SOPs4RI

D5.2: Report on the Results of the Focus Group Interviews

Authors: M.P. Sørensen, T. Ravn, A.-K. Bendtsen, A. Reyes-Elizondo, W. Kaltenbrunner , R. Ščepanović , A. Marušić , P. Kavouras, K. Labib, J.K. Tijdink, G.A. Veltri, J. Bergmans
Reviewer: A. Domaradzka
Editor: M.P. Sørensen and T. Ravn

Project title: Standard Operating Procedures for Research Integrity
Project acronym: SOPs4RI
Grant Agreement no.: 824481
Lead contractor for this deliverable: Aarhus University

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824481.

Coordination and Support Action
H2020-SwafS-03-2018

Project full title

"Standard Operating Procedures for Research Integrity"

Project acronym

SOPs4RI

Grant Agreement no.

824481

D5.2: Report on the Results of the Focus Group Interviews

Editors:	Mads P. Sørensen and Tine Ravn
Version:	1.0
Dissemination level[1]:	PU
Authors:	Sørensen, Mads P.; Ravn, Tine; Bendtsen, Anna-Kathrine; Reyes Elizondo, Andrea; Kaltenbrunner, Wolfgang; Ščepanović, Rea; Marušić, Ana; Kavouras, Panagiotis; Labib, Krishma; Tijdink, Joeri K.; Veltri, Giuseppe A.; Bergmans, Josephine
Reviewer:	Anna Domaradzka
Due date of deliverable:	30th of August 2020
Actual submission date:	27th of August 2020
Start date of project:	1st of January 2019
Duration:	48 months
Organisation name of lead contractor for this deliverable:	The Danish Centre for Studies in Research and Research Policy, Aarhus University (AU)

[1]This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824481

PU – Public; PP – Restricted to other programme participants (including the Commission Services); RE – Restricted to a group specified by the consortium (including the Commission Services); CO – Confidential, only for members of the consortium (including the Commission Services).

Document metadata

Version	*Date*	*Modification reason*	*Modified by*
0.1	14/7-20	First draft (the entire report minus heat maps, cross-case analyses and conclusion)	Sørensen, Mads P.; Bendtsen, Anna-Kathrine; Reyes Elizondo, Andrea; Kaltenbrunner, Wolfgang; Ravn, Tine
0.2	14/7-20	Textual layout	Ladegaard, Christinna Weyergang
0.3	3/8-20	WP partner review	Reyes Elizondo, Andrea; Kavouras, Panagiotis; Labib, Krishma; Marušić, Ana; Ščepanović, Rea
0.4	18/8-20	Review of deliverable	Domaradzka, Anna
0.5	19/8-20	Language editing	Brady, Emer
1.0	26/8-20	Final version	Sørensen, Mads P.; Bendtsen, Anna-Kathrine; Bergmans, Josephine; Reyes Elizondo, Andrea; Kaltenbrunner, Wolfgang; Ravn, Tine

Authors' contributions

This report builds on the work that has taken place in work package 5 in SOPs4RI:

- PI: Mads P. Sørensen.
- Design: Mads P. Sørensen, Tine Ravn, Andrea Reyes Elizondo, Wolfgang Kaltenbrunner, Ana Marušić, Rea Ščepanović, Panagiotis Kavouras, Joeri Tijdink, Krishma Labib, Giuseppe A. Veltri.
- Planning/conducting interviews: Mads P. Sørensen, Tine Ravn, Anna-Kathrine Bendtsen, Andrea Reyes Elizondo, Wolfgang Kaltenbrunner, Josephine Bergmans, Ana Marušić, Rea Ščepanović, Panagiotis Kavouras, Krishma Labib, Joeri Tijdink, Giuseppe A. Veltri.
- Coding the interviews: Anna-Kathrine Bendtsen.
- Analysis and writing the report: Mads P. Sørensen, Tine Ravn, Anna-Kathrine Bendtsen, Andrea Reyes Elizondo, Wolfgang Kaltenbrunner, Josephine Bergmans.

Acknowledgement

The authors would like to express our gratitude to the 145 participants in the 30 focus group interviews, who took the time to share their knowledge and experiences with us. We would also like to thank the many people, who have helped us set up the interviews at the different institutions around Europe. For reasons of anonymity, we cannot mention your names here, but without your help, it would not have been possible to conduct this study.

We would further like to thank George Gaskell (London) for valuable comments to the design and planning of the study. Thank you also to Ivan Buljan (Split), Eleni Spyrakou (Athens), Vasileios Markakis (Athens), Natalie Evans (Amsterdam) and Guy Widdershoven (Amsterdam), who besides the authors also took part in one or more of the interviews. Thank you also to Amalie Due Svendsen (Aarhus), Anders Møller Jørgensen (Aarhus), Jonathan Bening (Leiden), Dan Gibson (Leiden), Eleni Spyrakou (Athens), Vasileios Markakis (Athens), and Andrijana Perkovic Palos (Split), who together with five of the authors, Rea Ščepanović (Split and Trento), Josephine Bergmans and Andrea Reyes Elizondo (Berlin, Gent, Leiden), Panagiotis Kavouras (Athens) and Krishma Labib (Amsterdam), transcribed the interviews. Thank you to Christinna Weyergang Ladegaard (Aarhus) for helping with the textual layout of the report. We would finally like to thank Emer Brady (Aarhus) for taking the time

to language edit this 300-pager – and Anna Domaradzka (Warsaw) for valuable review comments to the report.

Table of Contents

Executive summary

The present deliverable (D5.2) reports on the results of the focus group study carried out under the auspices of WP5 in the European Horizon2020 project SOPs4RI (Standard Operating Procedures for Research Integrity).

The focus group study aims to explore how the main disciplinary fields of research – humanities, social science, natural science (including technical science) and medical science (including bioscience) – perceive and relate to a number of different research integrity (RI) topics relevant for both research performing organisations (RPOs) and research funding organisations (RFOs), to understand the potential disciplinary variations in challenges experienced in relation to RI, and to understand the research areas' needs for institutional guidelines and SOPs (Standard Operating Procedures).

The study consists of 30 focus group interviews, across eight different European countries, with researchers from the four main areas of research together with relevant stakeholders – such as REC and RIO members, journal editors, and industry and funding organisation representatives. Fourteen of the focus groups involve researches from these main areas of research, and sixteen groups include researchers as well as relevant stakeholders from the same areas of research. A total of 145 researchers and stakeholders have participated in the study.

The RI topics explored in the focus group study cover nine topics for the RPOs and eleven topics for the RFOs. These topics were identified through previous WP studies and included in a first preliminary version of a toolbox that eventually will feature a collection of tools (SOPs and guidelines). The toolbox will assist RPOs and RFOs in promoting a strong research integrity culture, as well as in the design and implementation of an institutional Research Integrity Promotion Plan (RIPP). The focus group study has generated a more nuanced and in-depth knowledge on these various topics and enhanced an understanding of the perception and prioritisation of these topics within the different disciplinary fields of research. Representing different main areas of research, various research disciplines, and diverse RI perspectives, the focus group participants have discussed the current landscape of RI from their point of view and reported on potential roadblocks and negotiable ways to promote research integrity. The discussions have illuminated existing challenges to cultivating RI

cultures, offered best case examples of institutional RI practices, and provided numerous recommendations and ideas for guidelines and SOPs.

In particular, the focus group study investigates and explores the following three distinct research questions:

Understanding the need for research integrity SOPs and guidelines

1) Is there a need for different SOPs and guidelines in different disciplinary fields for the same RI topics/subtopics?

- In general, the findings from the focus group study show that focus group participants lay emphasis on the responsibility of the RPOs to ensure a high standard of RI. Akin to this finding, the results from the mixed RFO focus groups also identify many areas in which RFOs can make a significant difference in promoting RI practices and procedures.

- A key finding across main areas of research is that variation exist within and across different areas of research, and this influences the perception of and needs for RI practices and guidelines. For instance, variations in research practices result in different challenges with regard to data practices, data management, ethical considerations, and authorship distribution, amongst other issues, which in turn yield different concerns. Hence, for the majority of topics discussed in the focus group interviews, the researchers request policies that are sensitive towards disciplinary differences. This is also evident for SOPs and guidelines, where researchers from different areas of research express a need for discipline-specific RI support and guidance in their work.

Prioritizing the need for research integrity SOPs and guidelines

2) Which topics and subtopics are the most important ones for the different disciplines/main research fields (humanities, social science, natural science, and medical science)?

- The focus group study has confirmed the importance of the selected topics for the toolbox for both RPOs and RFOs.

- For the RPOs, two topics are considered exceedingly important: 'Responsible supervision and mentoring' and 'Research environment'. Predominantly, the topic of 'Research environment' appear to be a recurring theme across all focus groups as a focal point for RPOs to address. A majority of the focus groups point to the importance of this topic as an underlying construct for managing and cultivating other issues of research integrity. For instance, challenges to strong RI research cultures such as hyper-competitiveness, performance pressures, power imbalances – amongst other issues – were emphasised in many variations in the focus group interviews. Generally, supportive and sound research environments with fair, holistic, and transparent procedures for appointments, assessments and promotions, a strong focus on relevant RI training at both junior and senior levels, and clear procedures for handling allegations of misconduct, are called for by the focus group participants.

- For the RFOs, the three topics of 'Dealing with breaches of RI', 'Research ethics structures', and 'Publication and communication' are considered to be particularly important. Consequently, it could be profitable for RFOs to review their evaluation and funding procedures, and formulate policies that relate to how funding proposals are selected and reviewed and how projects are monitored, for instance. RFOs are also in a position to ensure that RPOs address RI issues, i.e. by ensuring that they have clear policies, governance structures, and guidelines in place.

- While the different topics are not considered to be equally important for all main areas of research by the interviewees, each topic was ranked as significant by at least two of the main areas of research (medical science, natural science, social science and/or the humanities). In fact, seven out of nine RPO-topics, and nine out of eleven RFO-topics, were considered 'very important' or 'important' by at least three of the four main areas. 'Declaration of competing interests' and 'Collaborative research among RPOs' were the two topics that were considered of least importance by the RPO groups, whereas 'Intellectual property rights' and 'Collaboration within funded projects' were the topics that were ranked lowest in the RFO groups.

Adding new research integrity topics to existing topics

3) Do the different disciplines have any topics or subtopics to add to the map of the RI landscape?

- Overall, the extensive set of focus group data provides nuanced and in-depth insights into field-specific wants and needs for institutional RI guidelines and procedures, which can assist researchers and other stakeholders in their daily work and in contributing to improving RI practices within organisations. Emerging RI topics and subtopics are encompassed within the nine and eleven predefined and broad RI topics but they, as well as the interviews in general, add to a detailed understanding of the depth and width of the different topics. Still, the results of the focus group study indicate that several contextual factors and topics are of significance for researcher and stakeholder perceptions, and are therefore vital to take into consideration when customising institutional RI polices and guidelines.

- Apart from disciplinary differences, a number of contextual matters seem to have an impact on the perception of and importance attached to the different topics. For instance, national and organisational variation in funding structures and legal and institutional structures for handling allegations and breaches of research integrity influence the perception and importance of topics, as very varied attention is given to the different topics in terms of already established RI practices and procedures. Hence, current national and organisational RI landscapes also determine the recommended RPO and RFO efforts.

- To avoid unnecessary use of resources – for instance when establishing parallel RI procedures, revising already well-functioning structures, etc. – it is important to evaluate existing practises in terms of cost-benefit analyses. Creating heightened awareness about already established guidance and support structures could also increase the use of existing resources.

- In general, the focus group study also points to the following contextual cross-cutting topic, which is of importance for safeguarding RI and for successfully implementing RI policies and guidelines: A key concern amongst the focus group participants related to the balance

between implementing sound and relevant procedures that can stimulate RI practices and avoiding adding unnecessary bureaucracy. The researchers express a willingness to engage in RI issues but they are concerned that new policies and demands will be placed on top of existing requirements and add to administrative tasks that take time away from research. Hence, avoiding duplication and parallel systems are conveyed as an important issue by the interview participants. To increase the legitimisation of RI procedures, RPOs and RFOs should go to lengths to ensure that RI tools and requirements are meaningful, flexible, practical, and adapted to relevant contexts.

1. Introduction

1.1 Abbreviations

DORA - The Declaration on Research Assessment

DPO - Data Protection Officer

IPR – Intellectual property rights

IRB – Institutional review board

OA – Open access

PI – Principal investigator

REC – Research ethics committee

RFO – Research funding organisation

RI – Research Integrity

RIO – Research integrity office(r)

RIPP – Research Integrity Promotion Plan

RPO – Research performing organisation

R&D – Research and development

SOP – Standard Operating Procedure

WCRI - World Conferences on Research Integrity

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.

1.3 About SOPs4RI

SOPs4RI (Standard Operating Procedures for Research Integrity) is a four-year (2019-2022), multi-partner transdisciplinary project funded by the European Commission (H2020-SwafS-03-2018, Grant Agreement no. 824481). The project has 13 partners in 10 European countries, and is coordinated by Aarhus University (AU). The project's homepage can be found here: https://www.sops4ri.eu/. SOPs4RI has also been preregistered on the Open Science Framework: https://osf.io/49fbk/

Objectives

SOPs4RI will deliver an online, freely accessible and easy-to-use 'toolbox' that can help Research Performing Organisations (RPOs) and Research Funding Organisations (RFOs) cultivate research integrity and reduce detrimental practices. The end product of SOPs4RI thus addresses needs of RPOs and RFOs, contributing to solving problems related to research integrity and enabling positive change.

SOPs4RI takes a mixed-methods, co-creative approach to the development and empirical validation of Standard Operating Procedures (SOPs) and guidelines, to cultivate research integrity and reduce detrimental practices. Empirical elements of the project include 20 expert interviews, a three-round Delphi consensus consultation process, 30 focus groups across academic disciplines, an online survey of researchers across 31 countries, and four co-creation workshops engaging stakeholders.

Through comprehensive empirical research and inclusion of core user groups, SOPs4RI will develop a collection of tools (SOPs and guidelines) that are sensitive to the organisational context and the academic domain in which they will be applied. The sequential implementation of qualitative, quantitative, and co-creative parts of the empirical research programme will enable iterative refinement of the properties of the SOPs and guidelines. SOPs4RI includes a pilot programme, in which selected RPOs and RFOs apply the tools in local practices. A number of public and private research funding organisations as well as university networks have confirmed their willingness to participate in the pilot phase. Results of this final step of the validation procedure will feed into the final version of the toolbox.

1.4 About this deliverable

The present deliverable (D5.2.) is the report on the results of the focus group study. As described in the protocol for this study (D5.1, see link in references), the aim of the focus group study is to provide discipline specific knowledge on SOPs and guidelines related to research integrity in RPOs and RFOs. The study consists of 30 focus group interviews with researchers from the humanities, social sciences, natural and technical sciences, and medical sciences, together with relevant stakeholders. 14 of the focus groups involved researches from these four main areas of research, and 16 groups comprised researchers, as well as relevant stakeholders, from the same areas of research (see Methods section below for more details, section 2). The focus group interviews were carried out in February, March and April 2020, and took place in eight different European countries.

The aim of the focus group study has been to generate field-specific knowledge on the first version of a toolbox, with SOPs and guidelines created in SOPs4RI's WP4 (D4.2, see link in references). In WP4, nine topics for the RPOs and 11 topics for the RFOs were selected for version 1.0 of the toolbox. These topics have formed the basis of the focus group study, and as it will be clear in the following, the focus group study has generated new valuable knowledge regarding the differences in the main areas of research's understanding and prioritization of them. For the RPO section, we describe the comprehension of nine RI topics in the four main areas of research and for the RFO part, we describe how these four areas perceive 11 different RI topics. These descriptions are supplemented with 10 heat maps that show the main research areas' assessment of the importance of the topics for the RPOs and RFOs. Finally, in the two last chapters of the report, cross-case analyses have been made to flag issues that are especially important to pay attention to in the future work in SOPs4RI.

1.5 How to read this report

This report consists of four chapters this introduction. Section 2 describes the methodology and research strategy applied in the focus group study. Sections 3 and 4 contain the findings from the focus group study; section 3 focuses on the findings related to RPOs and section 4 concerns the findings related to RFOs. Section 5 highlights cross-cutting themes from the focus group interviews that SOPs4RI is recommended to take into account in future work. Section 5 also sums up and concludes the report.

