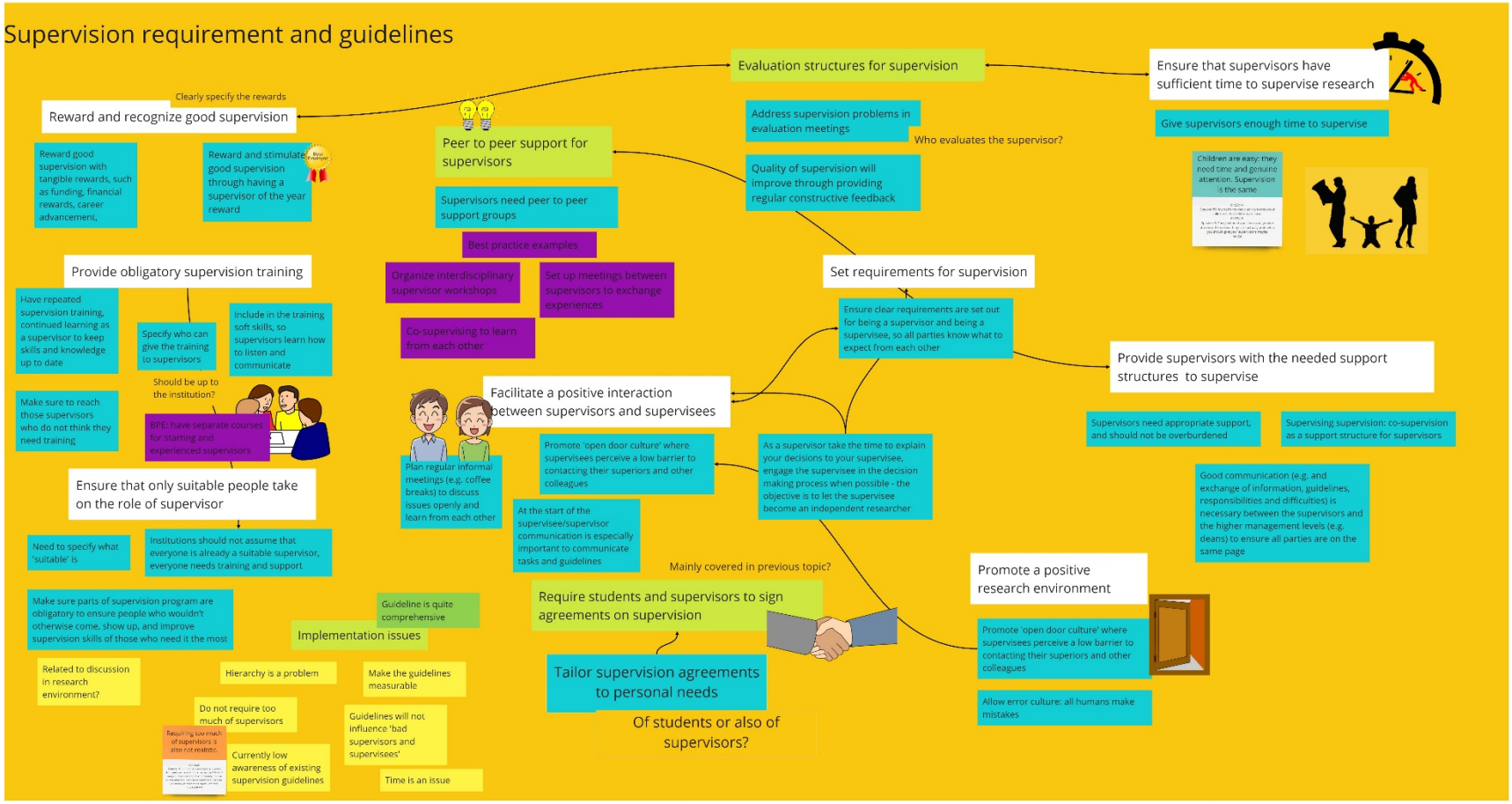


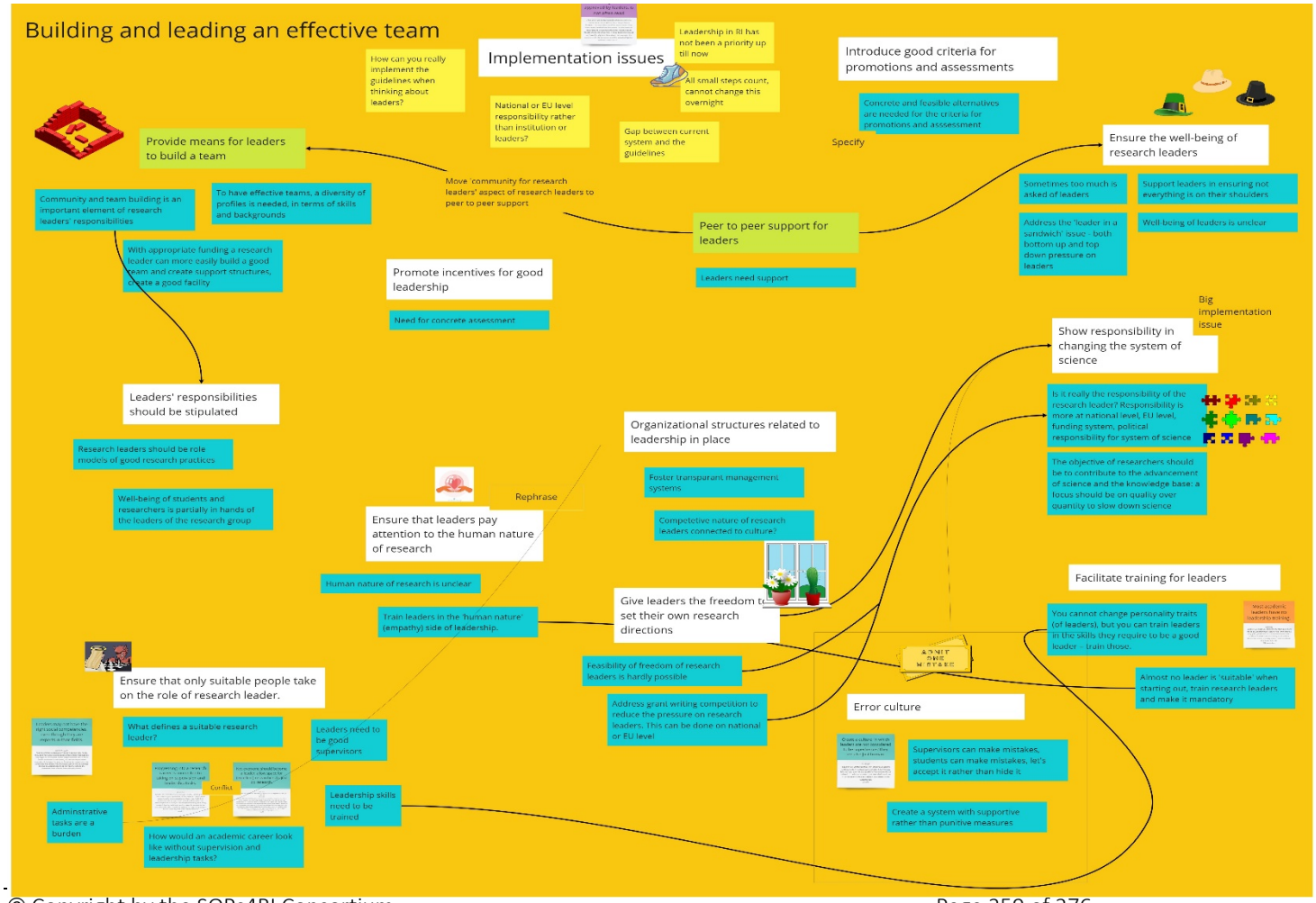

Guidelines to research institutions on RI counselling & advice
Analysis poster - second set of workshops
Key
Black - Main insights from workshop set 1
Blue - New insights added from second set of workshops
Gray - Main insights from SoRs discussed in workshop set 2
Green - Alterations made to insights from workshop set 1 based on results of workshop set 2
Red - Items out of workshop set 1 that are removed based on advice from workshop set 2
Provide researchers with contact persons for advice on specialized/domain specific RI issues (e.g. privacy officers, librarians, etc.)
Appoint trustworthy trained official confidential counselors, familiar with research, whom researchers can turn to in case of doubts or questions per department.
Ensure that needed advice is provided in a timely manner, and with sufficient follow-up.
Have a strong institutional commitment towards supporting RI
Set clear roles and responsibilities for different bodies/persons involved in counseling & advice.
Provide people in support roles the possibility to climb the career ladder, for instance by increasing their decision making weight.
Provide researchers with resources they can consult to prepare for counseling sessions.
Recruit volunteers to be RI stewards/champions and to act act as informal 'first aid responders' to researchers with RI questions to provide access to low-threshold counseling.
Include counselors & support staff in policy and education, so that counseling can improve policy and education and vice versa
Ensure that counselors & RI stewards are visible, approachable and easy to find.
Implementation considerations
Support from executive board is needed.
In some countries, confidential counselors have a legal duty to report on misconduct cases.
Counseling and advice should not just be seen as an extension of the executive board's will.
RI officers don't have the power to influence some of the issues.
Use a bottom up approach to develop the institutional policy, co-creating together with the community.
Budget constrains are important here.
COPE would be willing to support SOPs4RI in creating European level online helpdesk.
Cases are always context specific and complicated.