The results presented in section 3 and 4 can be read in several ways. Each section describes the comprehension of the nine or eleven research integrity topics (related to RPOs and RFOs, respectively) in the four main areas of research. Each analysis of a particular research integrity topic and its' subtopics is supported by a display presenting the key findings for the focus group discussions on that topic. In some displays rows for one or more subtopics are left empty because the particular subtopic(s) was not attended to in the focus group discussions. As will be explained in the methodology section all subtopics were not necessarily consistently addressed by the moderators, and empty display rows are therefore due to that the focus group discussions did not revolve around the specific subtopic(s) (see section 2.2.3). Furthermore, for some topics a display has not been

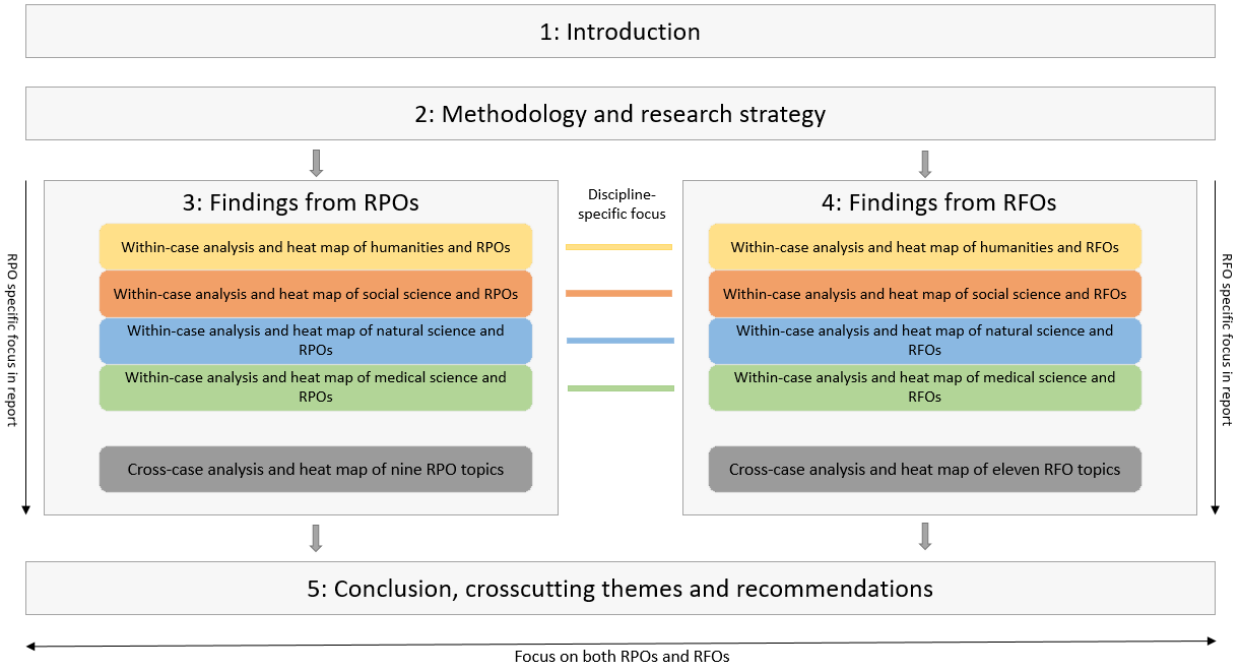
generated for this report due to that the focus group discussions generated limited data on the topic in question. This will be explained in further detail in the individual topic analyses.

The results can be read in both a vertical and horizontal manner. If one is mainly interested in the findings relating to RPOs, section 3 can be read vertically. In that case, one will come across the four main areas of research one by one, wherein the nine RPO topics will be examined one after another and supplemented by a heat map showing that main research area's assessment of the importance of the topics. Following the analysis of the four main areas, a cross-case analysis and a heat map for all the main areas of research supplements the individual topic findings.

Likewise, if one is mainly interested in the findings relating to RFOs, section 4 can be read vertically in the same way. If one is mainly interested in a specific main area of research, for instance the humanities, section 3 and 4 can be read horizontally, i.e. focusing one's reading on the respective subsections within section 3 and 4 dealing with the humanities. There, the field-specific knowledge generated for the humanities (and likewise with the other main areas) on the research integrity topics, relating to both RPOs and RFOs, can be read. If one is mainly interested in a specific research integrity topic, for instance 'Publication and communication', the results can likewise be read vertically, focusing on the subsections within each main area of research dealing with 'Publication and communication'.

The graphic below gives an illustrative overview of the report structure.

Figure 1.5: Graphic overview of report structure.



2. Methodology and Research Strategy

The aim of the focus group study is to generate discipline-specific knowledge on SOPs and guidelines related to the promotion of research integrity within RPOs and RFOs. The focus group study entails 30 focus group interviews across eight European countries[2], with researchers from the humanities, social science, natural science, and medical science, together with relevant stakeholders such as representatives from RECs and RIOs, amongst others. 14 focus groups involved researchers only from the different main areas of research, and 16 groups were composed of both researchers, as well as relevant stakeholders (see section 2.2.1 below for more details).

The objectives of the focus group study are twofold: 1) to generate field-specific knowledge on the first version of the SOPs and guidelines (created in WP4); 2) and to explore and generate knowledge on which RI topics are most important for researchers and stakeholders within and across the different disciplinary areas of research. The focus group study maps the ranking of important topics to pursue and it provides in-depth qualitative data on the different areas' understandings of the need and requests for SOPs and guidelines within these topics. In this regard, the different focus group interviews explore, assess, and report on current RI challenges and barriers, as well as convey best-practice cases and potential solutions for how to improve RI practices and procedures within each distinct topic[3].

2.1 Focus group research design

The focus group study consists of a total of 30 discipline-related focus group interviews. Researchers apply numerous approaches and methods in their work, and it is important that the SOPs and

[2] Denmark, Spain, the Netherlands, Germany, Belgium, Croatia, Italy, and Greece

[3] Parts of the method sections build directly on the research design descriptions included in the research protocol (D5.1, see link in references)

guidelines produced are meaningful and useful for researchers in different disciplinary areas of research. The focus group method is beneficial when the objective is to explore and produce such data on variation in assessments, arguments, negotiations, and interpretations (within and across groups) on complex and uncharted themes, such as RI practices and procedures. Furthermore, the focus group data generated through group interaction provides knowledge on how group representatives describe and ascribe meaning to current and required research practices within different disciplinary, institutional, and national contexts and influences (Halkier 2016, Morgan 1997).

The importance of research area representation is mirrored in the composition of the focus groups. Seven focus group interviews were conducted within the humanities, seven within social science, eight within natural science (including technical science) and eight within medical science (including biomedicine). Section 2.2.2 describes the composition of the focus groups in detail. Due to the COVID-19 situation, the remaining part of the data collection process had to be reorganised, and eight of the 30 interviews were transformed into an online format. In the introduction to the individual research areas, a display of participant profiles and type of interview (online or face-to-face) is provided. The specific challenges of reconfiguring interactional interviews into an online format are outlined in section 2.2.5. Two of the originally planned 32 focus group interviews, one within social science (a quantitative group) and one within the humanities (a philosophical and aesthetic group), both in the United Kingdom, could not be restructured into an online format and were cancelled.

The focus group study design was developed through a collective work package collaboration, and the process was initiated with a joint WP kick off meeting in Aarhus in autumn 2019, where the overall design was discussed, including particulars of the sampling and recruitment strategy, key interview topics, and the outline of the moderator guide. The research design was also constructed in close dialogue with WP4 in order to align the objectives, collaboration, resources, and learning possibilities of the work packages in the most beneficial ways. The research design was continuously refined and reported in a protocol for the study (D5.1, see references). The protocol, which was finalised in January 2020, includes detailed descriptions of the methodology, study participants, recruitment strategy, interview guide, consent form, and privacy policy etc. Different moderators conducted the individual focus group interviews in eight different countries. In order to streamline the data collection process and maintain consistency in the design and implementation phase, firm

procedures and a detailed roadmap and processual 'script' were produced at a preparatory meeting in Aarhus. In addition to the study protocol, other detailed documents/templates produced and applied included: invitation letter to potential participants, letter of information to potential participants, consent form, introductory power point slides to the interview, template for participant info sheet, moderator guide (including ranking exercise templates, topic questions and probes), and a list of practicalities/planning issues related to catering, equipment, materials etc. (see all appendices in section 7).

2.1.1 Research questions

The focus group research study was designed to address the following three research questions:

1) Is there a need for different SOPs and guidelines in different disciplinary fields for the same RI topics/subtopics?

In order to answer this question, we first need to *understand* how the different main areas of research comprehend the different topics and subtopics. Thereafter, we also need to understand their needs for SOPs and guidelines for the different RI topics. In all focus group interviews, we will therefore had in-depth discussions of two or three selected topics. After thorough deliberations amongst the WP partners, including VUmc as lead of WP4, we selected 10 topics for the researcher groups and eight topics for the mixed groups, to be discussed in detail in the interviews (see appendix IX). When deciding on the topics, we started with the first draft of the topics and subtopics for the first version of the toolbox (see D4.2, link in references). We thereafter discussed all the topics in detail and made a decision on whether to include the topic or not. In some cases, we chose to include a subtopic. We based our decision on the expected benefits of discussing a topic in the focus group interviews (i.e. new perspectives, new knowledge on disciplinary differences, etc.).

Subsequently, it was decided how to combine the topics in pairs, or groups of three, and how to distribute them between the groups and partners (see appendix XI). The main idea behind the grouping strategy was to ensure that the selected topics were covered within all the main areas of research. This implies that each selected topic is discussed in four different focus groups: one group within the humanities, one group within the social sciences, one group within the natural sciences (including the technical sciences), and one group within the medical sciences (including biomedicine). The rationale for how the topics were paired/grouped is explained in appendix XII.

2) **Which RI topics and subtopics are the most important ones for the different disciplines/main research fields (humanities, social science, natural science, and medical science)?**

It is important to gain knowledge about the relative importance attached to the different topics in terms of how they are *prioritised* as the most relevant by the different main areas of research. The *sorting exercise* we used is designed to facilitate this task of ranking. The exercise was carried out in all 30 focus groups with two different sets of topics, one set for the 16 mixed groups and one set for the 14 researcher-only groups (see appendix XIII). These topic lists are identical with the final lists of topics for the first version of the toolbox as described in SOPs4RI's Deliverable 4.2. Thus, the sorting exercise is created to gain insights into how researchers and stakeholders prioritise the topics selected in version 1.0 of the toolbox.

3) **Do the different disciplines have any topics or subtopics to add to map of the RI landscape?**

Although the topics for the first version of the toolbox (see D4.2) were selected on the basis of a thorough research process in WP3, it is likely that many of the researcher and stakeholder interview participants could add new, important topics to the current understanding of relevant RI issues and/or provide new perspectives and perceptions to existing topics. The partly explorative approach and the integration of open questions into the interview design, allows for a discovery of supplementary topics that need to be *added to* the current WP4 research results.

2.1.2 Practical implementation

The 30 focus group interviews conducted were distributed between SOPs4RI-partners from six different countries (coordinated by Aarhus University) and were carried out in eight different European countries (Denmark, Spain, the Netherlands, Germany, Belgium, Croatia, Italy, and Greece, see table 2.1.2 below). The interviews were primarily situated at partner universities to take advantage of institutional back up, local gatekeepers, and local knowledge, which facilitates the recruitment and data collection process.

Table 2.1.2 Distribution of focus group interviews amongst countries

Country	**Number and types of interview (i.e. face-to-face/online)**
Denmark	6 (2 online)
The Netherlands	6
Croatia	5 (1 online)
Germany	2
Greece	4
Spain	4 (2 online)
Italy	1 (1 online)
Belgium	2 (2 online)

The focus group interviews were conducted between February 2020 and April 2020. 22 interviews were carried out face-to-face as planned, whereas eight interviews had to be performed online due to the cross-country COVID-19 lock-down. All interviews were performed in English. A few introductions were conveyed in the local language (in case of any language barriers) to make sure that the purpose of the study was clearly conveyed and understood.

All interviews were recorded, and transcribed according to common guidelines to enhance accuracy and reliability. All interview transcriptions will be anonymised and handled in alignment with the European Union's General Data Protection Regulation.

The online interviews were both audio and video recorded via the particular recording features of Skype or Zoom. Oral consent to the additional video recording was given prior to each online interview. Subsequently, all transcribed interviews have been coded in the software program NVivo,

which is designed to facilitate data management, analysis, and reporting (see coding strategy, section 2.2.4).

2.1.3 Ethical considerations

Ethical approval for conducting the focus group study was obtained from the Research Ethics Committee at Aarhus University (5th of December 2019, see appendix XIV). Additionally, the ethical standards and guidelines of Horizon2020 were applied. Participants were provided with a description of the overall aim of the SOPs4RI project, the specific aim of the focus group study, an outline of the procedures involved in the focus group study, as well as the potential benefits and risks/burdens involved in participation (see appendix II (Invitation Letter), appendix III (Information Letter), and appendix IV (Consent Form)).

2.1.3.1 Risk and inconveniences

The focus group study posed a small risk of discovering sensitive information, for instance concerning research misconduct cases, or problems with how specific institutions handle research integrity issues. In the focus group introduction and debriefing, the focus group facilitators emphasised that participants are not to repeat to others what was shared in the focus group interviews.

The participants were also informed about these matters in the informed consent form (see appendix IV and section 2.1.3.2). By signing the informed consent form, the participants agreed to maintain the confidentiality of the information discussed by all participants and researchers during the focus group session.

2.1.3.2 Informed consent

Prior to each focus group interview, all participants in the focus groups were presented with an information letter (appendix III) and an informed consent form (appendix IV). These included information on the project's purpose, funding, recruiting process, methodologies, expected risks/adverse effects, beneficiaries of research results, communication of research results, all matters con-

cerning data collection, analysis and protection of the participants' personal information, the participants' opportunities for withdrawal and for viewing, and, if relevant, commenting on transcriptions of interviews and quotations. None of the participants have subsequently wished to comment on their own transcription/quotations. In the informed consent form, there was a clear description as to what the participants give their consent to by signing the form. The informed consent form follows the guidelines of Aarhus University (see. appendix IV, see also the privacy policy of the focus group study in appendix XV). For the face-to-face focus group interviews, consent forms were signed before the commencement of each interview. For the online focus group interviews, the consent was given verbally and subsequently provided in a written version as well.

2.1.3.3 Data management and privacy

The project as a whole, including the focus group study, has a distinct focus on ensuring that data management procedures comply with the General Data Protection Regulation (GDPR, link) of the European Union. The procedures for data management and privacy are specified in the privacy policy (see appendix XV). The invitation letter we used provides a link to the privacy policy and in this way informed participants of the study's data management and privacy procedures.

2.2 Data collection and data coding

The following sections describe the sampling and recruitment strategy employed and present the main issues related to interview design and the process of preparing data for analysis.

2.2.1 Sampling and recruitment strategy

The study identified and recruited participants for the focus group interviews from all the main areas of science and endeavoured to represent main methodological approaches (for example qualitative and quantitative methods in the social sciences) across the 30 interviews.

The study has conducted seven focus group interviews within the humanities, seven within social science, eight within natural science (including technical science) and eight within medical science

(including biomedicine). 14 of the 30 interviews focused on RI within RPOs and comprised researcher only groups (see section 2.2.2). Recruitment of participants in these groups took place on the basis of the researchers' main methodological approaches in their work. In the recruitment phase, attention was also given to engage experienced researchers who hold management positions (head of departments, associate deans etc.), since they also possess valuable knowledge of organisational issues. The remaining 16 focus groups that revolved around RI within RFOs included both relevant stakeholders and researchers. Variation in stakeholder representation was a key focal point in the recruitment process and stakeholders were recruited from RPOs, research integrity offices (RIOs), research ethics committees (RECs), funding organisations, trade unions, journals, and industry. We especially aimed to include one stakeholder employed in a high level management position in a research-funding organisation (RFO) and one stakeholder from a research integrity office (RIO) in each of the 16 stakeholder groups. As shown in the RFO participant profile overviews (see sections 4.1, 4.2, 4.3 and 4.4), it was not possible to secure such stakeholder representation in all 16 groups. Within both the RPO and RFO focus groups, sample homogeneity was sought regarding the area of research. The RPO groups were more segmented in character compared to the mixed stakeholder groups, as they were composed of researchers only with shared methodological approaches. In addition to the sample criteria mentioned above, the following criteria were employed, primarily with the purpose of enhancing representation, diversity and heterogeneity:

- Both senior/permanent position holders (professors, associate professors, senior researchers, etc.) and junior researchers/non-permanent position holders (post docs, assistant professors, last year PhD students) should be represented in the groups.
- The gender composition of the focus groups should be balanced.
- Two to three different area sub-disciplines should be represented in each focus group.
- Three different types of stakeholders should be included in the mixed focus groups (minimum two). Stakeholders must have discipline-specific knowledge.
- The selected disciplines should be broadly representative of research being conducted in the four main areas

The selected disciplines should be broadly representative of research being conducted in the four main areas. Furthermore, interviewees, who are dependent on each other (e.g. a lab leader and an employee from the same lab), should not be recruited to the same group. Interviewees should also

be able to perform the interview in English. To create a balance between manageable and information rich focus groups, we aimed at recruiting approximately six participants for each focus group. As depicted in the introductions to each main area of research some of the focus groups contained only three participants. Occasional cancellations and recruitment challenges were primarily experienced in relation to the online interviews, at were the COVID-19 situation made it more difficult to rearrange original planned face-to-face interviews as well as recruit new participants. Researchers were recruited from universities and other research institutions, whereas stakeholders were recruited from RIOs and university administrations, RECs, academies of science, journals, RFOs, governmental bodies, industry, science journalism organisations, and researcher unions.

Overall, the focus group study applied a purposeful sampling strategy with the intention to gather "information rich cases" (Patton, 1990, p. 169) based on the number of pre-selected criteria outlined above. Moreover, to identify "information rich key informants" (Ibid., p. 176), the study used snowball/chain sampling. This meant that relevant volunteers from existing networks, together with new volunteers recruited at e.g. conferences and seminars (where the SOPs4RI project was presented), were asked to act as gatekeepers and assist with the recruitment of relevant researchers and stakeholders within their organisations and institutions. This strategy was supplemented by a more randomised approach where participants were chosen from institutional web pages and then contacted by e-mail with an invitation letter (see appendix II).

2.2.2 Composition of focus groups

In addition to composing focus groups based on their main area of research, the composition strategy also entailed an orientation towards shared methodological and epistemic approaches in terms of how 'science is done'. The following outline shows the division of groups according to these two sampling criteria:

Humanities, seven groups:

- Three focus groups based on HUM-researchers' *basic orientation in research*: One language disciplines, one historical disciplines, and one communication disciplines
- Four groups including researchers from the humanities and relevant stakeholders

Social sciences, seven groups:

- Three focus groups based on whether researchers have *a qualitative* (two) or a *quantitative* (one) approach in their research
- Four groups including researchers from social science and relevant stakeholders

Natural sciences (including technical science), eight groups:

- Four groups with researchers formed as either *laboratory/experimental/applied/field research* groups (three) *or theoretical research* groups (one)
- Four other groups consisting of researchers from natural science and technical science, together with relevant stakeholders

Medical sciences (including biomedicine), eight groups:

- Four groups with researchers formed as either *basic research* groups (two) *or clinical/translational/public health* groups (two)
- Four groups consisting of researchers from medical science (including biomedicine) together with relevant stakeholders

2.2.3 Interview design and moderator guide

The purpose of the focus group study is to help us gain a better understanding of different disciplines'/main research areas' needs for research integrity support from RPOs and RFOs in the form of SOPs and/or guidelines. In order to make the toolbox (to be produced in WP4) useful for different organisations, it is important that it is sensitive to national, organisational and disciplinary differences. The focus group interviews and the moderator guide were designed to secure data

- that can answer the research questions in the most elaborate and effective way;
- that are capable of confirming or weakening the understanding and attributed importance of RI topics that were obtained from existing research in previous WPs;

- that can enrich previous understandings with new insights, emerging topics, and cross-cutting issues of contextual and substantial importance.

The moderator guide was structured as a 'funnel model' (Halkier 2016), in that it began with an explorative and open question regarding important RI topics to focus on for RFOs and RPOs (for the specific wording of questions and moderator structure, see appendix VII). Then the discussion revolved around two to three pre-defined topics. Each focus group discussed a selection of the topics from the topic list (see appendix IX) in depth. These topics were operationalised based on a thorough and collective approach amongst WP partners, as described above. The rationale for topic selection and operationalisation can be found in appendix XII. Appendix XI shows the distribution of topics between the 30 focus groups. These discussions were then followed by a topic ranking exercise, before ending the interview with an open question concerning additional topics, and a final debriefing.

In the topic ranking exercise, each focus group sorted and ranked all the topics selected for the first version of the toolbox, 'SOPs and guidelines vers. 1' (see appendix XIII), into three groups:

- Topics that are *very important* for research integrity within my field of research/work
- Topics that are *somewhat important* for research integrity within my field of research/work
- Topics with *no or very little importance* for research integrity in my field of research/work

In reality, some focus groups also placed the topics in between the three pre-defined categories, and the exercise topics have subsequently been coded according to five different categories.

The moderator guide (appendix VII) and the accompanying list of questions and probes for all RI topics (appendix IX) were constructed as supportive tools for the moderators, for instance including examples of questions and probes that moderators could ask. However, it was not prescribed that moderators should make use of all probes and attend to all subtopics under one RI topic discussion. The focus group discussions were to a great extent directed by the natural flows of conversations amongst the participants.

2.2.4 Coding procedure

The 30 focus group interviews were coded in the software program NVivo. The program assists with the organisation, structuring, and facilitation of large sets of qualitative data. It allows for easy overview and access to interview excerpts and coding segments, while supporting both a within- and across-case analysis. The facilitation enhances accuracy and reliability and renders possible collaboration amongst and across research teams to manage and analyse data, which has been an important feature for the work preceding this report. The coding process mainly followed a deductive coding strategy, which was based on the three research questions and directed by a set of predefined categories that relate to the list of RI topics and subtopics (see appendices IX and XIII) explored through the moderator guide. The coding process also made use of a more explorative approach, where new topics and cross-cutting themes emerged through an inductive coding procedure. More specifically, when new topics and themes unrelated to the predefined RI topics and sub-topics appeared in the focus group discussions, they were tagged with a code describing the theme content and coded under the heading of emerging themes/contextual themes. Furthermore, the data was coded through the process of first and second cycle coding (Saldana 2013), where an initial coding frame is constructed and then subsequently synthesised, refined, and conceptualised in terms of 'pattern coding' constructions. The second cycle coding mainly collected and examined the new, emerging theme codes. These were merged and reconceptualised into contextual and crosscutting themes around the predefined RI topics and sub-topics, adding a picture of the context, in which to understand the RI topics. The RFO and RPO groups were coded as two distinct cases, resulting in two different coding frames/lists. However, when RFO groups have discussed matters relating to RPOs, and vice versa, data were coded in the associated categories in order to include all relevant material in the analysis.

2.2.5 Challenges and mitigation strategies

The focus group interviews were conducted by multiple moderators and across eight different countries. Moderator insights into national and local conditions, institutional contexts and funding structures, for instance, are vital insights for leading and directing the individual focus group discussions and important in that these contextual understandings underpin the credibility and validity

of the analytical findings. Multiple moderators also increase heterogeneity in the research and interview design when variation is introduced into the execution of the focus group interviews. To mitigate potential variation that could reduce the explanatory force and subsequent comparative efforts, a very detailed and structured research process 'script' and moderator guide was developed to enhance homogeneity in the design and the validation of results. Still, variance in topic exploration and weighting did evidently occur across the focus group interviews. To increase transparency in terms of variation, each topic exposition outlines the number of groups that have discussed the particular topic as well as characterises the type of discussion.

In some of the focus groups, language barriers also posed a challenge in terms of being able to express views and perceptions that would have been easier to disseminate in one's native language. To ensure that all participants understood the purpose of the focus group study and to create a safe atmosphere, a few introductions to the focus group sessions were performed in the national language. Moreover, local transcribers have transcribed the interviews, which is likely to have increased the reliability of the transcriptions. However, in general, most participants spoke English fluently, and were accustomed to English being the 'lingua franca' within research. The quotations included in the report have all been reported verbatim and only slightly altered to remove an insignificant 'uhm' or slightly adjusted if a word or sentence appeared misleading.

Another challenge comprises the lack of funding representatives in all of the 16 mixed RFO groups. Presumably, it would have increased the explanatory force of the RFO discussions if they were to have included a funding representative that could help frame the discussions in terms of existing practices and policies. Still, due to the large number of mixed focus groups, the funding perspective was represented across the focus group study at large, and a variation in stakeholder representation was attained.

The scale and scope of the focus group study allow us to state some general observations found across the 30 different focus group interviews and across different disciplines, institutions and countries. At the same time, 30 interviews and the broad number of selection criteria applied still equals a relatively small sample if the objective is to provide more generalised hypothesis statements. By no means do we claim to provide a full picture of the research integrity landscape across Europe. Instead, the primary objective is to provide a more in-depth understanding of field specific variation in terms of the substantial richness of the different RI topics. This exploration furthermore points to contextual variation needed to be taken into consideration in this and in subsequent studies that could expand upon the insights provided in this one.

Due to the COVID-19 situation, eight of the 30 focus group interviews had to be performed online. The interactive nature of the focus group method is difficult to translate into an online format, as the flow of face-to-face interactions does not sit well with the online taken turn approach and at where the subtlety of body language and body gestures are difficult to convey. Some of the online discussions were to some extent dispositioned as group interviews, rather than focus group interactions. Still, moderators tried to enhance interaction though probes and prompts to encourage discussion rather than simply individual answers. Minor technical issues were encountered in some of the online interviews such as occasional fall-outs, but they were all managed in a way that did not compromise the quality of the interviews. Overall, for the purpose of answering the research questions and the partly structured approach of exploring topics, the quality of the online data is assessed to be of an equally high standard as the data obtained through face-to-face interviews.

2.3 Analytical strategy

As the main objective of the focus group study is to *understand and prioritise* individual RI topics and *add* new topics and conceptions to the emerging landscape of research integrity cultures within RPOs and RFOs, the analytical strategy prioritised within-case analyses of each RI topic included in the study. In the analysis presented here, each topic is explored in-depth in order to understand its uniqueness in terms of field disciplinary perceptions; the specific dynamics and correlations at play, as well as context-dependent implications that may reflect national and institutional variance that are of importance for the particular topic perceptions. Furthermore, examples of best practices and ideas and recommendations for SOPs and guidelines are also explored as part of each topic. The within-case research strategy covers the twofold ambition to study emergent themes of significance and confirm/dismiss existing research findings concerning key topics. The analyses of the RI topics are supported by displays presenting key findings. Subtopics that participants did not dwell on in their discussions are reflected by empty rows in the displays.

The analytical strategy also includes a topic and thematic across-case comparison that adds to and supports the explanatory force of the individual within-case analyses by focusing on identifying differences and similarities across the main field of research in terms of recurring patterns and contextual variation. Both the within and across-case analyses are displayed through heat maps that visualise the importance of RI topics across the four main areas of research.

2.4 Methodology for the heat maps

The heat maps were created by examining the results of the sorting exercises and, when available, the transcriptions of the discussions that occurred during the exercise. In most cases, a card would be sorted in a category by one participant. During the discussion, the group was able to provide feedback on each topic and nuance their position. Including these conversations allowed us to provide a richer view of the priorities assigned to the different RI topics.

The sorting exercise had three categories: very important, somewhat important, and of none or minimal importance. Participants were required to place each card in one of the categories after discussing it with the group. Most often, the participants were asked by the moderator(s) to take turn in choosing a topic card and then initiate a collaborative discussion. In some cases, the participants placed a card in between categories. Following this, a category was added in between each of the three categories named above. This addition also allowed us to better reflect the outcomes of the discussions during the sorting exercises. The categories for the heat maps became: very important (dark green), important (light green), somewhat important (yellow), of minimal importance (orange), and not important (red).

Translating the results of the sorting exercises and the discussions into its visual form was done through two rounds of coding. In the first round, two researchers analysed the pictures and transcriptions in order to place each topic in one of the categories. This was done for each of the 30 groups. In the second round, disparities in the coding were analysed and discussed. To account for the disparities, the coding of the two researchers was given a number and averaged, where the lower category (not important) was assigned one point and the higher five (very important).

The averages were translated into two graphics, which were merged into a heat map per area: one showing average positioning of each topic per focus group and the second showing the averages per topic for all the focus groups in one main area of research. Both in the group and in the combined graphics the averages of the two rounds of coding were calculated, thus on occasion the combined results might seem to differ between columns, despite the appearance of the columns having the same values. The encompassing heat maps for RPOs and RFOs used the results per group shown in each discipline, but for the combined graphic the average for all RPOs or RFOs was used.

3. Findings from RPOs – Perception and prioritisation of RI topics

In Deliverable 4.2 in SOPs4RI (see link in references), nine RI topics were selected as especially important for RPOs to address in their RIPPs. In this part of the report, we look into the understanding of these nine topics and examine their relevance for the different main areas of research. In other words, we try to answer the following research questions: How do the four main areas of research understand the nine topics? Which challenges do they identify in relation to the different topics? Are the nine topics equally relevant for all four main areas of research – and which topics are considered to be the most important ones for the different main areas?

With a disciplinary focus, this part of the report explores the need for RPOs to develop research integrity policies for the nine topics. It also looks into the potential use of SOPs and guidelines by RPOs for these topics. The policies, SOPs and guidelines are examined in relation to the four main areas of research: humanities, social science, natural science (including technical science), and medical science (including biomedical research). The results are presented in four subparts, each covering one main area of research. Within each subpart, all nine topics selected for Version 1.0 of the toolbox (see D4.2, link in references) are examined for the main area of research' understanding of the topic, the challenges related to it, and the importance of it. All topics are examined in relation to RPOs. The results therefore shed light on which policies and procedures the different main areas of research would particularly like to see universities and other research organisations focus on – and consequently where RPOs could aim their RI efforts.

This part of the study is mainly based on 14 focus groups consisting of researchers from the four main research areas (see section 2.2 for the characteristics of the RPO focus groups). The 14 focus groups were conducted across Europe. The Netherlands, Denmark, and Croatia each had three focus groups; two focus groups were conducted in Spain; and Germany, Belgium, and Greece each had one focus group. Each focus group consisted of researchers from one of the four main areas of research, representing the core methodological and epistemic approaches and disciplines of the area. In the social science groups, for example, the groups were either with researchers who worked with a qualitative or a quantitative approach. Within the other main areas of research, other distinctions were used (see Methods section 2.2.2). Each focus group further comprised researchers with different levels of seniority (see section 3.1, 3.2, 3.3 and 3.4 for a complete overview

of participants in the 14 focus groups). As is also explained in section 2.2.4, some of the 16 RFO groups, which are analysed in the next part of this report (see section 4), also discussed matters relating to RPOs. Where it is relevant, material from these discussions is included in this RPO-part of the study. It will be clearly highlighted under which topics specific mixed focus groups have provided input for the topic analysis.

In the RPO focus groups the following list of nine topics and related subtopics of RI (stemming from the first version of the toolbox, D4.2, link in references) were discussed:

Topic	Subtopic
1. Education and training in RI	a. Pre-doctorate b. Post-doctorate c. Training of RI personnel and teachers d. RI counselling and advice
2. Responsible supervision and mentoring	a. PhD guidelines b. Supervision requirements and guidelines c. Building and leading an effective team
3. Dealing with breaches of RI	a. RI bodies in the organisation b. Protection of whistle-blowers c. Protection of those accused of misconduct d. Procedures for investigating allegations e. Sanctions f. Other actions (including mobility issues)
4. Research ethics structures	a. Set-up and tasks of ethics committees b. Ethics review procedures
5. Data practices and management	a. Guidance and support b. Secure data-storage infrastructure c. FAIR principles
6. Declaration of competing interests	a. In peer review b. In the conduct of research c. In appointments and promotions d. In research evaluations e. In consultancy
7. Research environment	a. Fair procedures for appointments, promotions, and numeration b. Adequate education and skills training c. Culture building d. Managing competition and publication pressure e. Conflict management

	f. Diversity issues g. Supporting a responsible research process (transparency, quality assurance, requirements)
8. Publication and communication	a. Publication statement b. Authorship c. Open science d. Use of reporting guidelines e. Peer review f. Predatory publishing g. Communicating with the public
9. Collaborative research among RPOs	a. Among RPOs inside/outside the EU b. With countries with different R&D infrastructures c. Between public and private RPOs

All topics are explained in further detail in the introduction to each topic under the main areas of research (see subsections in 3.1, 3.2, 3.3 and 3.4). It will also be explained what the discussions particularly focused on. For example, if a specific subtopic was granted special attention, it will be highlighted. As is also explained in section 2.2.3, each focus group discussed two to three RI topics in-depth and addressed all the topics displayed in the list above in the sorting exercise. There are some minor differences between the discussed topics in the in-depth discussion part and the sorting exercise part. Some topics are worded a bit differently, and 'Declaration of competing interests' are only dealt with in the sorting exercise. Furthermore, 'Transparency' and 'Managing competition and publication pressure' – subtopics under 'Research environment' – were singled out as topics for in-depth discussions. The remaining subtopics under 'Research environment' were merely presented in the sorting exercise.