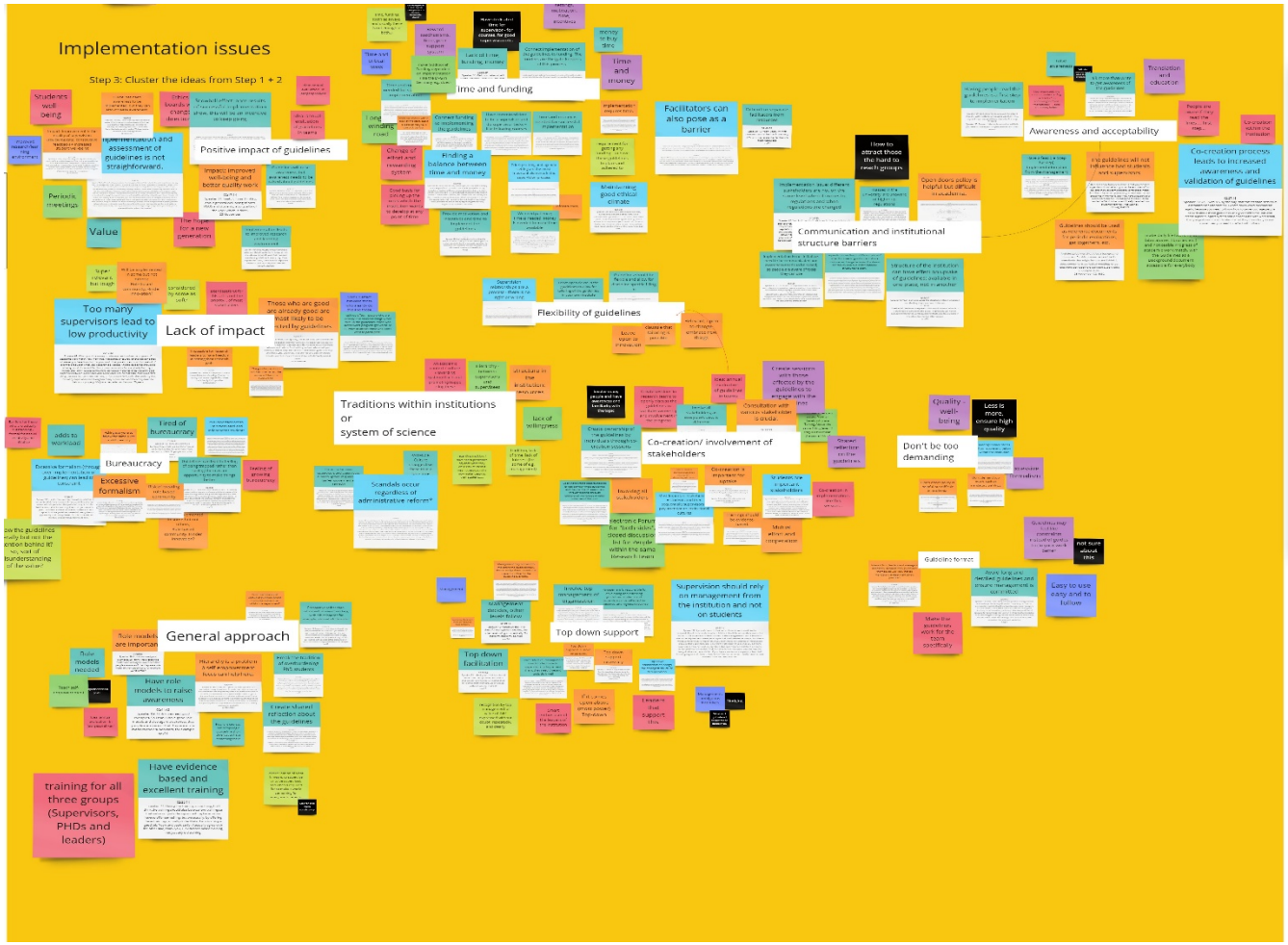

Top down/bottom up
Power
RIOs
Interest
Positive impact
Priorities
INFORM

6.9.3 Responsible supervision and mentoring

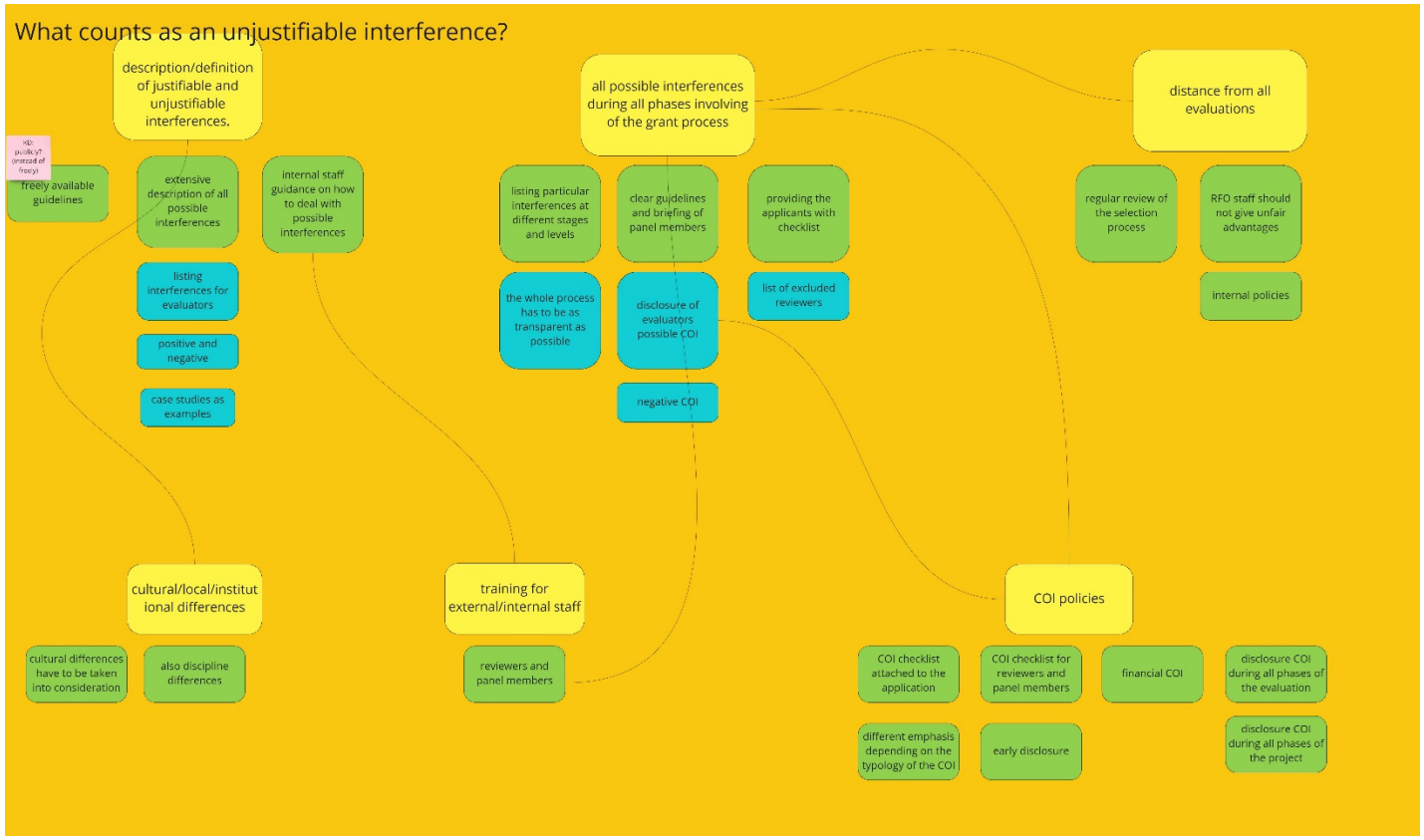


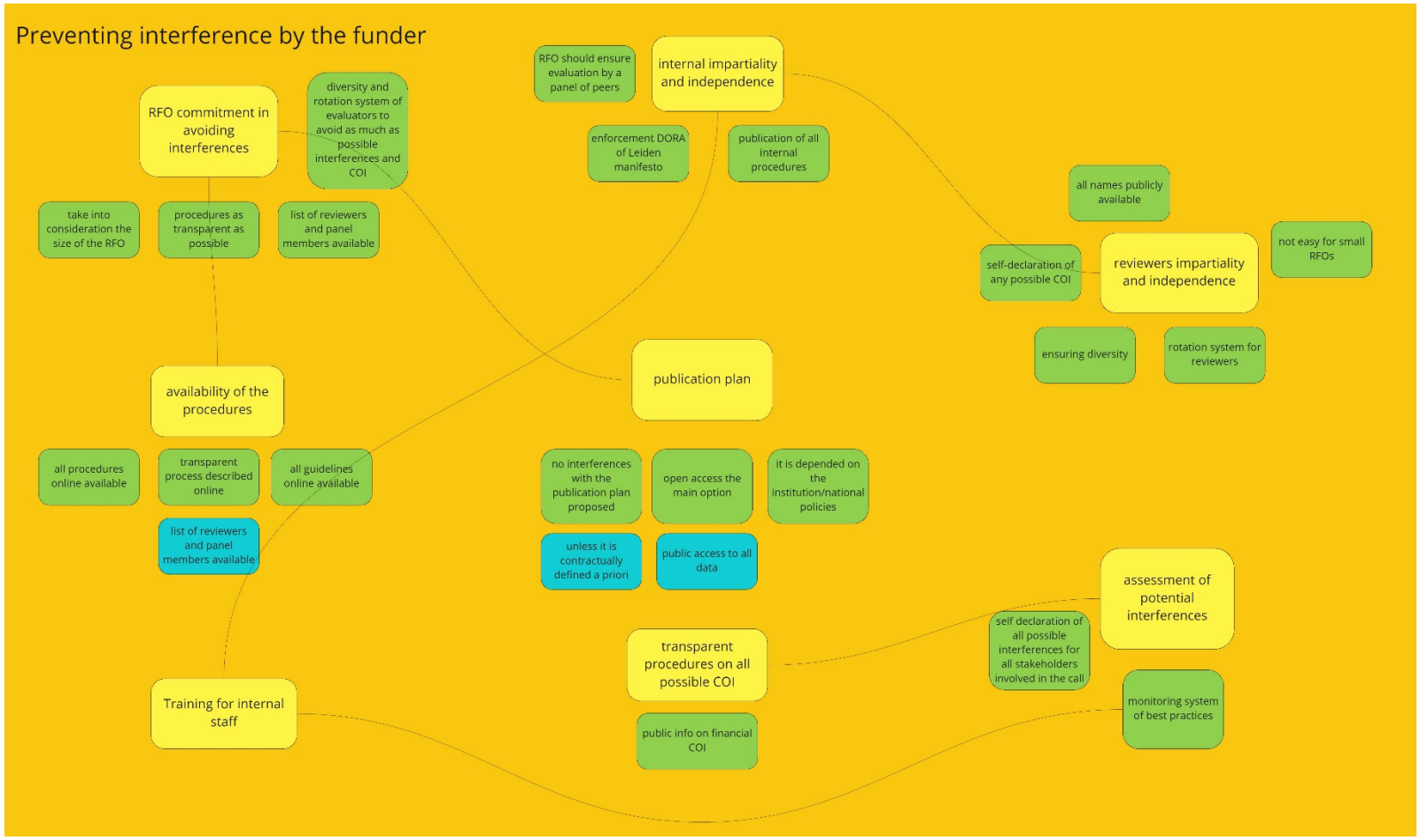

Supervision requirement and guidelines
Evaluation structures for supervision
Ensure that supervisors have sufficient time to supervise research
Give supervisors enough time to supervise
Children are easy: they need time and genuine attention. Supervision is the same
Clearly specify the rewards
Reward and recognize good supervision
Reward good supervision with tangible rewards, such as funding, financial rewards, career advancement,
Reward and stimulate good supervision through having a supervisor of the year reward
Peer to peer support for supervisors
Supervisors need peer to peer support groups
Best practice examples
Organize interdisciplinary supervisor workshops
Set up meetings between supervisors to exchange experiences
Co-supervising to learn from each other
Address supervision problems in evaluation meetings
Who evaluates the supervisor?
Quality of supervision will improve through providing regular constructive feedback
Provide obligatory supervision training
Have repeated supervision training, continued learning as a supervisor to keep skills and knowledge up to date
Specify who can give the training to supervisors
Include in the training soft skills, so supervisors learn how to listen and communicate
Should be up to the institution?
Make sure to reach those supervisors who do not think they need training
BPE: have separate courses for starting and experienced supervisors
Ensure that only suitable people take on the role of supervisor
Need to specify what 'suitable' is
Institutions should not assume that everyone is already a suitable supervisor, everyone needs training and support
Make sure parts of supervision program are obligatory to ensure people who wouldn't otherwise come, show up, and improve supervision skills of those who need it the most
Related to discussion in research environment?
Set requirements for supervision
Ensure clear requirements are set out for being a supervisor and being a supervisee, so all parties know what to expect from each other
Provide supervisors with the needed support structures to supervise
Supervisors need appropriate support, and should not be overburdened
Supervising supervision: co-supervision as a support structure for supervisors
Good communication (e.g. and exchange of information, guidelines, responsibilities and difficulties) is necessary between the supervisors and the higher management levels (e.g. deans) to ensure all parties are on the same page
Facilitate a positive interaction between supervisors and supervisees
Plan regular informal meetings (e.g. coffee breaks) to discuss issues openly and learn from each other
Promote 'open door culture' where supervisees perceive a low barrier to contacting their superiors and other colleagues
At the start of the supervisee/supervisor communication is especially important to communicate tasks and guidelines
As a supervisor take the time to explain your decisions to your supervisee, engage the supervisee in the decision making process when possible - the objective is to let the supervisee become an independent researcher
Mainly covered in previous topic?
Require students and supervisors to sign agreements on supervision
Tailor supervision agreements to personal needs
Of students or also of supervisors?
Promote a positive research environment
Promote 'open door culture' where supervisees perceive a low barrier to contacting their superiors and other colleagues
Allow error culture: all humans make mistakes
Implementation issues
Guideline is quite comprehensive
Hierarchy is a problem
Make the guidelines measurable
Do not require too much of supervisors
Guidelines will not influence 'bad supervisors and supervisees'
Currently low awareness of existing supervision guidelines
Time is an issue