In the following, it will be explored how the humanities, social sciences, natural sciences (including technical science), and medical sciences (including biomedicine) understand the above listed research integrity topics in relation to RPOs. Under each topic for the research area in question, the emerging perceptions, perceived challenges, best practices, ideas and suggestions for guidelines and procedures for RPOs to pursue are presented. A heat map displaying the sorting exercise results concludes the within-case analysis of each of the four main areas of research. Following the four within-case analyses, a cross-case analysis on emerging patterns across disciplines and the perceived need for policies and procedures in RPOs to support and promote a strong research integrity culture will be presented.

3.1 Humanities

In this section we delve into the promotion of research integrity in research promoting organisations from the disciplinary perspectives of the humanities. In general, academic literature on research behaviour and integrity for the humanities remains limited (Haven et al. 2019).

Through these interviews, we explore some of these knowledge lacunas by asking how different researchers within and around the humanities understand and prioritise topics such as education and training of RI, responsible supervision and mentoring, publishing practices, and dealing with breaches, amongst others. The objective is to increase our understanding of how RPOs may foster and advance RI practices and policies in alignment with particular needs and interests of the humanities.

The following analysis draws on the transcripts of four focus groups. Three of these were composed solely of researchers representing nine disciplines within the humanities from across three European countries. They discussed the current landscape of RI from their point of view and reported on potential roadblocks and negotiable ways to promote it. The other focus group involved individuals with a double role, e.g. researchers who also serve as members of ethics committees or as counsellors at their respective institutions. The participants in these groups discussed and prioritised nine different main RI topics, and a selected number of topics were discussed in depth, as shown in display 3.1 below. The results of these discussions are addressed in the following sections by topic and summarised in separate displays. We also provide a heat map at the end of this chapter (section 3.1.10) that visualises the assessed importance of each RI topic for the humanities.

Display 3.1. Overview of participants in the humanities focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Researchers/stakeholders represented**	Country	Face-to-face/online interview	Number of participants
1	(researcher only) History of ideas Archaeology	Data management Transparency	Management position at university	DK	Face-to-face	3

		Research collaboration among RPOs	Associate professor Assistant professor Professor			
11	(researcher only) Theoretical and applied linguistics Sociolinguistics Computer mediated communication	Managing competition and publication pressure Supervising and mentoring Education and training in RI	Post-doc Lecturer Senior lecturer Professor Associate professor	NL	Face-to-face	7
12	(mixed group) Media and Culture Archaeology Religion Philosophy Legal Philosophy	Education and training in RI Dealing with breaches of RI	Confidential Counsellor RI Committee member Professor Assistant professor Post-doc	NL	Face-to-face	5
21	(researcher only) Information sciences Communication sciences	Research collaboration among RPOs Publication and communication	Post-doc Assistant professor Associate professor	HR	Face-to-face	6

		Supervision and mentoring				

* Participants may represent more than one discipline
** Participants may represent more than one type of position

3.1.1 Education and training in RI

The topic 'Education and training in RI' is generally emphasised as vital to promote a more responsible research culture. In this case, the interviews focused on issues surrounding the successful implementation of education and training programmes and their effectiveness. These can refer to the subjects and types of cases that should be included in the training, but also to the differences in target groups according to the level of seniority as well as per discipline.

This topic was discussed in depth in the linguistics group, while in the history and the communication sciences groups it was assessed during the sorting exercise. The responses from the mixed humanities group from the Netherlands were also considered for this topic, as the discussion focused heavily on RPOs.

3.1.1.1 Key features of the topic 'Education and training in RI'

Display 3.1.1: The humanities groups' views on 'Education and Training in RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Education and training in RI	*"if you work with experience and testimonials and multiple voices, then I can see that being far more effective"* (Assistant professor of media and culture, focus group 12, p. 11) "*don't think yet another training will*	Mandatory online training for lecturers and researchers every three years	Lack of topic-specific training Making training more engaging and truly a learning experience Structures that value output	Subject-specific training Training for PhD supervisors (professors and assistants) Making training sessions mandatory, only if there are specific guidelines

	help, there are way too many trainings and things to do already" (Lecturer of linguistics, focus group 11, p. 17)		and competition conflict with the talk of an integral research culture How to ensure that those that need the training take it	Central place/office with clear documentation as a first entry point, or for doubts Using real life cases/examples Create awareness by discussing integrity issues in regular meetings
Pre-doctorate				Integral part of their training Ownership of publication and plagiarism How to deal with power dynamics
Post-doctorate				
Training of RI personnel and teachers				RI teachers should be aware of discipline specific cases/examples RI personnel should be diverse
RI counselling and advice				Diversity in counsellors and advisors Training could be taken up by graduate schools

3.1.1.2 Key observations: 'Education and training in RI'

In general, the participants assigned high relevance to this topic, although they also highlighted the difficulties of developing research integrity based solely on training. On a more abstract level, several participants referred to the ideal of having an established culture of integrity (focus group 12) where the different issues have been deeply reflected upon. The ultimate goal should be on sharing

the same values and teaching virtues (focus group 12), although this was recognised as a challenge in a structure based on competition.

On a more practical level, the participants mentioned the difficulty of relating to very general codes and guidelines intended for all of the disciplines in the humanities,

> "*If I look at the code of conduct, a lot of times... there will be a lot that's irrelevant to what I do and […], it's also a good idea to say what works for a specific discipline*" (Post-doc in archaeology, focus group 12, p. 7).

A widespread opinion was that codes (guidelines) and training need to be discipline specific. There were two concrete suggestions on how to tackle this particular issue. The first one was to involve graduate schools in shaping and providing discipline-specific trainings, while the second was to create pan-European discipline-specific guidelines and trainings. This last suggestion would pool resources and experiences from the same discipline across the EU, ensuring that the cases used are relevant for each discipline.

Beyond being discipline specific, training could benefit in their reach and effectiveness by incorporating diversity. As one participant mentioned,

> "*because you don't want to create an environment where you're ultimately reproducing again, the same kind of dynamic, or the same research, both content or politically speaking... so you have to create poly-vocality, multiple voices to kind of play into this*" (Assistant professor of media and culture, focus group 12, p. 10).

On the aspect on whether training should be mandatory or not, the opinions were divided. In one focus group it was mentioned that mandatory courses are necessary "*to preserve the integrity of the institution*" (Professor of legal philosophy, focus group 12, p. 8). In contrast, many shared the opinion that yet more courses would only be burdensome and a waste of time, especially because they are often not tailored to the needs of the different disciplines. In between these opposing views, there seemed to be a consensus that courses should only be mandatory if the content has been tailored for each discipline and if they provide tangible tools to work along specific codes of conduct.

Amongst the participants there was a shared perception that the current training programmes have serious gaps. Some of the topics that do not seem to be covered by training are bias (focus group 12), co-authorships (focus group 12), how to treat research participants and the issue of consent

(focus group 11), PhD supervision, data storage (focus group 11), and issues that post-docs and short-term contract researchers face (focus group 12).

This last point touches upon the issue of the 'new reality of hiring' where researchers might only work for short periods in the same environment, making the creation of a culture of integrity challenging. These hiring practices can become obstacles, as researchers who have limited time in a project might be burdened by yet another workshop, while at the same time a researcher might have to attend two or three different workshops in different organisations.

Another problem that seems to be common, is that the different guidelines are not gathered in a central place but scattered amongst different pages of a website. To tackle this, participants suggested a single point where all ethics and integrity issues are covered. Further, given that not all RI issues can be covered in a course or solved through reading a document, it was suggested that RI could be fostered by also having an advisor. This person could, for example, provide insights on subjects not covered, such as power dynamics. Another suggestion was to create opportunities to openly discuss grey issues and doubts in groups. Both suggestions shift the idea of education from single events to a long-term approach.

Beyond the lack of discipline-specific courses and the gaps perceived in the programmes offered, participants felt that most training could benefit from using real problems and cases related to each discipline. This shift would make the training more relevant and engaging.

3.1.2 Responsible supervision and mentoring

The topic 'Responsible supervision and mentoring' for the humanities was mainly approached in regard to PhDs and students. Although in some disciplines there are large research teams, most seem to include mostly PhDs. Mentoring and supervising a team seem to be less relevant than for other fields, such as medicine. The views for this topic were dealt with in depth in the linguistics and communication sciences groups, while in the history group it was addressed during the sorting exercise. As in the previous topic, we also applied data from the mixed humanities group from the Netherlands, as the discussion for this topic focused heavily on RPOs.

3.1.2.1 Key features of the topic 'Responsible supervision and mentoring'

Display 3.1.2: The humanities groups' views on 'Responsible supervision and mentoring'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Responsible supervision and mentoring	"They coach you in supervising your PhDs but they don't address the problems that really occur" (Professor of Islamic studies, focus group 12, p. 7)			Provide tailored training to assistant and associates that supervise PhDs Provide access to a counsellor that can advise on specific issues Integrate research integrity and ethics into everyday interaction
PhD guidelines			Discipline specific is lacking	Ownership of publications
Supervision requirements and guidelines		In the Netherlands, a PhD must have two supervisors	Discipline specific is lacking	Set a limit on number of PhDs a person can supervise A PhD should have more than one supervisor
Building and leading an effective team				

3.1.2.2 Key observations: 'Responsible supervision and mentoring'

The interviewees attached high relevance to the topic of 'Responsible supervision and mentoring'. The focus of the discussion was two-fold: on the one side, it is important to have clear regulations and support for supervisors, while at the same time supporting the PhDs during this first stage of their careers. In general, the view was that at this stage it is extremely important to foster good research practices and thus work towards a research culture of integrity.

Amongst the diverse issues raised by participants was, firstly, the challenge of reconciling funders' expectations with academic freedom in PhD research. As an example, a case was mentioned where a project was expected to support a specific hypothesis while the research of one PhD actually arrived at a different conclusion,

> "*basically the research is done funded in a certain way, but it may not support the original hypothesis. The PI wants at all costs produce the deliverables and, what message does this give to the students, and in the end also in terms of student's autonomy, that is a very, sets a very bad precedent or feeling like, you know, what you found, we don't care about what you found, it's irrelevant, the important thing is just to confirm what we thought we would find*" (Professor of sociolinguistics, focus group 11, p. 15).

Other obstacles mentioned are also related to resources, specifically regarding the number of PhD students that professors supervise. This affects not only the amount of time that every PhD student is accorded, but also the quality of the supervision. Some universities have tackled this problem by allowing assistant/associate professors or researchers to supervise theses. However, these supervisors are not always eligible for training, nor are they always familiar with formal guidelines.

Regarding the supervisors, there was a general agreement that receiving training on how to supervise would be desirable. However, some raised the concern of too-general training that does not cover what really happens on the academic shop floor. On the issue of whether to make training for supervisors mandatory or not, the participants opinions followed the ones given in the previous section,

> "*All supervisors should be trained but you then have to, kind of, come up with a trainer, or a training body, that really is aware of what they're talking about, you know, not sort of post-its on a pyramid in a board or whatever.*" (Assistant professor in media and culture, focus group 12, p. 9).

Moreover, several researchers highlighted common issues that arise from power differentials. They agreed that making PhDs aware of formal RI and supervision guidelines can be a way of empowering and supporting them. Another suggestion to tackle power imbalances, was to have more than one supervisor as well as an advisor or ombudsperson that can provide leeway.

As with the previous topic, the participants mentioned that any guidelines or frameworks should be topic-specific and be based on real cases. A participant suggested that any regulations should

include the voice and experiences of PhDs. In light of this, guidelines could be reviewed periodically by a committee including those that are affected by them.

3.1.3 Dealing with breaches of RI

The topic 'Dealing with breaches of RI' for the humanities focused on the procedures that RPOs have in place and the perceptions of them. Some of the aspects covered were the transparency and speed of procedures, as well as lack of clarity on how to file complaints. The topic was prominently addressed by the linguistics and communication sciences groups, while the history group discussed it briefly during the sorting exercise. As with previous topics, the input from the mixed humanities research group from the Netherlands was also used.

3.1.3.1 Key features of the topic 'Dealing with breaches of RI'

Display 3.1.3: The humanities groups' views on 'Dealing with breaches of RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI	There is a tension between thorough procedures and the speed at which they are carried out Lack of clarity on what amounts to breaches of RI vs. other issues	Counsellors getting together and sharing advice on cases	Transparency and clarity on procedures Misuse of complaints Slow response	Clarity on how to file complaints Transparency of procedures Normalising a culture of talking about issues
RI bodies in the organisation			Loss of reputation for the organisation	
Protection of whistle-blowers				
Protection of those accused of misconduct				

Procedures for investigating allegations	They can take very long			
Sanctions				
Other actions (including mobility issues)				

3.1.3.2 Key observations: 'Dealing with breaches of RI'

The issue of 'Dealing with breaches of RI' was seen as complex. Some participants mentioned the lack of clarity on the structures and processes for dealing with breaches or suspicion of breaches,

> "A *certain clarity about procedure, who is responsible for what? What's gonna be done with my complaint? or perhaps it's not really a complaint but a suspicion or how is that going to be handled*." (Professor of legal philosophy, focus group 12, p. 14).

At the same time, there was the impression that the procedures are extremely lengthy and slow, which can act as a barrier for reporting issues,

> "*One of the biggest hurdles has been the time element because if there's a PhD student who has an issue with their supervisor, for example, and the meeting is once a year, and they miss the meeting for reviewing these cases, that's a third, a quarter of the time for their whole contract*" (Assistant professor in media and culture, focus group 12, p. 16).

The extent of breaches of RI is perceived as less in the humanities than for other fields; as one participant noted "*it's not something that in my everyday work is very relevant*" (Post-doc in theoretical linguistics, focus group 11, p. 22). Interestingly, participants in the mixed humanities group pointed out that to some extent misuse of raising of complaints occurs. The lack of proper channels available for handling human resources (HR) issues was mentioned as cause for this perceived misuse.

There seems to be tension between the advantages and disadvantages of allowing for anonymous complaints. Some participants felt this could facilitate individuals in lower positions to raise an issue, while others fear this may give rise to misuse. In any case, it was felt that the lack of clarity on what can be considered a breach of integrity, versus an HR or management problem, complicates the reporting of issues.

Besides making the structures and procedures clear, the participants had two other recommendations. The first one is to foster a culture of openness where issues can be more freely discussed, although no specific steps were suggested for achieving this. The other suggestion was to assign an advisor or counsellor to whom people can first talk to about an issue, before launching a whole complaint procedure.

3.1.4 Research ethics structures

The topic 'Research ethics structures' refers to the regulatory procedures in place and how they are experienced by researchers in the humanities. This topic was only sparsely discussed by the communication sciences group, while the linguistics and the history group covered it during the sorting exercise.

3.1.4.1 Key observations: 'Research ethics structures'

Given that this topic was sparsely covered, it is difficult to make general observations about how it is perceived in the humanities. Generally, there is tension between the perceived benefits of having committees and the danger of them becoming an obstacle for research. For example, one participant in the communication sciences group felt that guidelines and frameworks could be enough, while ethics review committees may stifle creativity. A related comment came from the linguistics groups, where a researcher noted that too many guidelines and procedures can turn the issue of research ethics into a legalistic question, as well as reinforcing the notion that researchers cannot be trusted. At the same time, some participants were of the opinion that committees and guidelines were both necessary for the humanities. The balance between these two views may rest in the set-up of committees, although the lack of feedback makes it difficult to assess the best way to implement them. The only specific feedback given on how regulatory procedures are established, is that they should consider the reality and contexts of temporary contracts.

3.1.5 Data practices and management

The topic 'Data practices and management' in the humanities focused on the challenges caused by the recent introduction of the GDPR, the complexity of storing data, and the lack of discipline-specific training on how to manage data. The topic was discussed in depth in the history, linguistics, and communication sciences groups.

3.1.5.1 Key features of the topic 'Data practices and management'

Display 3.1.5: The humanities groups' views on 'Data practices and management'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Data practices and management	"*I still don't understand the rules [of GDPR] to be honest*" (Assistant professor of archaeology, focus group 1, p. 17)			Clear guidelines per field and discipline, with examples
Guidance and support			Administrators lack sufficient knowledge to answer questions from researchers Data officers and managers are not widely known inside an organization	Clarity on where to find support and documentation
Secure data storage infrastructure	"*Data storage is always, always complicated*" (Lecturer in linguistics, focus group 11, p. 17)		How to backup different types of data	Support for ad-hoc needs
FAIR principles				

3.1.5.2 Key observations: 'Data practices and management'

In general, the introduction of the GDPR seems to have created a significant amount of uncertainty. Some participants felt that the guidelines provided were not clear and did not cover their own work, while others felt that institutions lacked the knowledge to support them properly in this transition,

> "*We talked about it at meetings week after week after week, and people kept having questions, and the administrators were being sent to meetings to talk about it, and they would come back and say "well, we don't have answers to these questions, we don't really know it, it's really confusing", and then it sort of just fizzled out, so don't think that people understand it completely even know.*" (Assistant professor of archaeology, focus group 1, p. 18).

This sense of lack of clarity was not only limited to the GDPR, but extended to practices of data storage, which were perceived by the participants of the communication sciences groups as not clearly regulated.

Regarding formal guidelines, most focus group participants agreed that humanities-specific guidelines could be quite useful, especially if they contain examples for the different fields. Concerning the differences amongst fields, one participant highlighted how in the case of the GDPR, there seems to be no room for other ways of interaction between researchers and participants,

> "*the problem I have is that if I used consent forms, then I wouldn't get my data because [of how] I collect data […] If I start working with consent forms that they need to... it doesn't... it's not going to happen. It's too much hassle, I would get 10 percent of my recordings.*" (Associate professor of sociolinguistics, focus group 11, p. 4).

The issue of data storage for humanities is also seen as highly complex, because of the many different forms that the data can take. Some participants felt that there is a lack of know-how from the RPOs themselves, and as such they do not receive the necessary support. As one participant noted,

> "*my problem is that I would need to maintain some sort of administration of apps that I sent at one point, before they disappear into space.*" (Associate professor of sociolinguistics, focus group 11, p. 5).

These anxieties and uncertainties indicate that the topic has not been clearly communicated by all RPOs and suggest that field-specific guidelines and SOPs could be beneficial.

3.1.6 Declaration of competing interests

None of the humanities groups addressed the topic of 'Declaration of competing interests' in depth. The history group touched briefly upon the issue of independence from commercial interests, which could be considered as related. However, the participants could not come up with examples related to the topic, suggesting that this is not an issue for the humanities. The groups only provided input through the sorting exercise.

3.1.6.1 Key observations: 'Declaration of competing interests'

Despite not having discussed it in-depth, both the linguistics and communication sciences groups considered the topic as very important. For the participants of the former, the conflicts of interest in the humanities are localised mostly in peer review, and how appointments and promotions are given. In contrast, the communication sciences group considered it as a less relevant topic, given that it is already formalised for the submission of articles and project proposals, it does not require much more attention.

3.1.7 Research environment

'Research environment' refers to what is perceived as the 'general atmosphere' or 'culture' facilitated by RPOs. The research environment is a key influence on integrity as it can foster good or bad research practices. Concerning the humanities, we discussed the criteria for promotions and evaluations, the effects of temporary contracts, and the challenges for creating a sound research culture. The material for this section was discussed in the communication sciences, history, and linguistics focus groups.

3.1.7.1 Key features of the topic 'Research environment'

Display 3.1.7: The humanities groups' views on 'Research environment'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research environment	Despite guidelines and policies, when unethical behaviour is observed there is nothing one can do		Temporary positions	Create spaces to discuss issues Assign an advisor/ombudsperson
Fair procedures for appointments, promotions and numeration	Unclear criteria on how promotions are handled		Teaching is not valued as output at evaluation	Make clear and transparent criteria for appointments and promotions
Adequate education and skills training	Guidelines are not enough; adequate training is needed			
Culture building			Reaching out to researchers that are not part of a large group	Change culture of short-term contracts
Managing competition and publication pressure	The incentives are on having long publication lists, and as such, people tend to cut corners			Focus on the quality of publications, not on the quantity
Conflict management				
Diversity issues				
Supporting a responsible research process (transparency, quality assurance, requirements)	"*There is something intrinsically different about the humanities than the natural sciences and that the guide we have for science integrity and science standards needs to be adjusted to that difference*" (Associate professor of history			

	of ideas, focus group 1, p.7)			

3.1.7.2 Key observations: 'Research environment'

The topic of 'Research environment' can be quite broad but in general it was agreed that it is crucial for a healthy culture at RPOs. An issue that was highlighted in the history and linguistics groups as a detrimental to a good research environment, was the widespread use of short-term and temporary job contracts,

> "*I think sometimes we forget, is the ethics connected to the temporal, temporary positions, that sort of mask all of the lack of ethics within academia, […] how to approach the fact that some people might act in different ways or abstain from doing or speaking up or something, we might get better research, we might get a better working environment, we might get healthier people*." (Associate professor of history of ideas, focus group 1, p. 31).

In general, these positions were seen as detrimental to an ethical environment because: a) the person might not have the time to integrate into the culture of a particular RPO; b) the person may be scared to signal misconduct or questionable practices; and c) it is not healthy for the researchers themselves. A participant from the linguistics group, who is in such a contract, pointed out that those in temporary contracts often lack the resources and support that other groups have access to.

These positions were also seen as a hindrance for publications, as they are often used to fill-in "workhorse" positions that are undervalued and do not count for promotions. This perception ties into two other interrelated issues raised by the participants; that of promotions and appointments, and that of evaluations. Concerning the former, one participant of the linguistics group mentioned that many people feel there are no clear criteria for career development, although another participant expressly disagreed with that point,

> *"[…] people around me are frustrated, I think, you know, […] that they are frustrated for very good reasons because they want to be more than that and they are not being given the criteria, and people who are less than them, they get higher positions*." (Associate professor of sociolinguistics, focus group 11, p. 13).

Concerning evaluations, there was a widespread perception that teaching, which is a core activity of many professors and lecturers, is not valued as output and that only publications count. As one

participant noted, "*there are extremely good teachers who do not get the promotion that they deserve*" (Lecturer in linguistics, focus group 11, p. 14). Participants also felt there is a mismatch in the activities expected from them (teaching and researching) and the time assigned to it.

Other values strongly related to a healthy research environment were identified as openness and transparency. In the various focus groups, these aspects were usually approached by highlighting the need for environments where open discussions can take place. In the history group, the discussion centred on the issue of reproducibility in science and the expectation that science must always be reproducible. As a participant noted,

> "*Whereas it's harder the things, I think, that we write, the thought process is going down the paper, so the experiment, the closest thing we got to an experiment, is what's there on the page. So we don't necessarily need the reproducibility I wouldn't think, because you are talking people through your thought process*." (Assistant professor of archaeology, focus group 1, p.7).

In the discussion that followed, participants agreed that transparency and openness in the humanities are rooted in their citation and source criticism practices. Given that these practices are already an integral part of the formation of researchers, they felt that specific guidelines are not necessary here.

As a way to foster a good research environment, guidelines and SOPs for certain issues were seen as positive. However, their effectiveness was at the same time perceived as limited. As a participant from the communication sciences group noted,

> "*I think that more important than guidance is discussions on this topic. So we need to actually open these question[s] and discuss them and put them in the somehow local or institutional tradition*." (Associate professor of information sciences, group 21, p. 5).

Thus, to ensure that guidelines and procedures are useful they should not stand alone. Participants agreed that training that covers real-life practical issues is needed, as well as an advisor or ombudsperson that researchers can approach with specific questions.

3.1.8 Publication and communication

The topic 'Publication and communication' focused on existing practices related to authorship, evaluations, peer review, and open science. The topic was covered in-depth in the linguistics and communication sciences groups, while some related issues were also discussed with the history group during the sorting exercise.

3.1.8.1 Key features of the topic 'Publication and communication'

Display 3.1.8: The humanities groups' views on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication	There is pressure to publish only positive results and ignore the negative ones			Make international guidelines per discipline
Publication statement				
Authorship	Although there are guidelines, the issues are mostly related to power dynamics	Helsinki agreement	Power dynamics between juniors and seniors Collaboration can diminish the counting of a publication and thus is discouraged	Empower juniors by making them aware of guidelines
Open science	The gap between North and South is widening due to lack of infrastructure		Many journals are not indexed. Pressure to publish in renowned journals	Make deposit in institutional repository obligatory Coherent policy between Open Science and evaluations
Use of reporting guidelines				

Peer review			Different from other fields (more subjective) Differs between countries Some humanities journals are not peer reviewed	
Predatory publishing				
Communicating with the public	Institutions are not considering this kind of communication			

3.1.8.2 Key observations: 'Publication and communication'

A recurrent issue discussed during the focus groups was authorship conflicts. One of the aspects most commonly noted was the power inequality between seniors and juniors. The suggestions to approach this problem includes having clearer guidelines,

> "*I think it would be good then just to make PhD students aware really from the very start what the guidelines are and what their options are*" (Lecturer in corpus linguistics, focus group 11, p. 10).
>
> "*That's as far as I think the guidelines can help. I totally agree, they wouldn't completely resolve things like that, but they could offer someone a little bit of institutional backing to have a voice.*" (Professor of sociolinguistics, focus group 11, p. 10).

At the same time, the issue of power imbalance was noted as being a constant in academia that neither guidelines nor procedures could address properly. As one participant highlighted, "*I don't think that the guidelines would do anything in power relations, that's just a separate issue that is wrong in some way, and unavoidable in another way*" (Senior lecturer in linguistics, focus group 11, p. 10).

The issues with authorship are also present in collaborations. In some cases, the problems have seemed to hinder publication, as one participant noted,

> "*and the data is lost and never published. We even have some big projects in history that we have a lot of data… We have lot of collaborators and nothing got published because of those problems with agreement between people*" (Post-doc in information sciences, focus group 21, p. 14).

The communication sciences and linguistics groups agreed that having guidelines on how authorships are handled in collaborations might be helpful. Given that some collaborations are international, these guidelines could be also international, in a similar way to the Helsinki Agreement.

Another topic covered was the widespread use of citation-based metrics that poorly cover scholarly communication systems in the humanities,

> "*we all heavily rely on those commercial providers of, I don't know, citation, data bases like Scopus and Web of Science, which is really pity that we on European level don't have something that is actually… a real open or a public service… because I think it's very important to contextualise also those metrics*" (Assistant professor in information sciences, focus group 21, p. 23).

The topic of 'Open science' was also covered. Concerns on the way in which the European Union is handling the transition to 'Open Access' were raised. According to participants in the communication sciences group, the EU agenda relies heavily on the big publishers, which are seen as having secured their incomes. New regulations and guidelines on 'Open Access' were variously perceived to widen the gap in the scientific performance and infrastructure between developed and developing countries.

3.1.9 Collaborative research among RPOs

The topic 'Collaborative research among RPOs' focused on collaboration in and across Europe, between countries with different infrastructures, and joint activities with commercial actors. The topic was discussed in depth by the communication sciences group, while the history and the linguistics group discussed it briefly during the sorting exercise.

3.1.9.1 Key features of the topic 'Collaborative research among RPOs'

Display 3.1.9: The humanities groups' views on 'Collaborative research among RPOs'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Collaborative research among RPOs			Lack of financial resources Disparity between institutional, national, and project-based guidelines	
Among RPOs inside/outside the EU				
With countries with different R&D infrastructures				
Between public and private RPOs				

3.1.9.2 Key observations: 'Collaborative research among RPOs'

The topic of collaboration focused largely on joint publications written by different authors, however that has been covered in section 3.1.8. Another relevant issue raised was the disparity or financial resources between Northern and Southern countries. As one participant from Croatia noted,

> "*To collaborate, you have to know people from foreign countries and many scientists, and find one that could be good partners. But we don't have [the] opportunity to travel and go to conferences*." (Assistant professor of information sciences, focus group 21, p. 18).

On this same issue, participants felt there was a lack of tools and support to foster collaboration.

When collaboration does take place, participants in the communications sciences group noted that there might be a disparity between the guidelines prescribed by institutions, national bodies, supranational bodies, and even project-based guidelines. During the sorting exercise, the history group noted a similar concern: the difficulties of standardising workflows amongst countries.

This topic was perceived of as being of low relevance by the various participants, which might indicate that collaboration amongst the humanities is less frequent than in other fields.

3.1.10 Heat map of perceived importance – humanities and RPOs

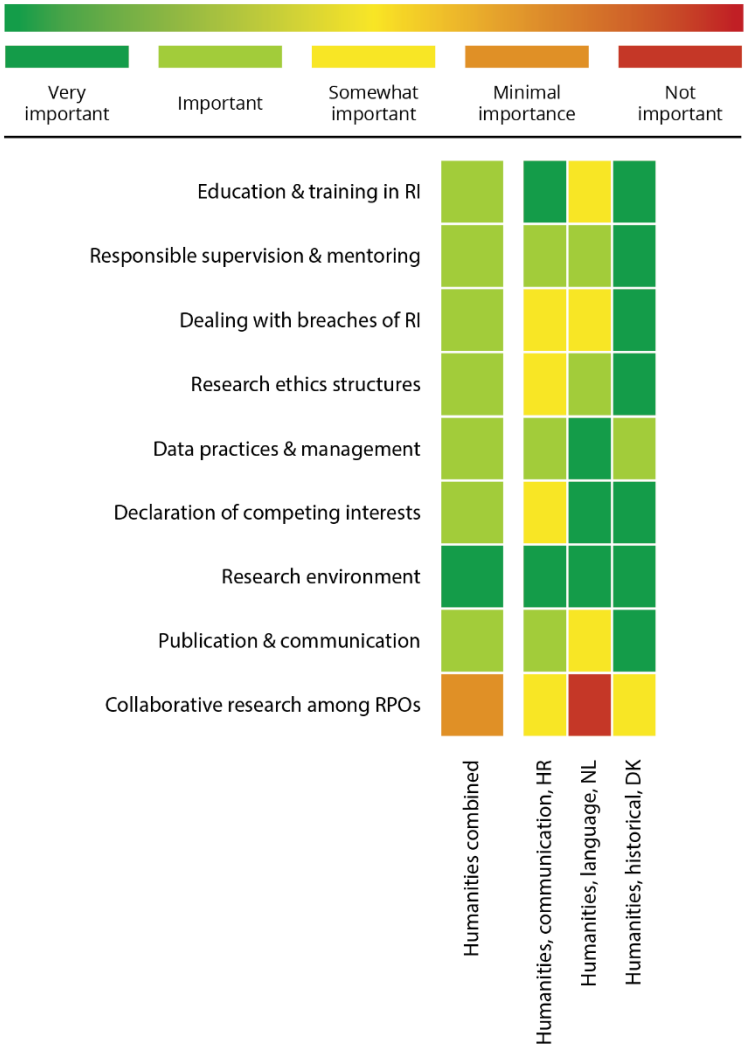


Figure 3.1.10: Heat map displaying sorting exercise results of nine RI topics in the humanities RPO focus groups.

This heat map shows the results of the sorting exercise done during the focus group interviews for the humanities. It reflects the importance assigned to specific topics by humanities researchers in relation to research integrity. Specifically, the map provides an overview of the areas where participants perceived that guidelines and SOPs could support the RI efforts of RPOs. The stark differences in the scale in which topics were arranged can be explained through disciplinary research cultures, but also by past experiences of researchers concerning the implementation of specific measures which have been perceived as "fashionable". Some researchers were reluctant to sort certain topics as very important out of fear this would become "yet another ticking box". The topic of 'Research environment' was unanimously chosen as very important due to its perceived influence on other topics. Although most of the other topics were considered as important, a few should be highlighted. For example, the topic of 'Responsible supervision and mentoring' was seen as a basis to foster a solid research culture. The topics of 'Research ethics structures' and 'Data practices and management' were perceived very differently amongst the three groups, owing to the experiences and needs of each disciplinary field. The latter was partly confused with GDPR, which was considered as a topic not requiring widespread efforts once the initial implementation has been adopted. Other topics that were seen as being of less importance (in the sense of receiving attention for guidelines and SOPs) were 'Publication and communication', and 'Collaborative research among RPOs'. The former is considered as already well regularised, while the latter seems to be less of an issue for the humanities.

3.1.11 Concluding remarks regarding humanities and RPOs

The humanities are composed of many disciplinary fields whose methods and epistemology diverge from other scientific fields, such as natural and medical sciences, on which most of the guidelines and regulations are based. This presents a challenge for RPOs when creating policies and guidelines. Formal policies that are not tailored to the specific needs of the different humanities disciplines can be perceived as irrelevant and even burdensome by researchers. Implementing policies this way can turn research integrity into yet another administrative checklist and create a culture in which researchers are by default mistrusted.