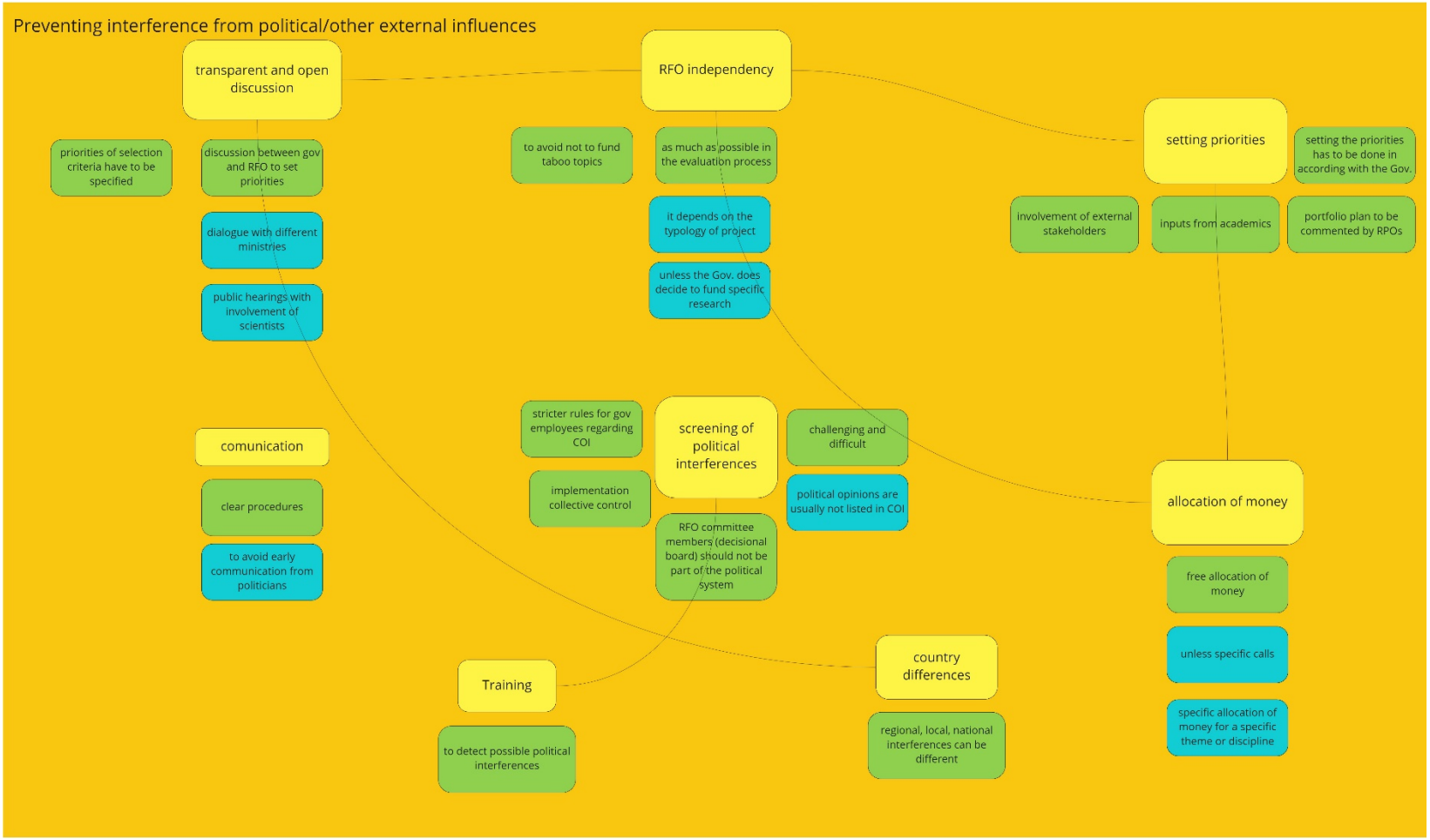

Building and leading an effective team
Implementation issues
How can you really implement the guidelines when thinking about leaders?
Leadership in RI has not been a priority up till now
All small steps count, cannot change this overnight
National or EU level responsibility rather than institution or leaders?
Gap between current system and the guidelines
Introduce good criteria for promotions and assessments
Concrete and feasible alternatives are needed for the criteria for promotions and assessment
Specify
Provide means for leaders to build a team
Community and team building is an important element of research leaders' responsibilities
To have effective teams, a diversity of profiles is needed, in terms of skills and backgrounds
With appropriate funding a research leader can more easily build a good team and create support structures, create a good facility
Move 'community for research leaders' aspect of research leaders to peer to peer support
Peer to peer support for leaders
Leaders need support
Ensure the well-being of research leaders
Sometimes too much is asked of leaders
Support leaders in ensuring not everything is on their shoulders
Address the 'leader in a sandwich' issue - both bottom up and top down pressure on leaders
Well-being of leaders is unclear
Promote incentives for good leadership
Need for concrete assessment
Big implementation issue
Show responsibility in changing the system of science
Leaders' responsibilities should be stipulated
Research leaders should be role models of good research practices
Well-being of students and researchers is partially in hands of the leaders of the research group
Is it really the responsibility of the research leader? Responsibility is more at national level, EU level, funding system, political responsibility for system of science
The objective of researchers should be to contribute to the advancement of science and the knowledge base: a focus should be on quality over quantity to slow down science
Organizational structures related to leadership in place
Foster transparant management systems
Rephrase
Ensure that leaders pay attention to the human nature of research
Competotive nature of research leaders connected to culture?
Human nature of research is unclear
Facilitate training for leaders
Train leaders in the 'human nature' (empathy) side of leadership.
Give leaders the freedom to set their own research directions
You cannot change personality traits (of leaders), but you can train leaders in the skills they require to be a good leader - train those.
Ensure that only suitable people take on the role of research leader.
Feasibility of freedom of research leaders is hardly possible
Almost no leader is 'suitable' when starting out, train research leaders and make it mandatory
Address grant writing competition to reduce the pressure on research leaders. This can be done on national or EU level
Error culture
What defines a suitable research leader?
Leaders need to be good supervisors
Supervisors can make mistakes, students can make mistakes, let's accept it rather than hide it
Conflict
Leadership skills need to be trained
Adminstrative tasks are a burden
How would an academic career look like without supervision and leadership tasks?
Create a system with supportive rather than punitive measures

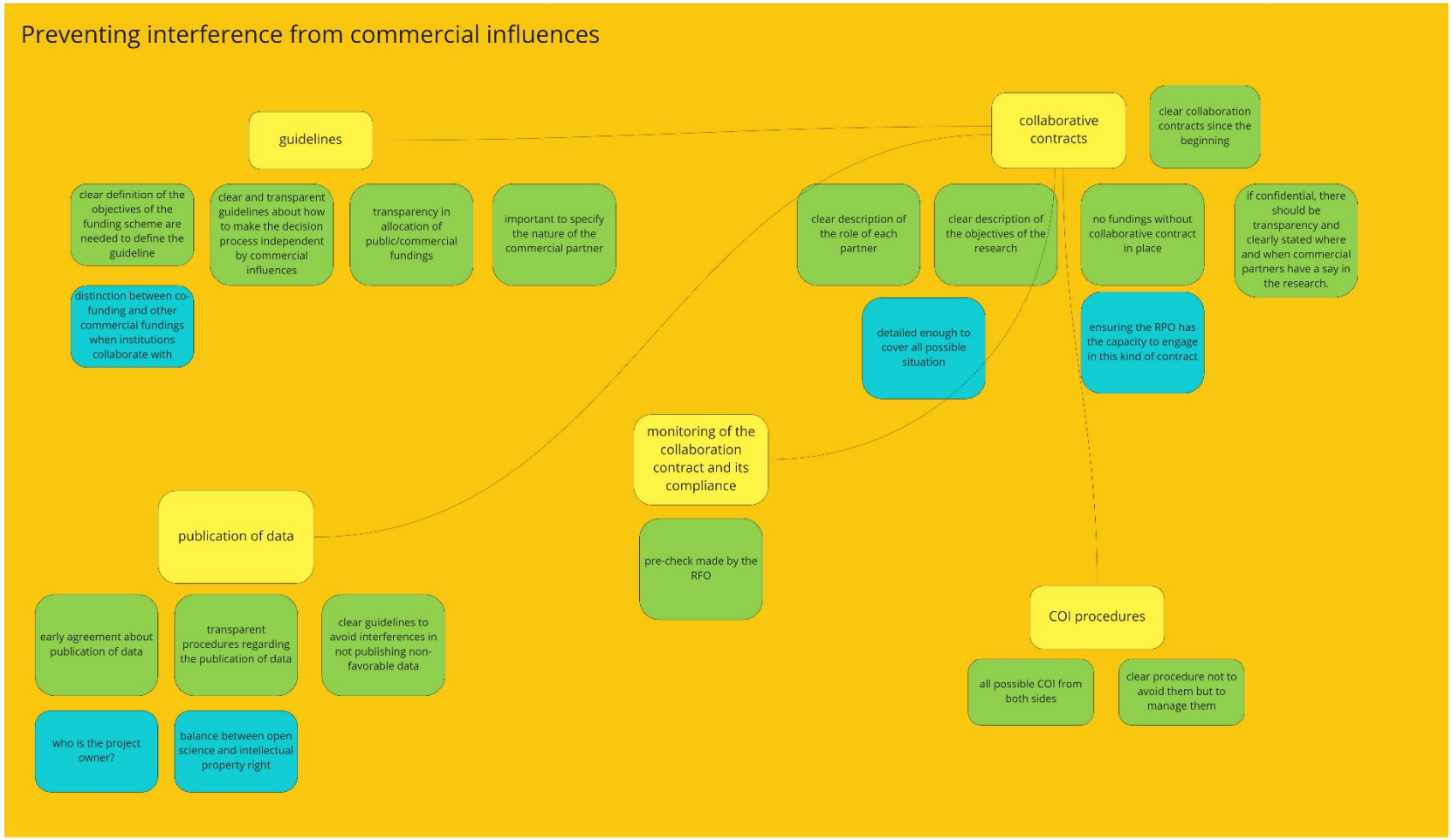

Implementation issues
Step 3: Cluster the ideas from Step 1 + 2
Time and funding
Time and money
Facilitators can also pose as a barrier
Translation and education
Awareness and acceptability
Co-creation process leads to increased awareness and validation of guidelines
Positive impact of guidelines
Finding a balance between time and money
Communication and institutional structure barriers
Value
Too many supervisors lead to low productivity
Lack of impact
Flexibility of guidelines
Traditions within institutions or system of science
Co-creation/ involvement of stakeholders
Quality well-being
Less is more, ensure high quality
Don't be too demanding
Bureaucracy
Excessive formalism
Scandals occur regardless of administrative reform
Supervision should rely on management from the institution and not on students
Easy to use easy and to follow
General approach
Top down support
Top down facilitation
Have role models to raise awareness
Have evidence based and excellent training
training for all three groups (Supervisors, PHDs and leaders)

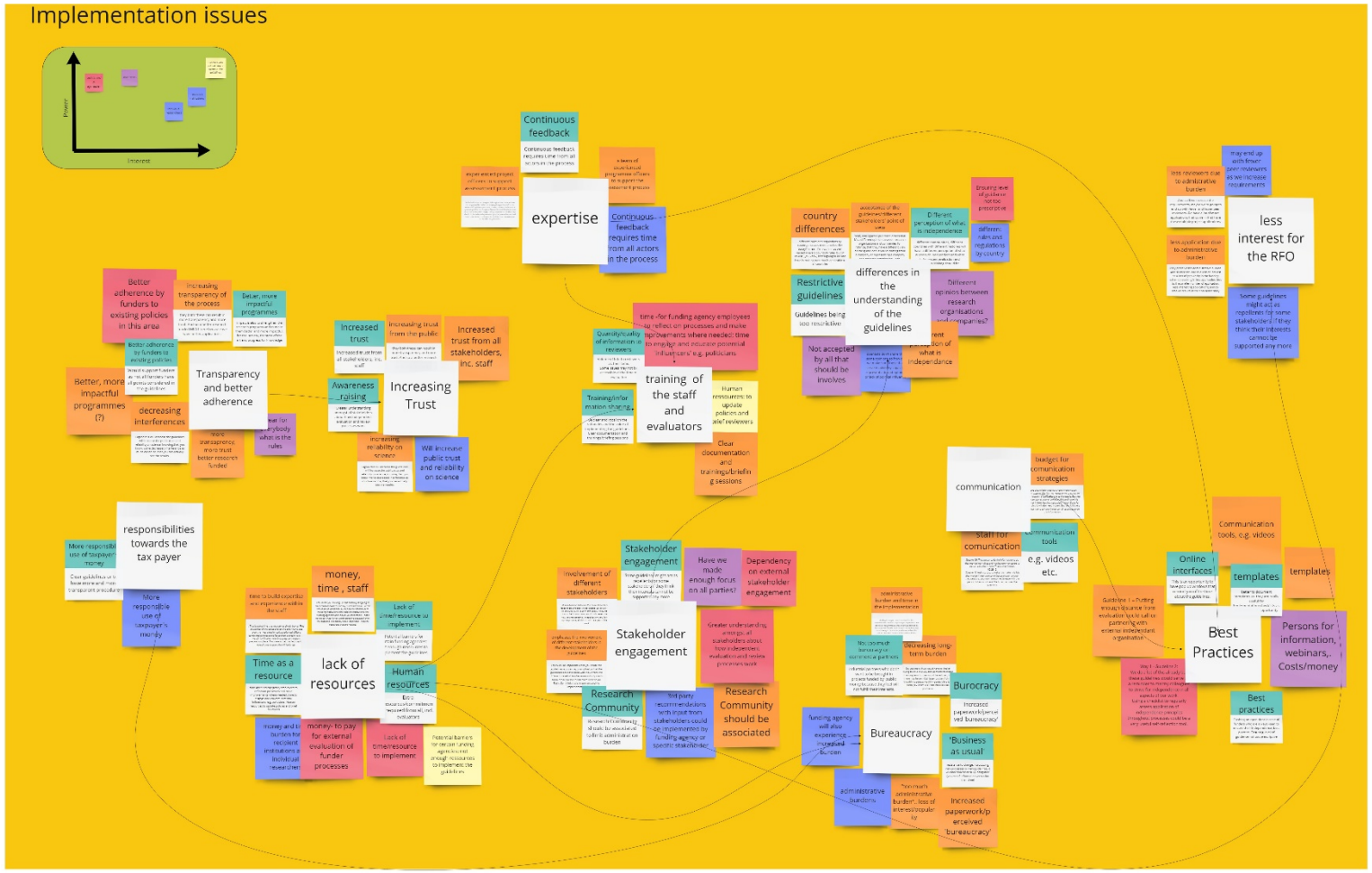
6.9.4 Independence



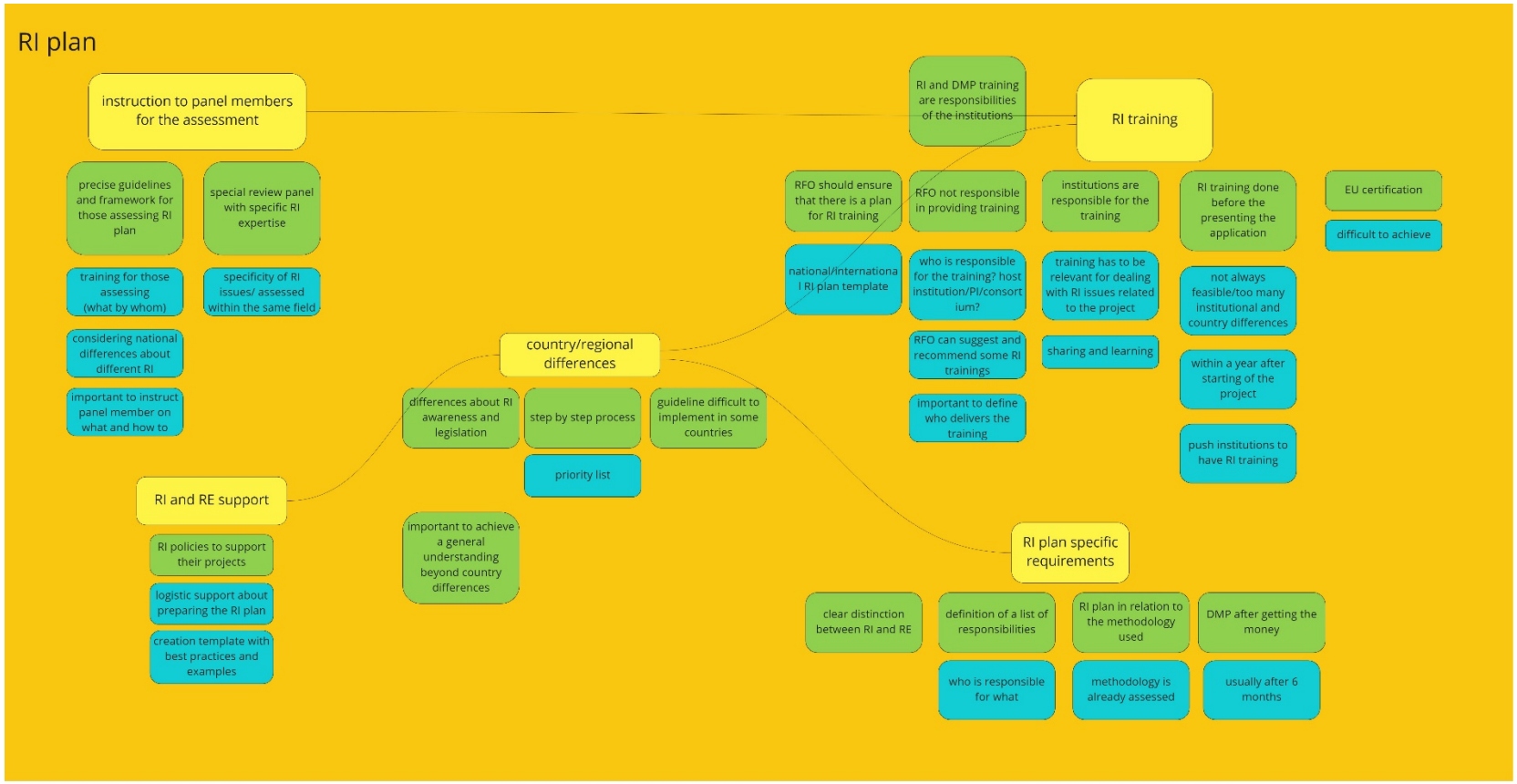

Preventing interference by the funder
RFO commitment in avoiding interferences
diversity and rotation system of evaluators to avoid as much as possible interferences and COI
take into consideration the size of the RFO
procedures as transparent as possible
list of reviewers and panel members available
availability of the procedures
all procedures online available
transparent process described online
all guidelines online available
list of reviewers and panel members available
Training for internal staff
RFO should ensure evaluation by a panel of peers
internal impartiality and independence
enforcement DORA of Leiden manifesto
publication of all internal procedures
publication plan
no interferences with the publication plan proposed
open access the main option
it is depended on the institution/national policies
unless it is contractually defined a priori
public access to all data
transparent procedures on all possible COI
public info on financial COI
all names publicly available
self-declaration of any possible COI
reviewers impartiality and independence
not easy for small RFOs
ensuring diversity
rotation system for reviewers
assessment of potential interferences
self declaration of all possible interferences for all stakeholders involved in the call
monitoring system of best practices