In our analysis, the need for a context-sensitive approach became particularly apparent in the following topics: 'Education and training in RI', 'Responsible supervision and mentoring', 'Data management practices', as well as in the 'Research environment' topic. Such contextual variation also

entails the availability of sources of ad-hoc advice, for example, when it comes to doubts that arise on specific practices or the so-called “grey areas”. RPOs should therefore not only ensure that their RI-related guidelines and SOPs are sufficiently tailored to the specific needs of humanities scholars, but also be prepared to institute robust structures for RI-related counselling and advice. It is important to highlight that RI structures need to be complemented by robust management and HR structures within RPOs; otherwise RI channels may be used to raise non-RI related issues.

The analysis also highlighted a range of other important issues that are perhaps not only specific to the humanities. This includes the need for harmonisation of digital research infrastructures, for example with respect to data storage. RPOs could try to make use of European infrastructure efforts that are already in place. Robust, pan-European and pan-disciplinary standards could go a long way towards eliminating the integrity ’grey areas’ that scholars encounter. Concerning the issue of “grey areas”, RPOs may focus on prevention by fostering a culture of openness in which issues or doubt can be easily discussed amongst peers.

Another overarching topic, that seems to pervade a number of specific issues, concerns hiring, evaluation, and appointment practices. Our focus group interviewees suggested that many common problems, such as authorship conflicts or abuse of power, are related to problematic incentives that emphasise individual publication performance above research and teaching. Also related to these problems is the widely-discussed practice of temporary contracts within RPOs.

3.2 Social science

The focus group study aims to explore how different research fields perceive and relate to a number of research integrity issues. It is specifically designed to understand the potential disciplinary variation in experienced challenges, and how institutional guidelines and SOPs might be tailored to enhance research integrity in these diverse cases. In this section, we delve into the promotion of research integrity from the disciplinary perspective of the social sciences. In the following, we explore how different researchers and stakeholders within and around the social sciences – i.e., mostly active academic scientists, but also individuals with specific administrative responsibilities, such as members of ethical review boards – understand and prioritise crucial RI topics. This includes questions surrounding proper education and training in RI, data management, adequate ways of dealing with breaches of RI, as well as responsible supervision and mentoring. The objective is to increase our understanding of how RPOs may foster and advance RI practices and policies in alignment with the particular needs and interests of the various social sciences.

The following analysis specifically draws on the transcripts of six focus groups. Three of these were exclusively composed of social scientists currently working at universities. This selection covers a range of different disciplines, both quantitative and qualitative fields. Another three focus groups involved researchers who held additional RI-related responsibilities in their institutions (e.g., members of ethical review boards, data management coordinators), as well as university employees with full-time or near-full-time administrative tasks (e.g., research ethics coordinators and trainers). Ten topics were discussed in depth by the different focus groups, as shown in the display below. The results of these discussions are addressed by topic and summarised in separate displays in the following sections. We also provide a heat map at the end of this chapter that visualises the assessed importance of the various RI topics for the social sciences.

Display 3.2. Overview of participants in the social sciences focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Researchers/stakeholders represented**	Country	Face-to-face/online interview	Number of participants
3	(mixed group)	Research ethics structures	Research ethics coordinator (REC)	DK	Face-to-face	4

	Economics (health, business) Political science	Selection and evaluation of proposals	Member of research ethics committee RIO Management position at university Associate professor			
4	(researcher only) Gender studies Sociology Sociology and religion	Data management Transparency	Gender and equality commissioner Professor Associate professor Post-doc	ES	Face-to-face	4
14	(mixed group) Psychology (Developmental, methodology, cognitive, organisational) Political science Statistics	Education and training in RI Dealing with breaches of RI	Researcher Management position at university Ethical review board member RI course lecturer Journal editor Professor Post-doc	NL	Face-to-face	6

15	(researcher only) Social psychology Political science Quantitative science studies Education and child studies Anthropology and developmental sociology	Managing competition and publication pressure Responsible supervision and mentoring	Researcher Data management commissioner Lecturer PhD fellow Assistant professor Post-doc	NL	Face-to-face	6
16	(researcher only) Qualitative science studies Higher education research	Education and training in RI Publication and communication	Researcher PhD fellow Project manager	DE	Face-to-face	5
22	(mixed group) Sociology Pedagogy Maritime Studies Psychology	Publication and communication Monitoring of funded applications Dealing with breaches of RI	Management position at university Researcher Researcher (industry) Associate professor Assistant professor Former journal editor	HR	Face-to-face	5

* Participants may represent more than one discipline
** Participants may represent more than one type of position

3.2.1 Education and training in RI

This section focuses on researchers' views of current mechanisms for RI education and training offered by RPOs, as well as their perceived limitations and what could be done to remedy them. The following results draw on both researcher-only groups and mixed stakeholder groups with social scientists, since both generated very relevant data. A mixed focus group involving psychologists from a Dutch university (focus group 14) dedicated particular attention to the topic, arguably because that field has recently experienced various cases of misconduct and is currently witnessing heated debates about integrity and reproducibility of research results.

3.2.1.1 Key features of the topic 'Education and training in RI'

Display 3.2.1: The social science groups' views on 'Education and Training in RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Education and training in RI	Education and training in RI at many institutions is not pervasive enough, e.g. it happens only during early career and only in one-off events (rather than regularly)			Measures should be taken to make education and training in RI a recurrent process that moreover covers all career stages (from PhD students to professors)
Pre-doctorate	Most institutions have by now set up RI education and training courses for students, which is perceived as a good thing			

Post-doctorate	Many perceive there to be a lack of RI education and training events for professors and supervisors			
Training of RI personnel and teachers	*"Integrity [training], also for PhD students of the whole building. […] for me it's still a challenge to see how we can cater to all the disciplines within social sciences, because there are many differences there already*." (Assistant professor in statistics, focus group 14, p. 3)		Overly formal education and training events that are not field-specific enough create the danger of these training events being perceived as merely an annoying formal exercise	Ensure education and training events are hands-on, with enough references to concrete research practice and involving experiences of participants Some participants suggested covering also ethical and legal questions regarding data management, as well as responsible citation practices
RI counselling and advice	Wide perception of insufficient contact points to get advice on how to handle RI issues on a regular basis (i.e., outside of formal training events)	an "integrity walk-in hour"		Encourage institutions to create informal contact points, where researchers can confidentially consult with ethics advisors about concrete issues and questions

3.2.1.2 Key observations: 'Education and training in RI'

The topic of 'Education and training in RI' was generally considered to be an important issue amongst the social scientists. Interview participants agreed that formal training events should be attended on a recurrent basis, for example every few years.

The focus groups also generated recommendations as to the content of such training events. Of crucial importance is to design them in discipline-specific ways, to make clear how RI can be practiced in concrete, everyday research situations. This means that formal training events should create enough room for participants to bring their own examples and questions to the table, not least

to avoid that the events are perceived as merely symbolic exercises (a "box" one has to tick). One interviewee (focus group 4) moreover suggested including reflexive discussion on problematic publication practices in the training events, while another (focus group 16) proposed including instruction on good citation practice and potentially also legal and ethical questions regarding data management.

Finally, a noteworthy issue raised by a number of participants, is the need to create better possibilities for ad-hoc ethical advice outside of formal training events. This could, for example, take the shape of informal contact points or an "integrity walk-in hour", where researchers can confidentially consult with ethics advisors about concrete issues. To some extent, such opportunities already exist at some universities (e.g., in the shape of an ombudsman), but researchers are not always aware of them.

3.2.2 Responsible supervision and mentoring

This part of the analysis addresses 'Responsible supervision and mentoring' in the social sciences. The focus group discussions covered both currently perceived issues in supervisory relationships, as well as possible ways of fostering good practice in supervision and mentoring through new formal guidelines that could be implemented by RPOs. The most significant amount of data was generated in a focus group composed of quantitative social scientists (conducted in The Netherlands), where the question of supervision and mentoring was explicitly raised by the moderators. It also featured – less prominently – in a discussion with a group composed of qualitative social scientists, where the topic was touched upon as part of an open discussion at the beginning (Germany, focus group 16).

3.2.2.1 Key features of the topic 'Responsible supervision and mentoring'

Display 3.2.2: The social sciences groups' views on 'Responsible supervision and mentoring'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Responsible supervision and mentoring	Responsible supervision and mentoring is a neglected topic by both RPOs and academic communities			Offer more training for mentors and supervisors
PhD guidelines	"*I think the biggest issues I would see is using students as free labour […] Everybody is under the pressure to publish. Data needs to be collected. Students are used as a convenience source of data collection because nobody feels like doing that*" (Assistant professor in social science, data manager, focus group 15, p. 12)		Unclear boundary between exploitation of students and the legitimate use of student labour as part of graduate training and collaborative work	Work towards discipline-specific guidelines for responsible supervision, in particular with respect to co-authorship and related questions
Supervision requirements and guidelines				
Building and leading an effective team	Many PIs never received proper management training Widespread abuse of power relations		Supervisory skills are not a serious consideration in professorial appointments	Make supervisory and mentoring performance a serious consideration in professional evaluation

	in supervision and mentoring			

3.2.2.2 Key observations: 'Responsible supervision and mentoring'

The topic of 'Responsible supervision and mentoring' was considered to be a very pertinent issue in all of the focus groups with social science researchers. The participants of the focus group in which it was explicitly raised for in-depth discussion firstly pointed out that supervision and mentoring skills are generally undervalued by universities. They lamented a common assumption, according to which supervisory qualities are seen as a sort of negligible soft skill. As one Dutch senior researcher put it,

> "*what you actually want is that, that in universities supervisors are actually good supervisors, but there's no, you're not trained to be a supervisor, you're not, I mean in science there's no, nothing, there's no schooling, there's no incentive, there's nothing which can actually give you training for being a good supervisors.*" (Associate professor in experimental psychology and neuroscience, focus group 15, p. 16).

This is partly due to a lack of awareness amongst researchers, but also to a significant extent the result of institutional appointment and evaluation practices, in which the ability to attract prestigious grants overrides all other considerations regarding the competence of a researcher. A unanimous recommendation by participants was for RPOs to offer explicit (and potentially mandatory) training for academics to become better supervisors and project leaders, and to make supervisory skills a more important criterion in evaluation processes.

The focus group also offered some more concrete suggestions for potential elements of such supervision and mentoring training. Firstly, it is important to draw clearer boundaries around legitimate behaviour of supervisors vis-à-vis their students, to avoid exploitation and using them as 'free labour'. At the same time, exactly how to draw that boundary is a tricky question. In many collaborative and lab-based fields, enrolling students in project work and co-authorship is part of their training, but there is a point where this legitimate involvement turns into exploitation, e.g. when supervisors unduly "scoop" discoveries and authorships. Focus group participants therefore recommended that guidelines by RPOs should be worked out in close collaboration with researchers from the respective field. Clearer guidelines for responsible supervision would not least put those

researchers, who currently abstain from co-authoring papers with students to avoid the impression of abusing their hierarchical status, at ease.

3.2.3 Dealing with breaches of RI

This topic focuses on procedures that RPOs are using to deal with breaches of RI, as well as on the many ways in which these currently fall short of their intended functions. Particular aspects covered in the focus group discussions included the role of RI bodies within RPOs (e.g., ethical review boards), procedures for investigating allegations, as well as mechanisms for protecting both whistle-blowers and researchers suspected (but not yet found guilty) of misconduct. The topic was prominently addressed in three focus groups: A first, mixed, one that involved a number of psychologists and a political scientist in the Netherlands (focus group 14); another mixed group with researchers from pedagogics, sociology, and psychology in Croatia (focus group 22); and a third researcher-only group composed exclusively of quantitative social scientists (the Netherlands, focus group 15). To a lesser degree, it also featured in an open discussion with a group of qualitative social scientists conducted in Germany (focus group 16).

3.2.3.1 Key features of the topic 'Dealing with breaches of RI'

Display 3.2.3: The social science groups' view on 'Dealing with breaches of RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI	Widely seen as a particularly complex and insufficiently addressed issue	"integrity walk-in hour"	Steep power differentials amongst researchers Field-specific examples of good/bad practice	Create more informal opportunities for getting advice on RI issues, e.g. an "integrity walk-in hour"

RI bodies in the organisation	Often expected to serve as ad-hoc information points for inquiries about RI		Review boards suffer from lack of personnel and resources	Mobilise more resources for review boards
Protection of whistle-blowers	Widely perceived as lacking		Steep power differentials amongst researchers	Create guidelines and institutional structures to protect whistleblowers
Protection of those accused of misconduct	Perceived as currently insufficient, given the lack of effective investigation procedures			Create more effective institutional structures to investigate misconduct allegations
Procedures for investigating allegations	General lack of efficient procedures to investigate allegations of misconduct		Field-specific examples of good/bad practice	Ensure flexible and field-specific means of investigating misconduct
Sanctions	Seen as problematic, since their effectiveness in preventing misconduct is unclear			Prioritise preventive measures over sanctions
Other actions (including mobility issues)				

3.2.3.2 Key observations: 'Dealing with breaches of RI'

The question of how to deal with breaches of RI is widely seen as a particularly complex and urgent issue that is largely unsuccessfully addressed by RPOs. One of the reasons for this difficulty is the fact that breaches of RI can take many different shapes and degrees of severity, ranging from mere oversights to intentional data fabrication and abuse of power. Participants repeatedly described a large "grey area", i.e. a range of practices whose exact ethical and legal acceptability is unclear.

However, one relatively consensual point amongst participants – raised in both the mixed Dutch psychology group (focus group 14) and the mixed focus group involving social scientists in Croatia (focus group 22) – was that RPOs should not primarily focus on sanctions, but on creating preventive structures. In other words, the aim should be to facilitate research processes in such a way as to avoid RI issues, instead of focusing on punishment post-hoc.

An important part of such preventive measures could be the creation of more informal contact points where researchers can inquire in case they are unsure about potential RI breaches. Such contact points should ideally offer advice on integrity-related question in one's own research practice (for example when one is uncertain whether a given course of action is ethically and legally correct), or the research practice of colleagues (for example in case of problematic practices that do not (yet) amount to outright misconduct). To some extent, it seems that researchers so far have made use of ethical review boards at their institutions to resolve such ambiguities on an ad-hoc basis. However, these review boards are generally perceived as being overstrained and under-resourced.

Another issue was a general perception of insufficient protection for whistle-blowers. Especially for junior researchers, reporting cases of misconduct by more senior researchers is risky. One participant reported a case from a neighbouring university, where a PhD student considered filing a complaint about problematic authorship practices of his supervisor. The dean, however, put pressure on the PhD student to abstain from taking formal measures,

> "*I had a case in my previous, like just like two years ago: someone with an ERC grant, a bunch of his PhD students complained. Some ran away, some went together and finally complained about the authorship, and you know, he was going to submit it and then they never ended up where they were going to end up even though they did most of the work, so they never knew, maybe he put himself on the first place and then they would end up as last, and things like that. […] And then the dean actually pressured one of my friends, who was a PhD student like: "You don't want to do this, you don't want to go public, because you're going to jeopardise the reputation of the faculty and we're all going to get hurt*". (Assistant professor of political science, focus group 15, p. 13).

Again, preventive and consultative structures in the shape of informal contact points could be part of a solution. They would allow junior researchers to confidentially discuss potential RI breaches, without immediately having to raise formal allegations against colleagues or supervisors.

3.2.4 Research ethics structures

This section focuses on the organization and activities of 'Research ethics structures' at RPOs, most importantly in the shape of ethical review boards. This topic was partly touched upon in the previous section, but will now be expanded on. Relevant empirical material for this analysis was generated in both the researcher-only groups as well as mixed groups involving social scientists. One mixed focus group in fact involved two participants who also act as members of two different ethical review committees at a Dutch university. Moreover, the topic was taken up in both in-depth as well as in open discussions.