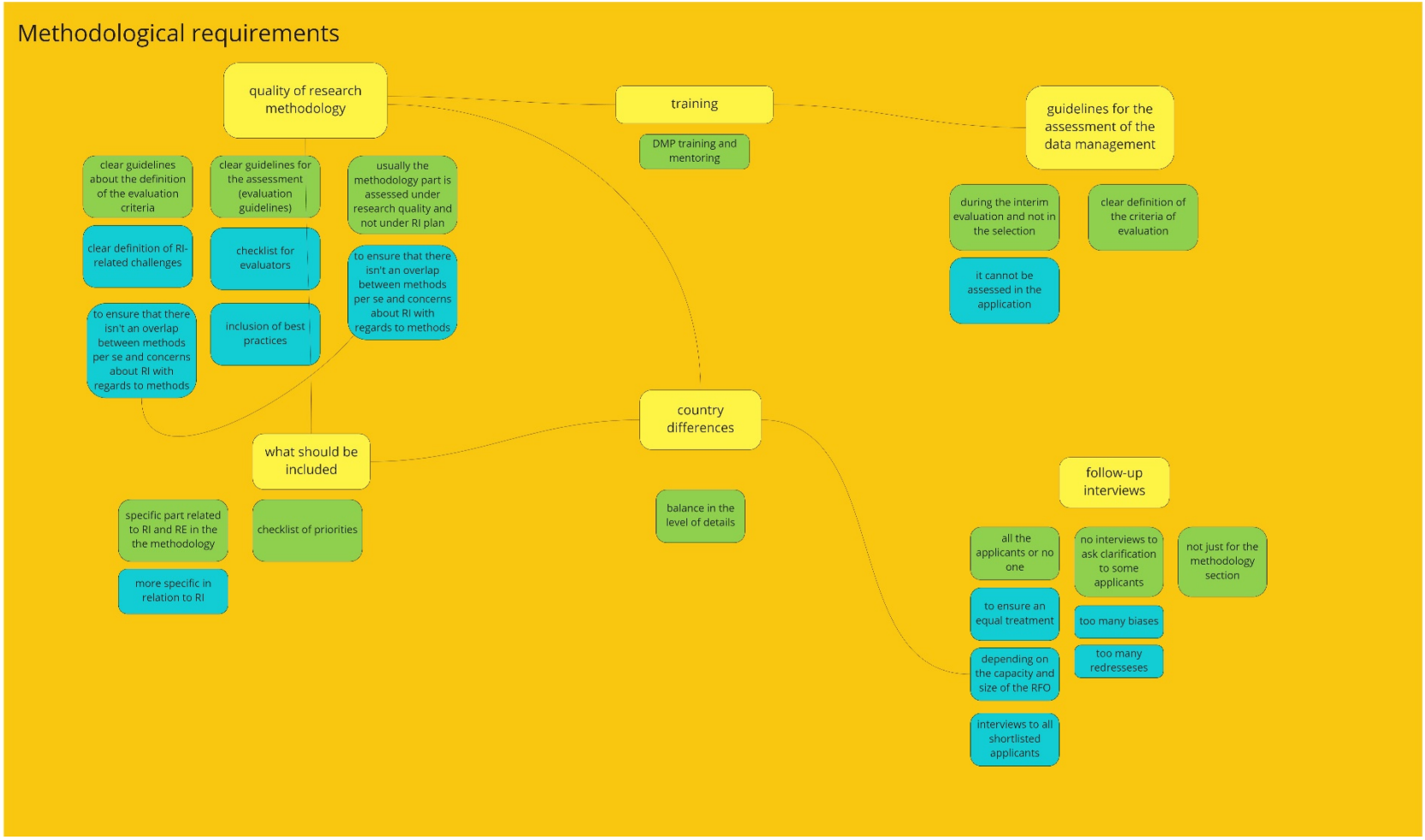

Preventing interference from political/other external influences
transparent and open discussion
RFO independency
setting priorities
setting the priorities has to be done in according with the Gov.
priorities of selection criteria have to be specified
discussion between gov and RFO to set priorities
dialogue with different ministries
public hearings with involvement of scientists
to avoid not to fund taboo topics
as much as possible in the evaluation process
it depends on the typology of project
unless the Gov. does decide to fund specific research
involvement of external stakeholders
inputs from academics
portfolio plan to be commented by RPOs
comunication
clear procedures
to avoid early communication from politicians
stricter rules for gov employees regarding COI
screening of political interferences
challenging and difficult
implementation collective control
political opinions are usually not listed in COI
RFO committee members (decisional board) should not be part of the political system
allocation of money
free allocation of money
unless specific calls
specific allocation of money for a specific theme or discipline
Training
to detect possible political interferences
country differences
regional, local, national interferences can be different

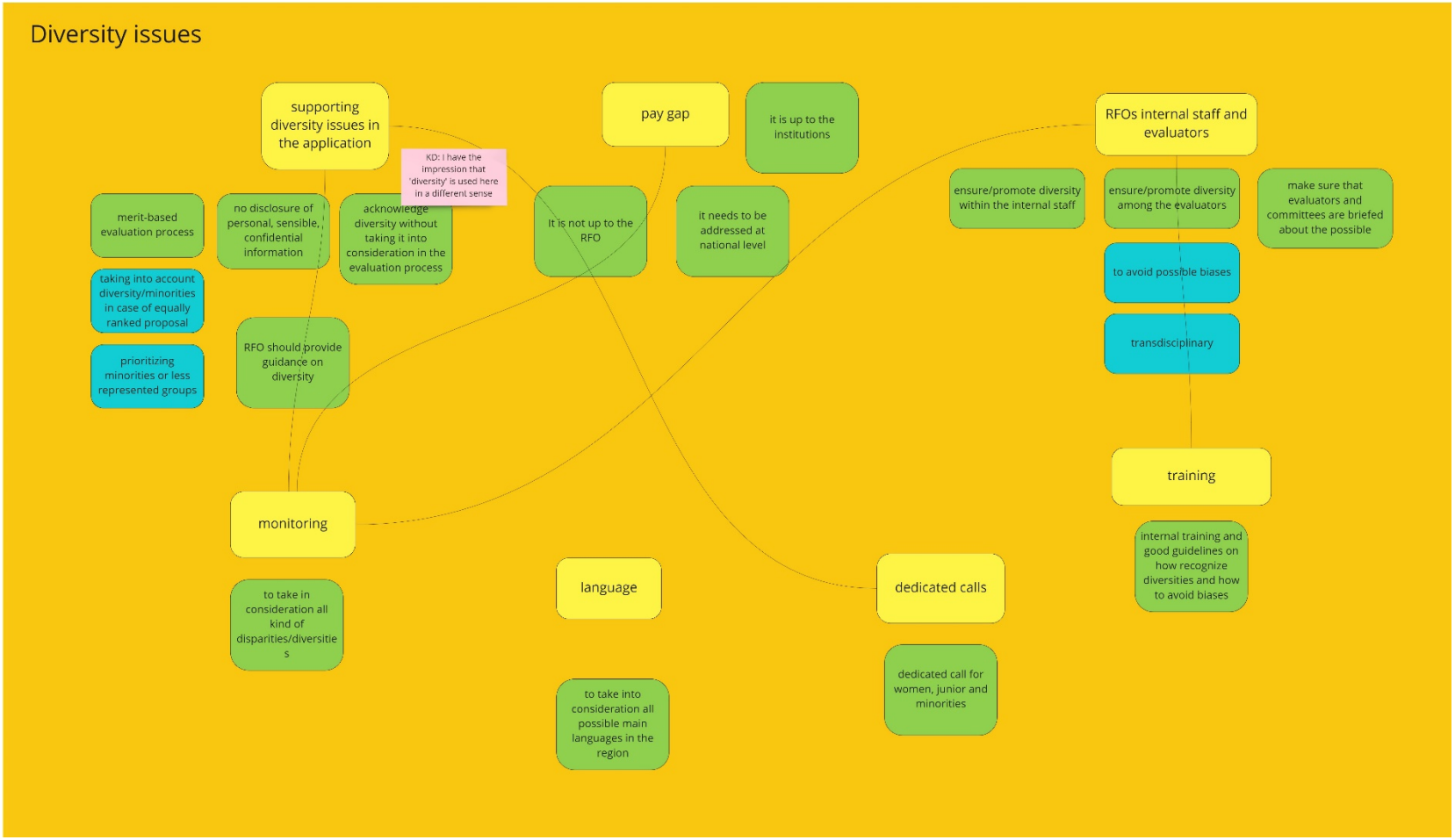

Preventing interference from commercial influences
guidelines
clear definition of the objectives of the funding scheme are needed to define the guideline
clear and transparent guidelines about how to make the decision process independent by commercial influences
transparency in allocation of public/commercial fundings
important to specify the nature of the commercial partner
distinction between co-funding and other commercial fundings when institutions collaborate with
collaborative contracts
clear collaboration contracts since the beginning
clear description of the role of each partner
clear description of the objectives of the research
no fundings without collaborative contract in place
if confidential, there should be transparency and clearly stated where and when commercial partners have a say in the research.
detailed enough to cover all possible situation
ensuring the RPO has the capacity to engage in this kind of contract
monitoring of the collaboration contract and its compliance
pre-check made by the RFO
publication of data
early agreement about publication of data
transparent procedures regarding the publication of data
clear guidelines to avoid interferences in not publishing non-favorable data
who is the project owner?
balance between open science and intellectual property right
COI procedures
all possible COI from both sides
clear procedure not to avoid them but to manage them

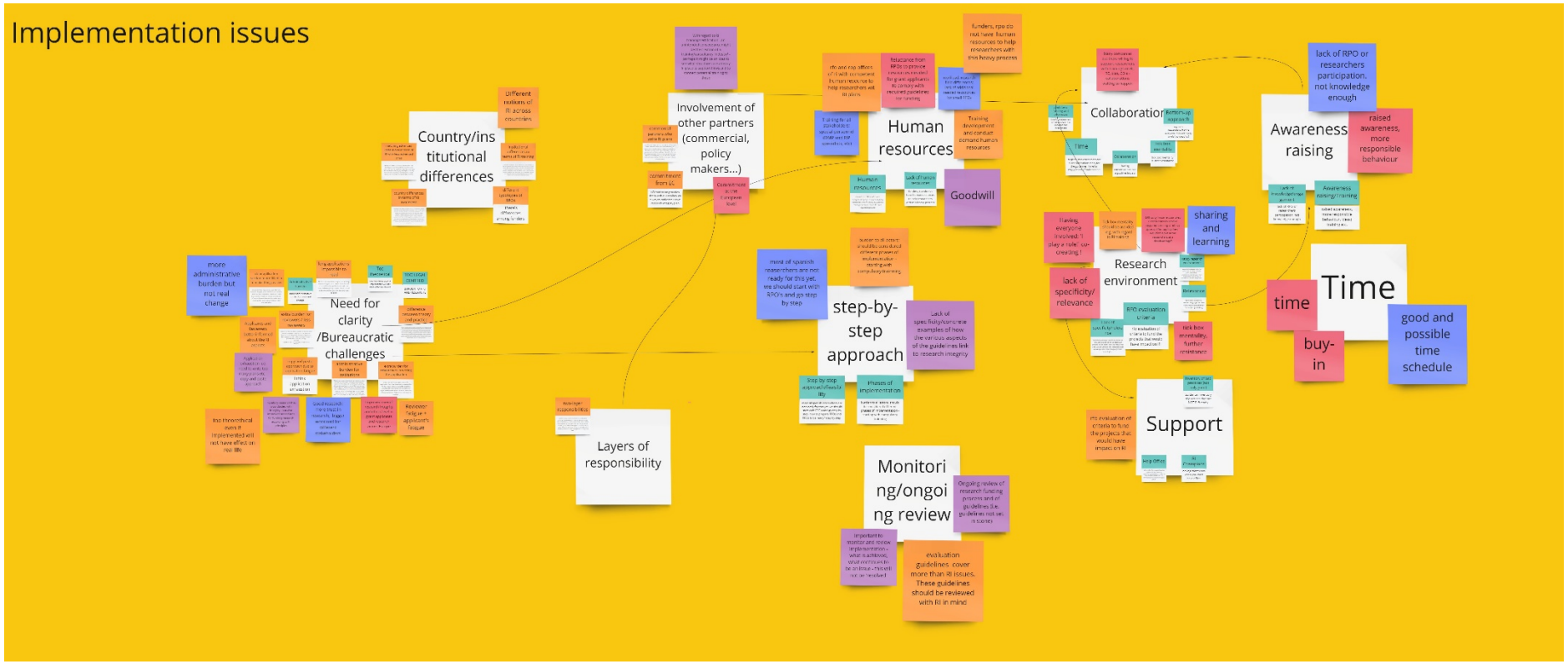

Implementation issues
Continuous feedback
expertise
Continuous feedback requires time from all actors in the process
country differences
differences in the understanding of the guidelines
Restrictive guidelines
less interest for the RFO
Better adherence by funders to existing policies in this area
Increasing transparency of the process
Better, more impactful programmes
Transparency and better adherence
Better, more impactful programmes (?)
decreasing interferences
Increased trust
Increasing trust from the public
Increased trust from all stakeholders, inc. staff
Awareness raising
Increasing Trust
Will increase public trust and reliability on science
training of the staff and evaluators
Human resources to update policies and site reviewers
Clear documentation and trainings/briefing sessions
communication
budget for comunication strategies
staff for comunication
communication tools
e.g. videos etc.
Communication tools, e.g. videos
Online interfaces
templates
templates
Best Practices
Persons for information, webinars,. Costs/money
Best practices
responsibilities towards the tax payer
More responsible use of taxpayer's money
money, time , staff
Time as a resource
lack of resources
Human resources
Lack of time/resource to implement
Stakeholder engagement
Stakeholder engagement
Have we made enough focus on all parties?
Dependency on external stakeholder engagement
Research Community
Research Community should be associated
Bureaucracy
Burocracy
Increase paperwork/perceived bureaucracy
'Business as usual'
Increased paperwork/perceived bureaucracy
administrative burdens
Decreasing long-term burden