3.2.4.1 Key features of the topic 'Research ethics structures'

Display 3.2.4: The social science groups' view on 'Research ethics structures'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research ethics structures	Ethical review boards constitute the backbone of RPO ethics structures		Resource limitations	Mobilise more resources for review boards
Set-up and tasks of ethics committees	"*I realise it's become really difficult to be an ethics committee member. The complexity of the proposal, plus all these regulations, privacy. At the same time, we have no legal basis, which is scary*." (Associate professor of organisational psychology, focus group 14, p. 31)		Lack of legal expertise (sometimes) lack of expertise on data management and GDPR-related questions Sometimes unclear mandate for ethical review boards	Provide guidelines for how to handle recurring legal questions and data management issues, or provide dedicated advisors with relevant expertise Make sure to clarify the function of ethical review boards as well as the exact legal status of its decisions

Ethics review procedures	*"I: Is that a problem you encounter? That many of these things are forms for medical research or for natural science and that they don't apply that well to social science? IP: This is absolutely what I found in the states (US), and … to an extent when I'm applying for a grant like the ERC, it's kind of similar things going on."* (Associate professor in sociology, focus group 4, p. 5)		Discipline-specific nature of ethical review	Ensure that ethical review boards possess the necessary disciplinary diversity to do justice to the diverse projects they are asked to review

3.2.4.2 Key observations: 'Research ethics structures'

The backbone of 'Research ethics structures' at RPOs in most countries is formed by ethical review boards. They are usually staffed by researchers, as well as (ideally) some administrative support. Their function is to provide ethical assessment of research projects before they are undertaken. The previous section has already pointed out how ethical review boards of RPOs are often expected to serve as informal contact points for researchers who come across unexpected ethical, legal, or confidentiality issues during their work. Additionally, universities are making increasing use of data protection officers (DPOs) to provide input for data management questions and GDPR compliance. It should also be noted, however, that research ethics structures in European countries are very unequally developed. For example, Dutch social sciences faculties have only recently begun to comprehensively set up review boards for the qualitative social sciences, and participants in a focus group in Spain pointed out a pronounced lack of such facilities in their national institutions.

Ethical review boards are currently facing several issues. One is the contextual, discipline-specific nature of ethical questions, which to some extent limits the usefulness of general guidelines. To

really assess the health, privacy, or ethical implications of proposed projects, detailed understanding of the respective research practices is necessary. Ethical review boards, however, do not always possess the necessary field-specific expertise, or are institutionally obliged to apply guidelines that are not tailored to the fields in question. A typical example are cases where researchers in qualitative social sciences (e.g., political science or anthropology) are asked to comply with guidelines formulated for social psychological or biomedical research. Another major issue is the resource limitations of ethical review boards. This pertains to lack of legal and IT expertise as well as sheer time constraints due to insufficient (wo)man power. One participant in a mixed focus group (focus group 14) conducted in the Netherlands complained that the local review board has reduced the already scare contact hours it used to offer, thus virtually eliminating its usefulness as an ad-hoc ethical consulting body. Another participant in the same discussion (focus group 14), who is a member of an ethical review board, complained that the committee simply lacks the human resources to comprehensively deal with all the queries they are confronted with. In particular, the participant also pointed out an unease about the fact that the committee is implicitly expected to assess the legal compliance of research proposals, but at the same time is not an official adjudicating body,

> "*I realise it's become really difficult to be an ethics committee member. The complexity of the proposal, plus all these regulations, privacy. At the same time, we have no legal basis, which is scary*." (Associate professor of organisational psychology, focus group 14, p. 31)

We conclude from this that RPOs should not least make an effort to clarify the exact function of ethical review boards, and to make clear where the limits of their mandate lie.

3.2.5 Data practices and management

This section focuses on 'Data practices and management' in the social sciences. It particularly addresses the challenges that the recent introduction of the GDPR has created for social scientists, and the current efforts of RPOs to provide infrastructure and training/instructions to meet those new requirements. The topic was prominently discussed in two researcher-only focus groups with social scientists (the Netherlands and Spain), and also touched upon in an open discussion in the quantitative social sciences focus group conducted in the Netherlands.

3.2.5.1 Key features of the topic 'Data practices and management'

Display 3.2.5: The social science groups' views on 'Data practice and management'

Topic/sub-topics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Data practices and management	A newly prominent concern for many social scientists, due to the introduction of the GDPR and lack of preparedness of many RPOs			
Guidance and support	Perceived as severely lacking		Significant uncertainty surrounding the GDPR Discipline-specific nature of data management issues	Better and more instruction on how to be GDPR-compliant Ensure instruction and training to be field-specific, e.g. to do justice of different disciplinary data practices
Secure data storage infrastructure	*"And there's also contradictions, like the university says you have to use [a specific cloud service] and then the [national research council] says whatever you do, don't use [that cloud service] […] so there's definitely need for some standardization there*." (Assistant professor of political science, focus group 15, p. 2)		Problematic fragmentation of infrastructures and data management requirements across institutions/countries	Foster overarching approaches and standards to data management across institutions/countries
FAIR principles	Considered desirable, but hampered by fragmentation of infrastructures and local data management practices			

3.2.5.2 Key observations: 'Data practices and management'

Generally, it appears that the recent introduction of the GDPR has created a significant amount of confusion amongst researchers. Many focus group participants stated that they do not yet fully understand what the GDPR requires them to do when it comes to data management, and that their institutions do not offer sufficient instruction and training in this respect. As one assistant professor of political science in the Netherlands put it,

> "*as an individual researcher it's sometimes difficult to know what you can and what you cannot do. Especially, I don't think the institutional support is there yet. I think the data manager went through a checklist on Excel with me once with some guidelines, but afterwards I still had no idea what to do*." (Assistant professor of political science, focus group 15, p. 2).

In addition to more and better training, several participants also complained that there are not enough data protection experts available at their institutions that they can consult with regarding specific queries.

Regarding the content of the training events and formal guidelines many researchers are asking for, it would be important to make sure that it is discipline-specific. For example, the meaning of anonymisation of data will depend on the nature of the empirical material (e.g., anonymizing MRI (Magnetic Resonance Imaging) scans poses different challenges than anonymizing interview data). One associate professor of psychology commented,

> "*I went to a few of these courses on good clinical practice, and there were so many discussions about, among scientists and the people from the adviser, the advisory people. And I was, for example especially when it comes to large data collection, you can, about that you can collect a lot of data, and that is apparently anonymous, but if you can combine data you can finally find out who it is. I mean, if you have an anatomical scan of somebody's brain, if you have a good algorithm, and that scan is detailed enough, then you can find out perhaps who that is. I mean technically that is all possible, so what is anonymous data?*" (Associate professor in experimental psychology and neuroscience, focus group 15, p. 4).

Moreover, researchers highlighted a lack of concerted data management approaches across institutions. To give a specific example, participants in a researcher-only quantitative social sciences focus group in the Netherlands (focus group 15) complained that their home university operates

with different standards regarding cloud storage services than the national research council NWO. What is considered "best practice" by one institution is thus considered unacceptable by another. This creates particular challenges when researchers try to work together in collaborative projects across universities and different countries. Several participants therefore called for a more integrated European research infrastructure to do away with the current fragmented landscape of local standards.

3.2.6 Declaration of competing interests

This section addresses issues of competing interests, e.g. in evaluative settings as well as in collaborative projects where academics work together with commercial entities. Our specific analytical interest lies in existing or potential policies and guidelines for handling such tensions. While the issue of conflicts between academic/commercial interests did not generate any noteworthy discussion, competing interests in evaluation were touched on in several of the discussions, both in in-depth discussions and as part of the open questions.

3.2.6.1 Key observations: 'Declaration of competing interests'

As suggested above, competing interests between academic and commercial actors were not touched upon in any of the focus groups with social scientists. This is arguably due to the types of social scientists that were recruited, namely psychologists, sociologists, political scientists and anthropologists. Presumably, these fields are not heavily involved in project work with or for commercial partners.

In contrast to this, focus groups addressing questions of evaluation and appointment procedures did variously touch upon another kind of competing interest, namely the role of publication and grant-based evaluation criteria vis-à-vis other forms of academic achievements. A common perception here was that there is an imbalance between the weight given to these criteria in many RPOs, in the sense that traditional markers of academic achievement (publications and grants) are often considered far more important than excellence in teaching and administration. This has very negative effects on the overall research environment, as we will discuss in significant detail in the following section.

3.2.7 Research environment

This section focuses on the key factors that seem to determine the quality of the research environment created by RPOs, i.e. the 'general atmosphere' or 'culture' of an institution. The research environment crucially affects the likelihood that various forms of misconduct and questionable research practices will occur. We will specifically discuss the role of academic evaluation criteria, the link between problematic evaluation incentives and misconduct, as well as various diversity issues. Relevant material for this section was generated primarily in the two researcher-only focus groups conducted in the Netherlands and Germany (quantitative and qualitative social scientists, respectively). Some additional pertinent comments were also made by the qualitative social scientific group conducted in Spain.

3.2.7.1 Key features of the topic 'Research environment'

Display 3.2.7: The Social science groups' view on 'Research environment'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research environment	Overly narrow evaluative focus on publications/grants in many RPOS			
Fair procedures for appointments, promotions and numeration	Insufficient diversity in evaluative criteria for promotion and tenure		Entrenched view that publications + grants = excellence	RPOs should ensure that other forms of academic performance, for example excellent teaching and administration are adequately valued
Adequate education and skills training				
Culture building	Nepotism amongst research staff is perceived as an issue by some		'Old boys' networks are entrenched in some RPOs	Ensure transparency of evaluation and promotion criteria

Managing competition and publication pressure	"E*verybody is forced to publish as quickly as possible to become eligible for the grants, and yeah I'm afraid this is where integrity becomes damaged*"(Assistant professor in social science, data manager, focus group 15, p. 8)		Publications are seen as the main precondition of promotion and tenure 'Publish or perish' attitude is perceived to incentivise misconduct	
Conflict management				
Diversity issues	Nepotism and 'old boys' networks may harm diversity Diversity of career paths is undermined by dominant evaluative focus on publications and grants			Ensure diversity and transparency of evaluation criteria
Supporting a responsible research process (transparency, quality assurance, requirements)	"*I still have this couple of friends in the back of my head who I know have been busted by [the] data police (…) there was nothing wrong with their work, but the other researchers they were just searching and searching*." (Associate professor in experimental psychol-			Need for RPOs to find a balance between being too strict/too lenient in regulating research processes on the academic shop floor

	ogy and neurosci-ence, focus group 15, p. 20)			

3.2.7.2 Key observations: 'Research environment'

An overriding issue that seems to influence almost all other, more specific, aspects of the research environment created by RPOs, is the problematic role of evaluation criteria that focus on publication performance and prestigious grants. According to participants across all of the focus groups conducted, too narrowly defined performance criteria create unhealthy levels of competition amongst individuals, which in turn effectively incentivises various forms of misconduct. A group of psychology researchers at a Dutch university, for example, suggested a connection between publication pressure and the infamous p-hacking, i.e. the selective use of data to artificially inflate statistical significance of findings,

> "*I'm afraid we work in a very high tension field and everybody is forced to publish as quickly as possible to become eligible for the grants, and yeah I'm afraid this is where integrity becomes damaged. Being at the wrong side of the p-value, 0.06 and just try another technique, or [moving an outlier], or you know: what possibilities do we have? […] you're competing with the other PhDs because there's only going to be so many assistant professor positions, and after assistant professor there are only so many tenure tracks, so I think the pressure with us is very real.*" (Associate professor in social science, data manager, focus group 15, p. 8).

While the exact ways in which publication pressures manifest themselves vary between disciplines, they are nevertheless keenly felt across fields. A participant in a quantitative social sciences focus group (the Netherlands) for example pointed out that it is an issue also in book-bound fields, like anthropology. According to our participants, there is moreover a direct connection between an (over)emphasis on narrow publication-based performance criteria and underperformance in other areas of academic work, such as teaching. In a research environment that values publication productivity and grants above all else, researchers who might be excellent teachers will end up not being hired or permanently employed. The quality of education will often suffer as a result. One participant working as a sociology professor in Spain (focus group 4) advocated that universities should encourage more diverse career paths, for example by explicitly valuing administration- or teaching-focused academic careers,

> "*We have a problem at this university at least because we think about teaching and researching as kind of opposite, a fight against each other. I think, we when we think about management for instance, for one it can take four years for being vice chancellor or for being … and this is a stop in the carrier. Why do you think about the academic carrier, you are as flexible as you can be. You can be a manager or you can be in teaching and do research. I mean it's not the problem*." (Professor of sociology, focus group 4, p. 14).

A discussion that emerged in a focus group with quantitative social scientists (the Netherlands) moreover suggests that RPOs should always try to find a balanced approach in how they deal with concerns about RI in daily research practice. One senior researcher in social psychology argued that the recent concern with reproducibility of research findings in psychology has created a climate of generalised distrust in his department. He specifically used the term "data police" to denote colleagues and administrators who are in his view overeager in raising allegations of questionable use of research data (Associate professor in experimental psychology and neuroscience, focus group 15, p. 20). However, other participants called for a more formal role of RPOs in fostering transparency in data management practices. Such diverse views may reflect unequal levels of activity in particular universities/departments in debates about RI and responsible data management. A message is, in any case, that RPOs should try to find a balance between being too lenient and too restrictive in formulating requirements for a transparent, responsible research process. A final issue raised in a focus group with quantitative social scientists in the Netherlands (focus group 15), is the need for RPOs to continue fighting nepotism amongst their academic and administrative ranks, not least to ensure diversity amongst the research staff. Transparent evaluation and promotion criteria could be an important part of the solution to this problem.

3.2.8 Publication and communication

The following section focuses on RI implications of publication and communication practices, as well as on existing and potential future RPO guidelines to regulate such practices. More specifically, the topic covers aspects such as authorship in collaborative research projects, OA publishing, and 'Open Science' more generally. The topic was explicitly raised for in-depth discussion in a researcher-only group (Germany), as well as a mixed focus group involving social scientists (Croatia).

3.2.8.1 Key features of the topic 'Publication and communication'

Display 3.2.8: The social science groups' view on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication	A prominent issue due to recurrent authorship conflicts as well as tensions created by the transition to OA			
Authorship	Many conflicts around questions of co-authorship	COPE and other guidelines that spell out how authorship questions can be systematically decided	Power differentials amongst researchers Gift authorship and nepotism Disciplinary specific differences in authorship practices	Encourage the use of existing authorship guidelines across institutions Ensure that guidelines on how to deal with authorship are field-specific
Open science	OA publishing is considered important, but many practical issues		Who covers OA charges? Fully OA journals can't rival flagship journals in terms of prestige	Better financial support for OA publishing
Use of reporting guidelines	Partly already in place at RPOs		Not all researchers are aware of available guidelines	Create better visibility for existing guidelines and resources
Peer review				

Predatory publishing				
Communicating with the public	OA publishing considered important, but many practical issues (see above)			

3.2.8.2 Key observations: 'Publication and communication'

Firstly, a recurrent issue that appeared in the discussions about 'Publication and communication' was authorship conflicts. In the focus group with quantitative social scientists in the Netherlands (focus group 15) in particular, participants reported various occasions where they had experienced lack of clarity as to how to divide authorship in collaborative settings. What type of contribution is necessary to warrant authorship, and how to determine the order of authors? There appears to be two main challenges that render it difficult to settle these questions. One is power differentials amongst researchers, i.e. the risk that supervisors unduly claim authorship by abusing their power. A second issue is the fact that authorship practices are field-specific. The following snippet from an in-depth discussion captures the ethical uncertainty that can arise from this,

> "*I think there are definitely big differences between disciplines, I recently received an e-mail on a collaboration paper from somebody from the medical sciences, like: "Oh yeah, can you take [an author] off this paper and put this person on?". Just yeah, she was also, totally not involved, "Yeah, but it's better". So I just, I ignored the e-mail. I hate that, but, I mean, that's how apparently some psychiatrist talk [laughs], think about science*." (Associate professor in experimental psychology and neuroscience, focus group 15, p. 15).

Some participants in both the qualitative (Germany) and quantitative (the Netherlands) focus groups mentioned that their RPOs have already put in place some guidelines on how to tackle authorship questions, as well as related issues like archiving the data that were used for particular publications. At the same time, it seems that not all researchers are aware of such resources.

Another relatively prominent topic raised in the focus groups was that of conflicts regarding OA publishing. On the one hand, many European funders and policy-making bodies are pushing for research articles to be published in such a way as to make them fully available to everybody and without any paywall. On the other hand, this creates a problem for researchers, since it is unclear

who should cover the significant costs for Gold OA. While academics could of course publish in fully OA journals (i.e. without additional charges), these outlets often do not have the same academic prestige as established "flagship" journals. The following conversation amongst quantitative social scientists highlights the dilemma,

> "*So there's a call for researchers to only publish in open-access journals and not in high impact factor journals and I think that's just a stupid rule if it's only going to be The Netherlands, Belgium, and I don't know what not. Because you're going to ruin people's careers on an international scale. […] if you don't have the money you would have to go to open-access journals that anyone can publish in and then you don't even stand out on the international market anymore*." (Assistant professor of political science, focus group 15, p. 12).