6.9.5 Selection and evaluation of proposals

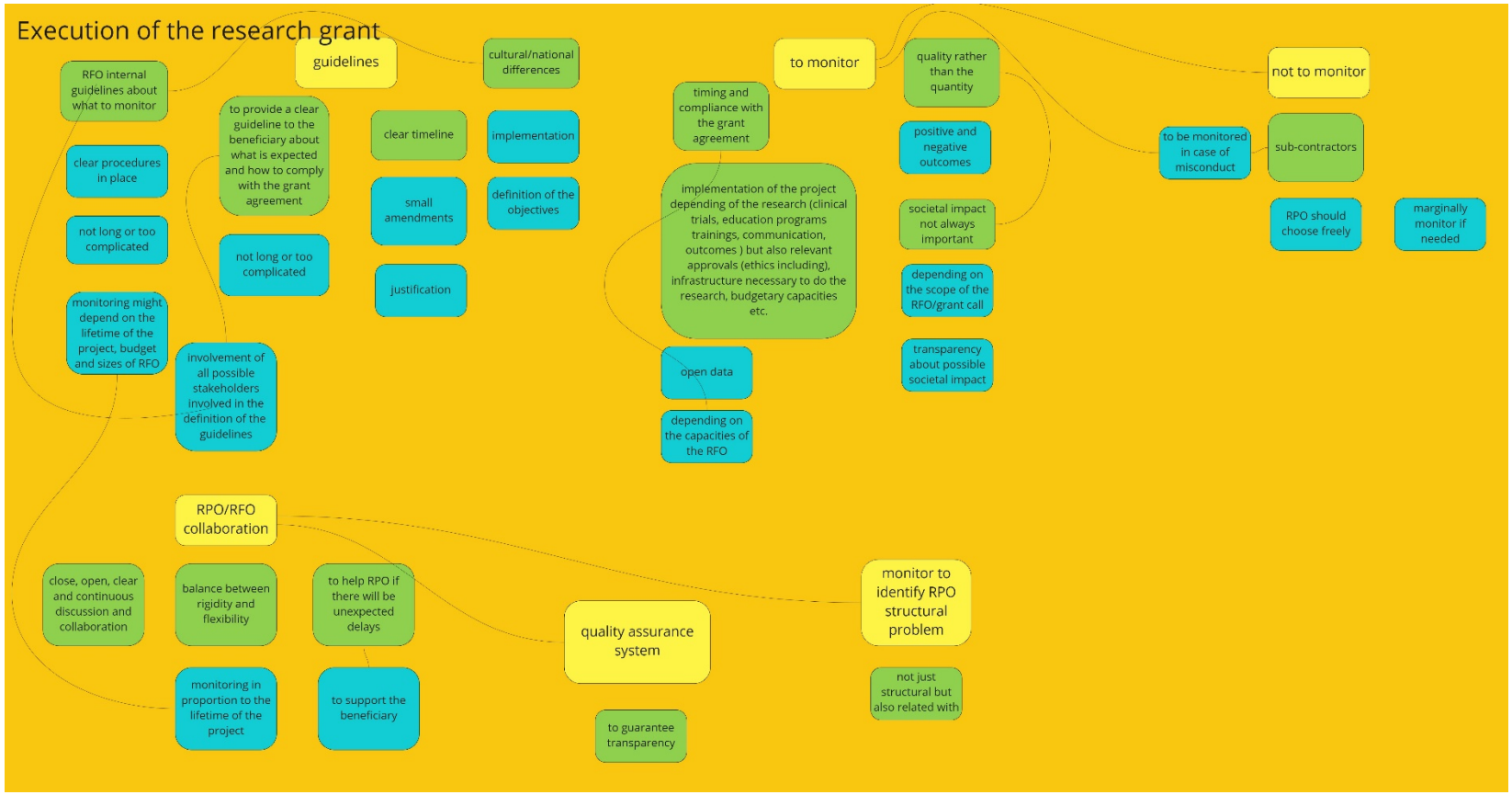


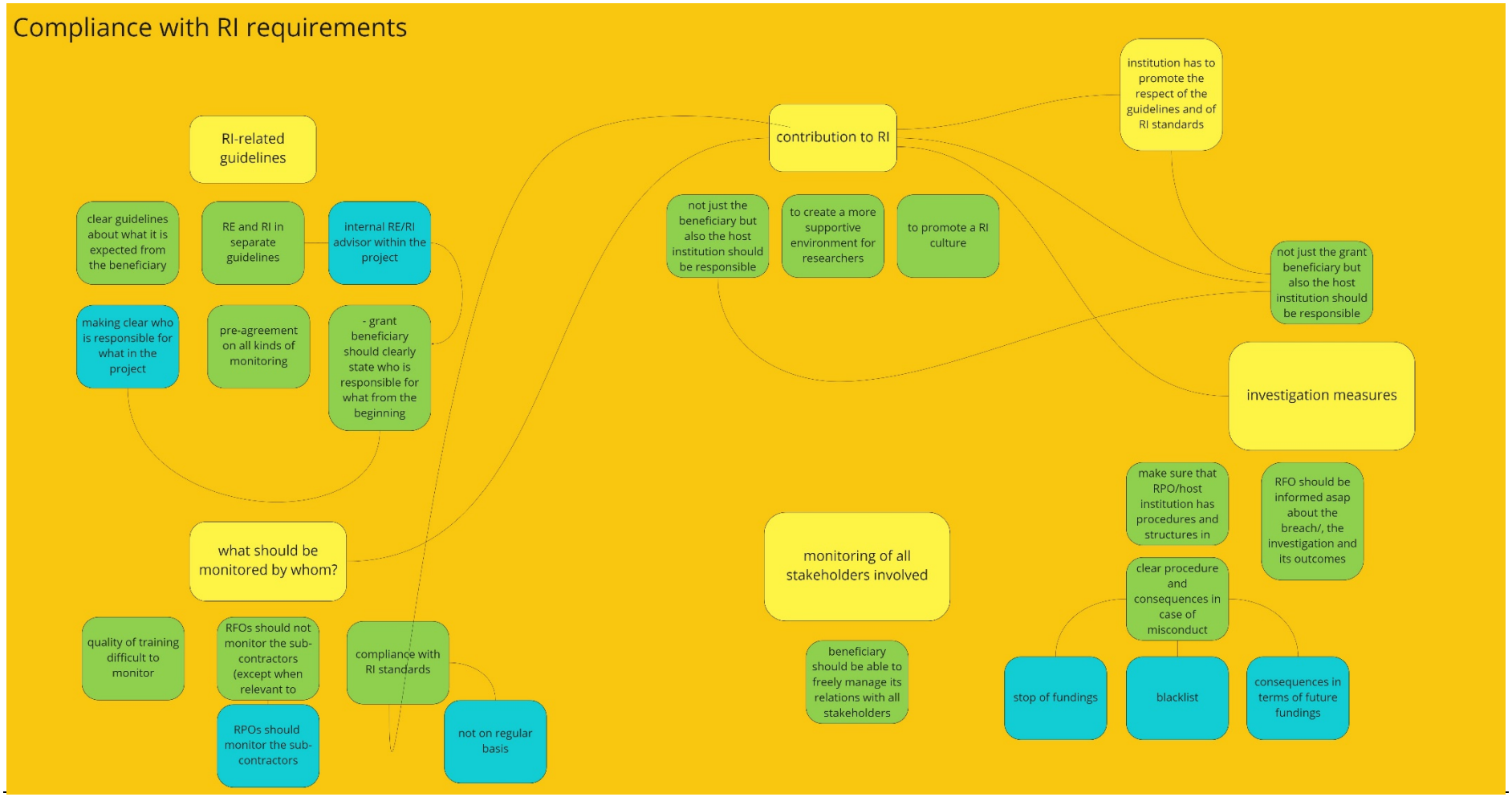

Methodological requirements
quality of research methodology
training
guidelines for the assessment of the data management
clear guidelines about the definition of the evaluation criteria
clear guidelines for the assessment (evaluation guidelines)
usually the methodology part is assessed under research quality and not under RI plan
clear definition of RI-related challenges
checklist for evaluators
to ensure that there isn't an overlap between methods per se and concerns about RI with regards to methods
to ensure that there isn't an overlap between methods per se and concerns about RI with regards to methods
inclusion of best practices
DMP training and mentoring
during the interim evaluation and not in the selection
clear definition of the criteria of evaluation
it cannot be assessed in the application
country differences
what should be included
specific part related to RI and RE in the the methodology
checklist of priorities
more specific in relation to RI
balance in the level of details
follow-up interviews
all the applicants or no one
no interviews to ask clarification to some applicants
not just for the methodology section
to ensure an equal treatment
too many biases
depending on the capacity and size of the RFO
too many redresseses
interviews to all shortlisted applicants

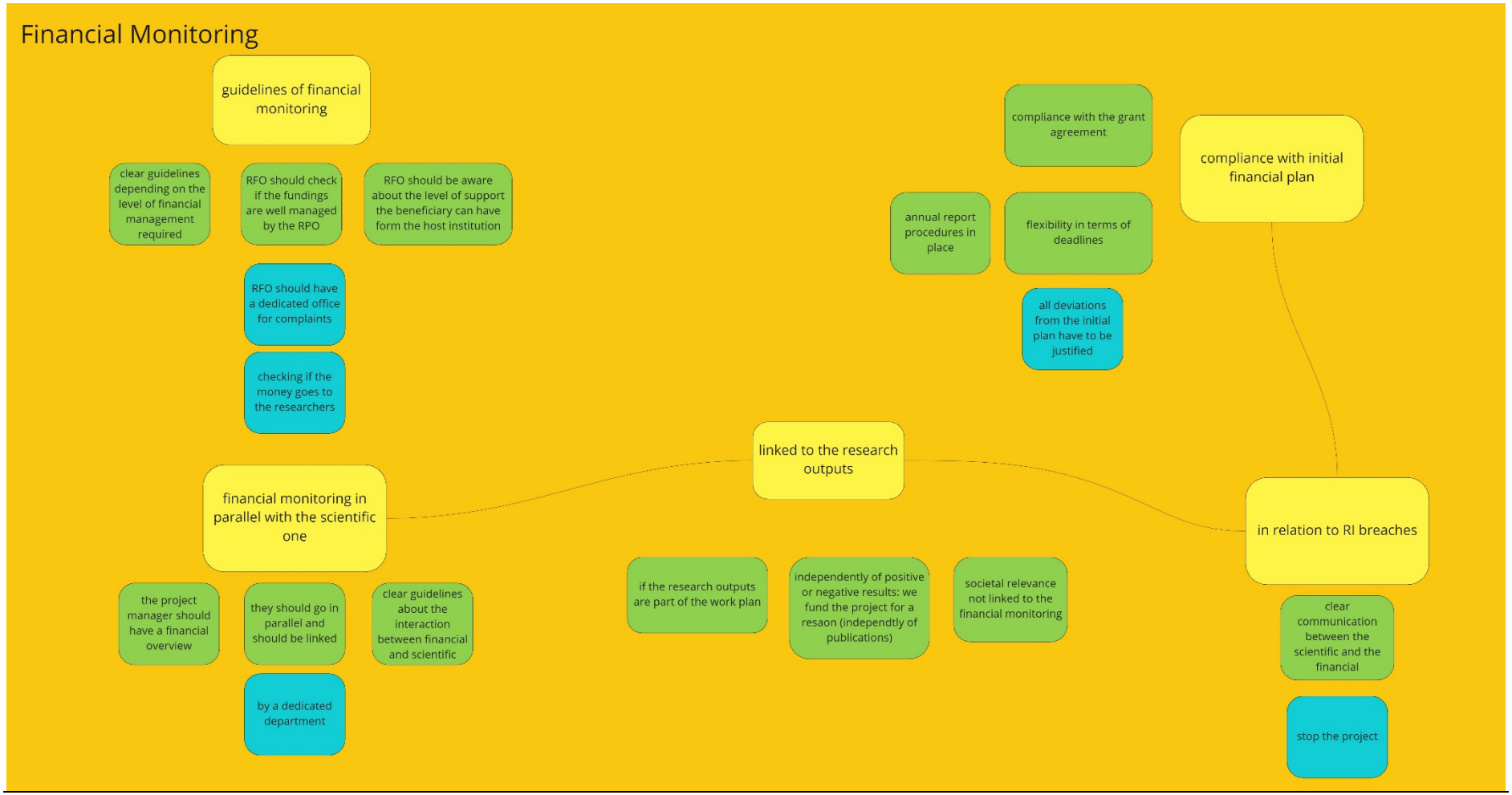

Diversity issues
supporting diversity issues in the application
KD: I have the impression that 'diversity' is used here in a different sense
merit-based evaluation process
no disclosure of personal, sensible, confidential information
acknowledge diversity without taking it into consideration in the evaluation process
taking into account diversity/minorities in case of equally ranked proposal
prioritizing minorities or less represented groups
RFO should provide guidance on diversity
monitoring
to take in consideration all kind of disparities/diversities
pay gap
it is up to the institutions
It is not up to the RFO
it needs to be addressed at national level
language
to take into consideration all possible main languages in the region
dedicated calls
dedicated call for women, junior and minorities
RFOs internal staff and evaluators
ensure/promote diversity within the internal staff
ensure/promote diversity among the evaluators
make sure that evaluators and committees are briefed about the possible
to avoid possible biases
transdisciplinary
training
internal training and good guidelines on how recognize diversities and how to avoid biases

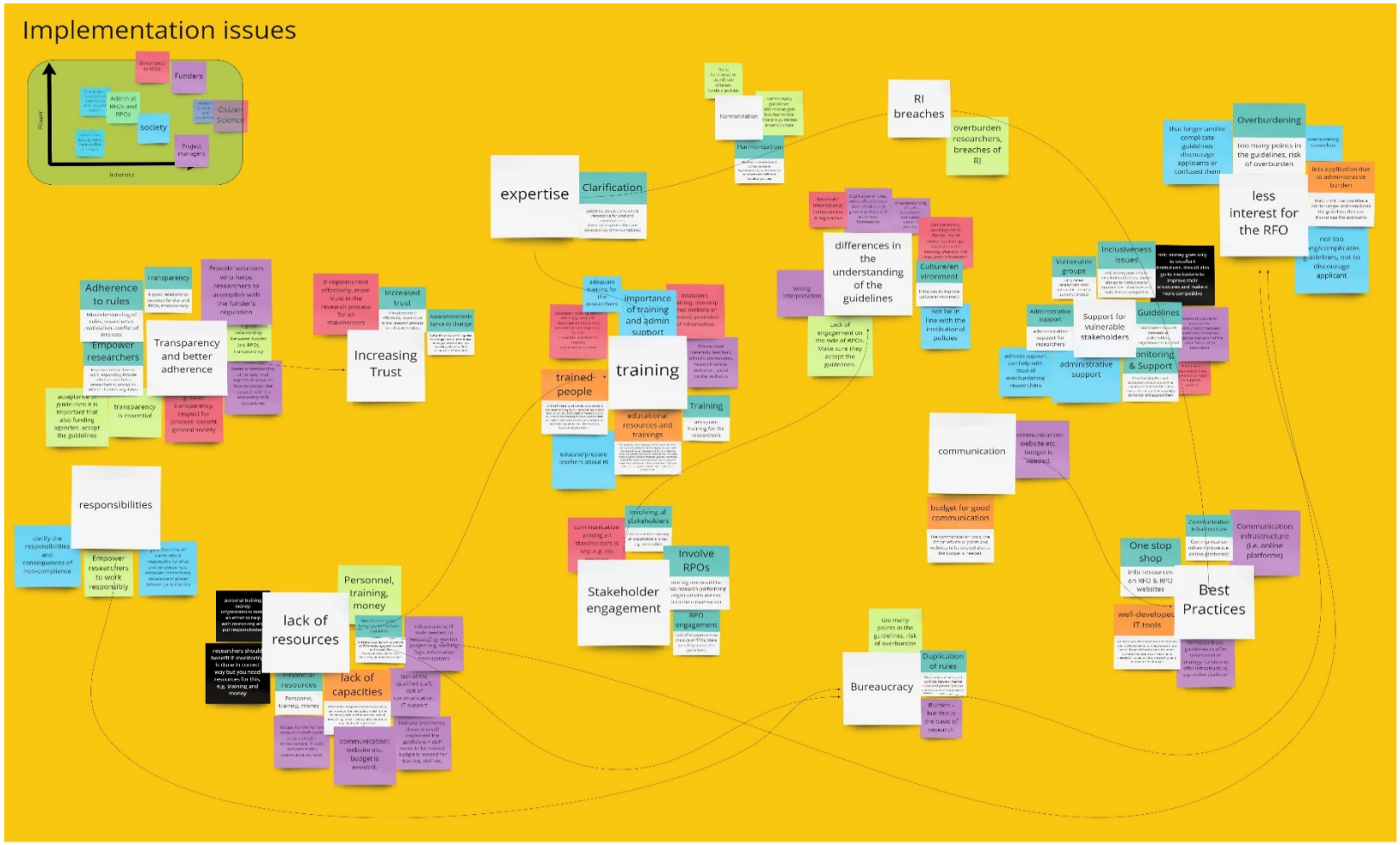

Implementation issues
Country/institutional differences
Different notions of RI across countries
Involvement of other partners (commercial, policy makers...)
Human resources
Goodwill
Collaboration
Awareness raising
raised awareness, more responsible behaviour
lack of RPO or researchers participation, not knowledge enough
Research environment
sharing and learning
lack of specificity/ relevance
Time
time
buy-in
good and possible time schedule
Support
step-by-step approach
Need for clarity /Bureaucratic challenges
more administrative burden but not real change
Layers of responsibility
Monitoring/ongoing review

6.9.6 Monitoring of funded projects



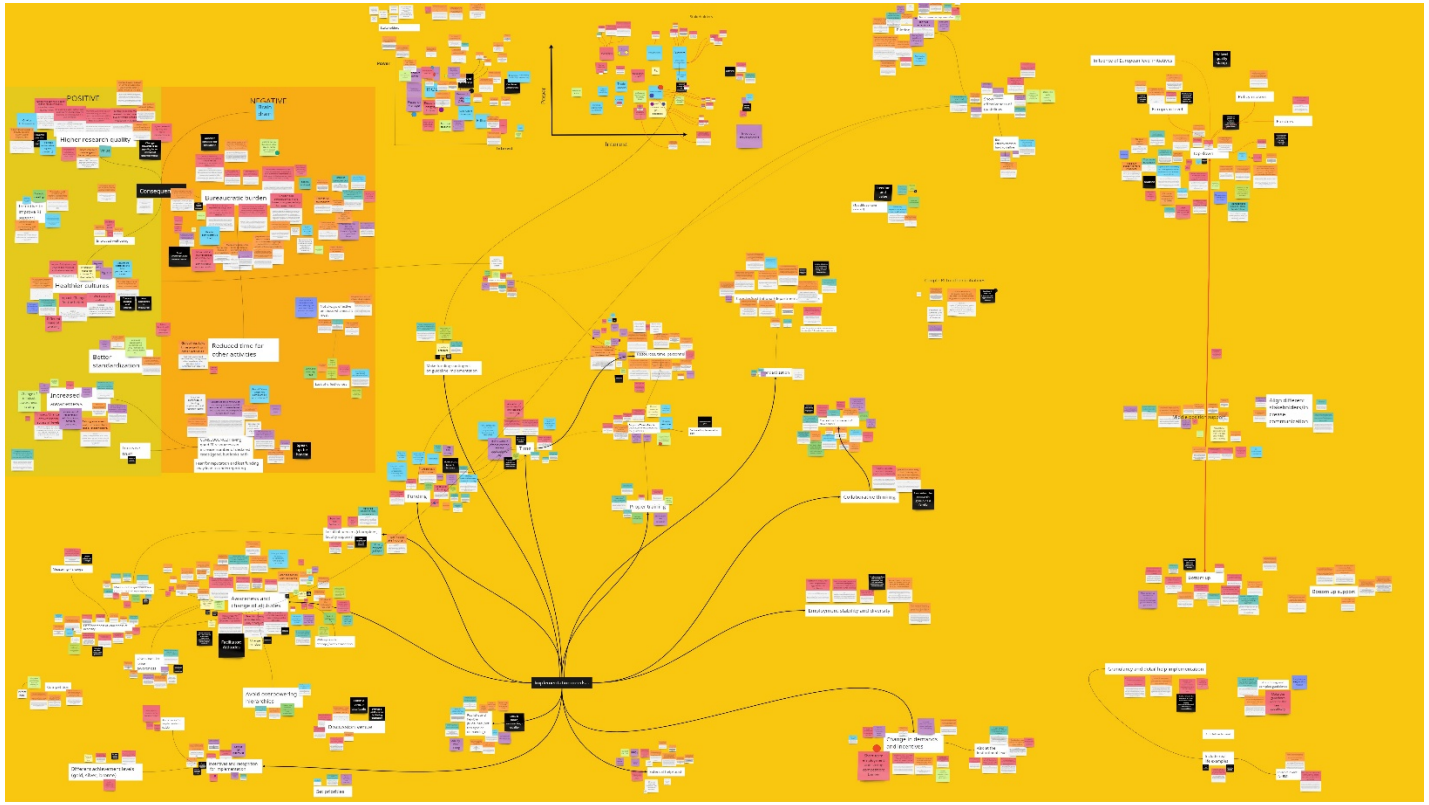

Compliance with RI requirements
RI-related guidelines
clear guidelines about what it is expected from the beneficiary
RE and RI in separate guidelines
internal RE/RI advisor within the project
making clear who is responsible for what in the project
pre-agreement on all kinds of monitoring
- grant beneficiary should clearly state who is responsible for what from the beginning
what should be monitored by whom?
quality of training difficult to monitor
RFOs should not monitor the sub-contractors (except when relevant to
RPOs should monitor the sub-contractors
compliance with RI standards
not on regular basis
contribution to RI
not just the beneficiary but also the host institution should be responsible
to create a more supportive environment for researchers
to promote a RI culture
institution has to promote the respect of the guidelines and of RI standards
not just the grant beneficiary but also the host institution should be responsible
investigation measures
make sure that RPO/host institution has procedures and structures in
RFO should be informed asap about the breach/, the investigation and its outcomes
clear procedure and consequences in case of misconduct
stop of fundings
blacklist
consequences in terms of future fundings
monitoring of all stakeholders involved
beneficiary should be able to freely manage its relations with all stakeholders

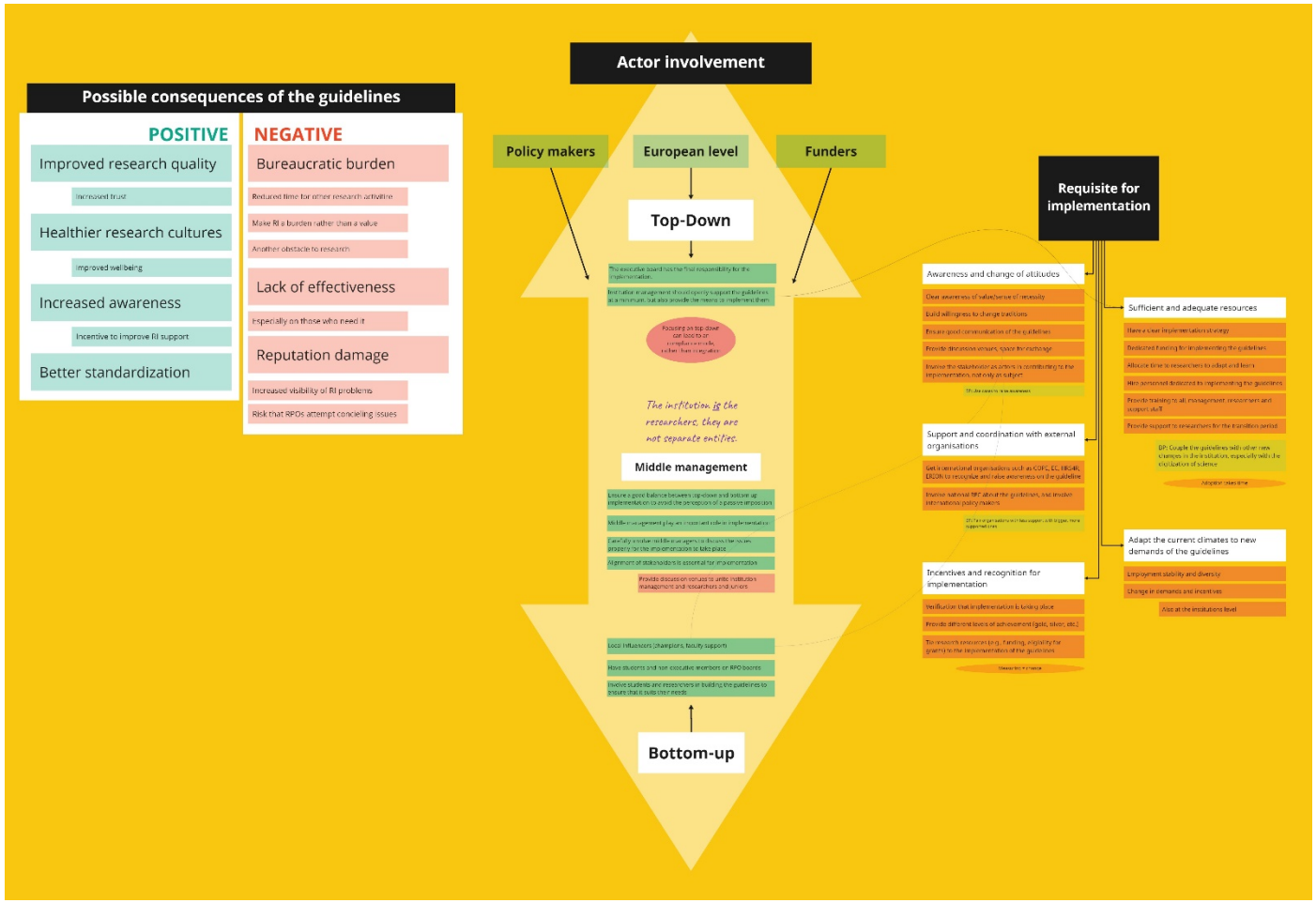

Financial Monitoring
guidelines of financial monitoring
clear guidelines depending on the level of financial management required
RFO should check if the fundings are well managed by the RPO
RFO should be aware about the level of support the beneficiary can have form the host institution
RFO should have a dedicated office for complaints
checking if the money goes to the researchers
compliance with the grant agreement
compliance with initial financial plan
annual report procedures in place
flexibility in terms of deadlines
all deviations from the initial plan have to be justified
linked to the research outputs
financial monitoring in parallel with the scientific one
in relation to RI breaches
the project manager should have a financial overview
they should go in parallel and should be linked
clear guidelines about the interaction between financial and scientific
by a dedicated department
if the research outputs are part of the work plan
independently of positive or negative results: we fund the project for a resaon (independtly of publications)
societal relevance not linked to the financial monitoring
clear communication between the scientific and the financial
stop the project


Implementation issues
Funders
Admin at HICs and RPOs
society
Citizen Science
Project managers
Power
Interest
expertise
Clarification
harmonization
Harmonization
RI breaches
overburden researchers, breaches of RI
Overburdening
too many points in the guidelines, risk of overburden
less interest for the RFO
differences in the understanding of the guidelines
Culture/environment
not be in line with the institutional policies
wrong interpretation
Lack of engagement on the side of RFOs. Make sure they accept the guidelines.
Inclusiveness issues
Vulnerable groups
Support for vulnerable stakeholders
Guidelines
Administrative support
administrative support
Adherence to rules
Transparency
Empower researchers
Transparency and better adherence
Increasing Trust
Increased trust
training
Importance of training and admin support
trained-people
educational resources and trainings
Training
educate/prepare teachers about RI
responsibilities
Empower researchers to work responsibly
lack of resources
Personnel, training, money
lack of capacities
Stakeholder engagement
Involve RPOs
RPO engagement
communication
budget for good communication
One stop shop
Best Practices
Communication infrastructure (i.e. online platforms)
well-developed IT tools
Bureaucracy
Duplication of rules

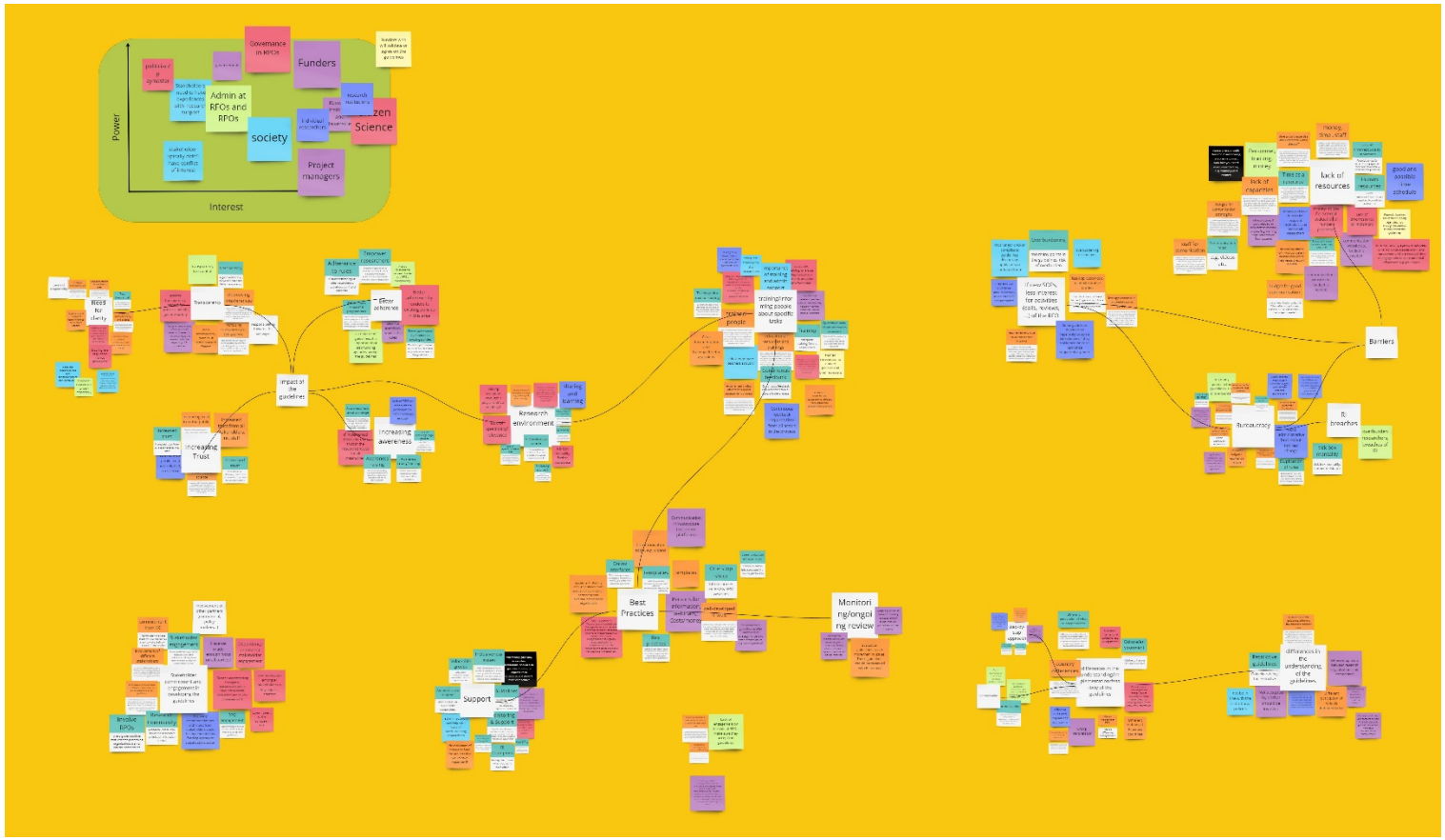
6.10 Analysis posters for the implementation issues

6.10.1 RPO- related CCWs




Possible consequences of the guidelines
POSITIVE
Improved research quality
Increased trust
Healthier research cultures
Improved well being
Increased awareness
Incentive to improve RI support
Better standardization
NEGATIVE
Bureaucratic burden
Reduced time for other research activities
Make RI a burden rather than a value
Another obstacle to research
Lack of effectiveness
Especially on those who need it
Reputation damage
Increased visibility of RI problems
Risk that RPOs attempt concealing issues
Actor involvement
Policy makers
European level
Funders
Top-Down
The executive board has the final responsibility for the implementation
Institution management should properly support the guidelines as a minimum, but also provide the means to implement them
Focusing on top-down can lead to a compliance mode, rather than integration
The institution is the researchers, they are not separate entities.
Middle management
Ensure a good balance between top-down and bottom-up implementation to avoid the perception of a passive imposition
Middle management plays an important role in implementation
Carefully involve middle management to discuss the issues properly for the implementation to take place
Alignment of stakeholders is essential for implementation
Provide discussion venues to unite institution management and researchers and funders
Local influencers (champions, faculty support)
Have students and non executive members on RPO boards
Involve students and researchers in building the guidelines to ensure that it suits their needs
Bottom-up
Requisite for implementation
Awareness and change of attitudes
Over awareness of value/sense of necessity
Build willingness to change traditions
Ensure good communication of the guidelines
Provide discussion venues, space for exchange
Involve the stakeholders as actively contributing to the implementation, not only as subject
Sufficient and adequate resources
Have a clear implementation strategy
Dedicated funding for implementing the guidelines
Allocate time to researchers to adapt and learn
Hire personnel dedicated to implementing the guidelines
Provide training to all management, researchers and support staff
Provide support to researchers for the transition period
BP: Couple the guidelines with other new changes in the institution, especially with the digitalization of science
Adaption takes time
Support and coordination with external organisations
Get international organisations such as COPE, EC, UNESAR, ERCOR to recognise and raise awareness on the guideline
Involve national RPO about the guidelines, and involve international policy makers
RP: Foreign organisations may be supportive with bigger, more experienced lines
Adapt the current climates to new demands of the guidelines
Employment stability and diversity
Change in demands and incentives
Also at the institutions level
Incentives and recognition for implementation
Verification that implementation is taking place
Provide different levels of achievement (gold, silver, etc.)
Tie research resources (e.g., funding, eligibility for grants) to the implementation of the guidelines
Measures + incentive

6.10.2 RFO-related CCWs



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