A further interesting aspect are preprints, which currently appear to be relatively widely used by social scientists. Many participants in the focus groups already publish their work on platforms like arXiv. One issue, however, is that some journals do not accept submissions that have previously been made accessible in preprint form. This obviously puts researchers in a difficult situation, where they have to balance the interest of making their work publicly accessible with strategic career interests,

> "*My main issue, if you submit to AJS, the first journal in sociology, it clearly says there must not be previous measures of it in Preprint. It mentions Preprint clearly. It also mentions it cannot be present and in part conference. That's the top leading journal in our field*." (Postdoc in science studies, focus group 16, p. 10).

3.2.9 Collaborative research among RPOs

The topic of 'Collaborative research among RPOs' principally covers three more specific aspects: Collaboration amongst RPOs in and across Europe, collaboration amongst countries with different R&D infrastructures, as well as joint research activities involving both academics and commercial actors. However, in general, issues related to collaboration were featured very seldom in the actual focus group discussions.

3.2.9.1 Key features of the topic 'Collaborative research among RPOs'

Display 3.2.9: The social science groups' view on 'Collaborative research among RPOs'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Collaborative research among RPOs				
Among RPOs inside/outside the EU				
With countries with different R&D infrastructures	*"I work with these persons from another university. They have their own formal. Their own Dropbox […] I can't use Dropbox, it is not safe enough. Then I need very big places to put the data. Then we have this other project, we ask the university to have a safe place. It was difficult*." (Professor of sociology, focus group 4, p. 9)		Problematic fragmentation of infrastructures and data management requirements across institutions/countries	Foster overarching approaches and standards of data management across institutions/countries
Between public and private RPOs				

3.2.9.2 Key observations: 'Collaborative research among RPOs'

As noted above, the material generated in focus groups with social scientists did not contain much insight into factors that hamper/foster the various sorts of collaborative relations. The only pertinent comments were made by researchers who discussed challenges of cross-institutional collaboration created by fragmented digital infrastructures. More specifically, the debate focused on the different cloud storage services used by the collaborating academics. The specific problem raised

here was the fact that different institutions have different understandings of what cloud services are considered safe enough for academic data sharing,

> "*Now for instance, it is an example, I work with these persons from another university. They have their own formal. Their own Dropbox. […] Then I hear that they have theoretical one, a kind of solution, that don't really work. Theoretically I can't use Dropbox, it is not safe enough. Then I need very big places to put the data. Then we have this other project, we ask the university to have a safe place. It was difficult. I really understand the knowledge. It is very difficult, because its make you work. Now I have, I don't know how many folders with information. I think that in this case, that's the question of investment or trying to create something European… Something really goes beyond the borders and creates a digital space for everyone easy to access*" (Professor of sociology, focus group 4, p. 9).

Participants ended up agreeing that European universities should strive for integrating their digital infrastructures and overcome the current fragmentation. Aside from this, none of the focus groups touched on issues in collaborating with commercial partners, or other general questions regarding collaboration with RPOs in or outside of Europe.

3.2.10 Heat map of perceived importance – social science and RPOs

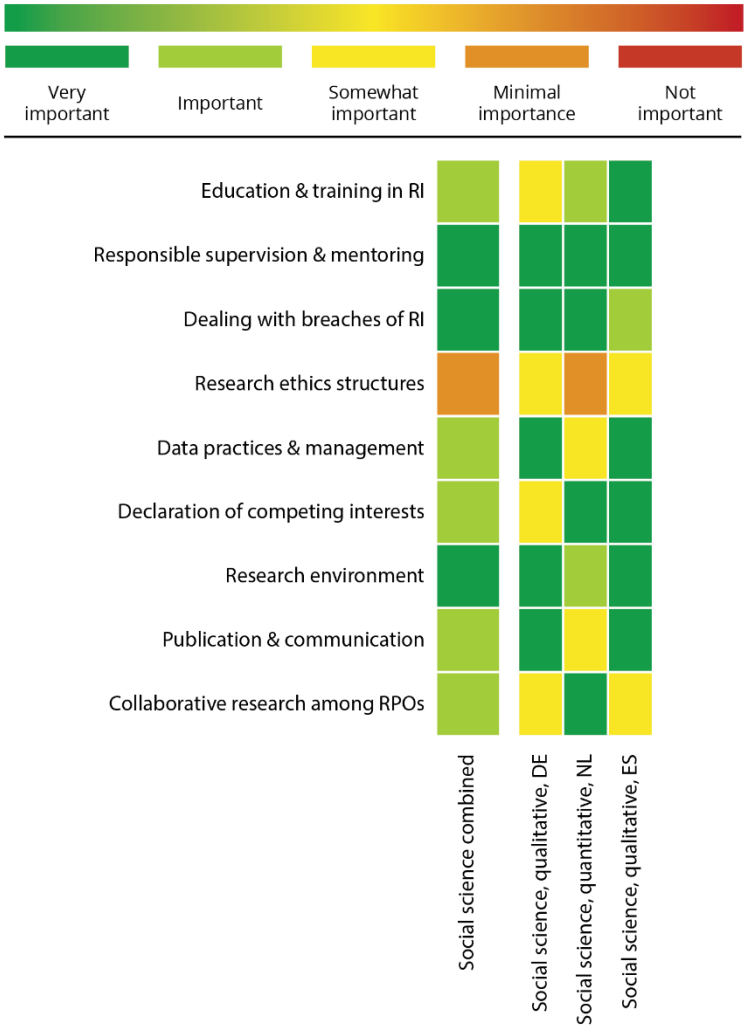


Figure 3.2.10: Heat map displaying sorting exercise results of nine RI topics in the social science RPO focus groups.

This heat map shows the results of the sorting exercise conducted during the focus group interviews for the social sciences. It reflects the importance assigned to specific topics by social science researchers in relation to research integrity. Specifically, the map provides an overview of the areas

where participants perceived that guidelines and SOPs could support the RI efforts of RPOs. The differences regarding the level of importance assigned can be explained by the different disciplinary research cultures, and the specific research misconduct cases that researchers in the social sciences have witnessed.

A few topics deserve to be further explained here. For example, 'Education and training in RI' were seen as important. However, the participants noted the emphasis should be on integrating RI topics into existing courses and that specific RI guidance could better focus on supervision and mentoring. The heat map shows some peculiar results which could be seen as contradictory. For example, 'Dealing with breaches of RI' is seen as very important while 'Research ethics structures' is less important. This sorting is likely due to the perceived need for improvement on the former topic while the latter was seen as already being well regulated. Similar to other groups, the 'Research environment' was seen here as pivotal for regulating other areas such as 'Declaration of competing interest'. Finally, the topics of 'Data practices and management' and 'Publication and communication' were also highlighted as an issue which could benefit from better guidance.

3.2.11 Concluding remarks regarding social science and RPOs

The social sciences are a particularly diverse array of (inter)disciplinary fields. They include qualitative fields that in many ways resemble the hermeneutic domains of the humanities, but also fields whose methods and epistemology have much in common with the natural sciences. This creates a particular challenge for RPOs when creating guidelines and protocols. Formal policies that are not tailored to the specifics of a field risk being perceived as irrelevant and even annoying by researchers.

In our analysis, the need for a context-sensitive approach became particularly apparent in the following topics: 'Education and training in RI', 'Dealing with breaches of RI', 'Data practices and management', as well as 'Publication and communication'. Such contextual variation also entails a certain irreducible need by researchers for sources of ad-hoc advice, for example when it comes to ensuring the ethical soundness of proposed research, or when the ethical acceptability of certain practices is unclear. RPOs should therefore not only ensure that their RI-related guidelines and SOPs are sufficiently tailored to the specific needs of social scientists, but also be prepared to institute robust structures for RI-related counselling and advice.

The analysis also highlighted a range of other important issues that are perhaps less specific to the social sciences. This includes the need for RPOs to try and harmonise their digital research infrastructures, for example with respect to data sharing and OA policies. Ideally, RPOs should try to make use of European infrastructure efforts that are already in place. Robust, pan-European standards could go a long way towards eliminating the many integrity 'grey zones' that currently plague academic life. Another overarching topic pertains to evaluation and appointment practices. Our focus group interviewees suggested that many seemingly perennial problems – for example authorship conflicts, data manipulation, or outright abuse of power – are in one way or another related to problematic incentives that emphasise individual publication performance above all else.

3.3 Natural science

In this section we address the promotion of research integrity in research performing organisations from the disciplinary perspectives of the natural sciences. Through these interviews, we explore how different researchers within and around the natural sciences understand and prioritise topics such as education and training of RI, responsible supervision and mentoring, data management, and dealing with breaches, amongst others. The objective is to increase our understanding of how RPOs may foster and advance RI practices and policies in alignment with the particular needs and interests of the natural sciences.

Four focus groups within the natural sciences discussed and prioritised the nine main RI topics, whereas a selected number of topics were discussed in depth by the different focus groups as shown below in display 3.3. Representing 12 disciplines within the natural sciences, 17 different stakeholders across five European countries discussed the current landscape of RI from their point of view and reported on potential challenges and possible ways to promote research integrity.

The results of these discussions are addressed in the following sections by topic and summarised in separate displays. We also provide a heat map at the end of this chapter (section 3.3.10) that visualises the assessed importance of each RI topic for the natural sciences.

Display 3.3. Overview of participants in the Natural sciences focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Researchers/stakeholders represented***	Country	Face-to-face/online interview	Number of participants
5	(researcher only) Water management Biodiversity	Data management** Independence from commercial influences**	Senior researcher	ES	Online	2
6	(researcher only) Theoretical physics	Dealing with breaches of RI Transparency	Associate professor Post-doc	DK	Face-to-face	6

	Mathematics Chemistry Computer science					
17	(researcher only) Biology Bioscience and Engineering Statistics	Managing competition and publication pressure Supervising/Mentoring Research collaboration among RPOs	Associate professor Professor	BE	Online	3
18	(mixed group) Health research Technical health Physics Biomedical engineering Nanoscience	Education and training in RI Dealing with breaches of RI	Medical coordinator, RPO Privacy coordinator, industry Compliance review member Ethical review board member Public funding org. representative Assistant professor	NL	Face-to-face	8

			Professor			
23	(researcher only) Geoscience Mathematics Theoretical physics Translational biomedicine Biology	Education and training in RI Publication and communication Research ethics structures	Professor Senior scientist Post-doc PhD	HR	Face-to-face	6

* Participants may represent more than one discipline
** Due to the online format, the topics for in-depth discussion were discussed as part of the sorting exercise
*** Participants may represent more than one type of position

3.3.1 Education and training in RI

The topic of 'Education and training in RI' for the natural sciences focuses on the tools available at RPOs, as well as their perceived limitations and what could be done to remedy them. The following results draw on discussions from one of the researcher-only groups in experimental natural sciences (Croatia) and on the mixed stakeholder group, since both generated very relevant data.

3.3.1.1 Key features of the topic 'Education and training in RI'

Display 3.3.1: The Natural science groups' view on 'Education and training in RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Education and training in RI	*"Create an environment that opens up […] discussion"* (Ethics		Unwillingness of (senior) researchers to participate Yet another separate course	Periodical training for seniors Update educational materials with new cases

	committee member, focus group 18, page 7)			Embed the topic into other courses
Pre-doctorate				
Post-doctorate				
Training of RI personnel and teachers				
RI counselling and advice				

3.3.1.2 Key observations: 'Education and training in RI'

Both focus groups that discussed 'Education and training in RI' at length found it to be a very relevant topic. In the mixed group, some stakeholders suggested using real examples and focusing on how they have affected the subjects participating in research and the research community overall. Other voices suggested that training should focus more on fostering an ethical way of thinking, rather than on spectacular cases of misconduct or a "box ticking" approach to RI. As one participant conveyed, the focus should be on long term education,

> "[*talk about] the daily work, and what type of perhaps dilemmas you would get into, […] because they are so young in their career, they don't really have experience with those type of dilemmas, but like the authorship […] How much of your data do you use, which ones do you leave out, and how can you decide what is right and wrong. […] it's something that should evolve over time, also within research groups […] And you should, I think, create an environment that opens up this discussion*." (Ethics committee member, focus group 18, p. 7).

Concerning the content, some of the topics that were mentioned as relevant for the natural sciences were misconduct, data management, and lab work. Authorship was another recurrent topic that was viewed as generating problems. Furthermore, a participant noted the importance of making RI training relatable and challenging,

> "*Researchers want to be triggered by some intellectual challenge, so the training should keep; have a lot of intellectual challenges. It could be […] a discussion with this really high level on pushing the borders*." (Public funding org. representative, focus group 18, p. 15).

Beyond the need to use real life cases, participants highlighted the difficulty of covering "grey areas" in RI education. One suggestion from one of the experimental natural sciences group (Croatia) was to have prominent spaces where information can be easily attained. The participants of both groups noted the importance of having moments and room for reflecting on grey areas. "*I think for the grey zones its really about having open atmosphere in a group and that you have periodic [conversations] of these grey cases*" (Ethics committee member, focus group 18, p. 17).

Both groups agreed that there should be training for undergraduates and graduates, as well as junior and senior researchers. As one participant stated, "*it should be present on all levels, depending on the depth. But it's also something that even senior people should occasionally have*" (Professor of physics, focus group 23, p. 7). Nonetheless, they also agreed on the difficulty of having senior researchers attend courses, because the material tends to be repetitive. In the mixed group it was suggested that "refreshed" courses could be created with new material that should be attended periodically. These courses could also be rebranded from "research integrity" into "how to be an awesome researcher" (Research support manager, focus group 18, p. 16). In this way, research integrity can be coupled back to the basic skills of a researcher.

Although courses are usually separated by different levels of experience, mixing groups of senior researchers and graduate students may facilitate not only learning, but the communication between both of them. As one participant noted,

> "*The training seems to be really separate, so, the things that are appropriate for PhDs maybe and the things that are appropriate for PIs, but is it worth having trainings where these groups are actually mixed somehow. So, that PIs can more easily see a PhD's perspective*" (Research support manager, focus group 18, p. 17).

In general, it is suggested that courses should be obligatory, as long as the content is adequate. Most participants recommended making courses a requirement for graduation, promotion, or even before applying for funds.

3.3.2 Responsible supervision and mentoring

The topic of 'Responsible supervision and mentoring' focuses on the responsibilities of the supervisors and how to foster good practice in supervision and mentoring through new formal guidelines that could be implemented by RPOs. The topic was discussed by two of the experimental natural

sciences groups (Belgium and Croatia), the mixed researcher-stakeholder group (the Netherlands), as well as the theoretical natural sciences group (Denmark). There was also some input given during the sorting exercise by the third experimental natural sciences group (Spain).

3.3.2.1 Key features of the topic 'Responsible supervision and mentoring'

Display 3.3.2: The Natural science groups' view on 'Responsible supervision and mentoring'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Responsible supervision and mentoring	"*There are different styles of supervising and it depends on the promoter as well as the PhD research*" (Associate professor on bioscience and engineering, focus group 17, p.11)	More than one supervisor	Different personalities of supervisors	Requirement of two supervisors or supervising committee Setup national guidelines
PhD guidelines				
Supervision requirements and guidelines				How to end/discontinue a PhD
Building and leading an effective team				

3.3.2.2 Key observations: 'Responsible supervision and mentoring'

Supervision and mentoring was seen as highly relevant, given that it is a formative process for researchers. As one participant noted, *"[universities bring together researchers from different backgrounds] they need to be set to the same standards and they need to know what that is*" (Postdoc in chemistry, focus group, p. 26). According to the focus group conducted in Croatia, guidelines on what is expected from supervisors and PhD students could be useful, especially if they are at a national level, although they recognised these could not tackle all the issues.

The lack of clarity on what the supervisor's job should entail can also give way to misplaced expectations. As one participant noted,

> "T*he supervisors must know what are their responsibilities, so it's not like we take a student just because you have money or because they are interested. It's more than that, it's like a big responsibility to take a student and spend four or five years with that student, because it's gonna be an important part of the future of the student*" (Senior researcher in biodiversity researcher, focus group 5, p. 15).

The necessity for guidelines was not perceived as justified across the board. For one group in particular (Belgium), it was expressed that supervision is particular to each person. One participant conveys,

> "*My experience is you do your PhD, you do a post-doc and at some point you gradually end up being a supervisor and you learn by doing. For each individual supervisor it works differently at some level which is then difficult to translate into universal guidelines for other people*" (Professor of biology, focus group 17, p. 10).

There was a perceived tension between guidelines seen as a sign of not trusting the supervisors, and tools to give clarity for everybody involved. Despite some participants arguing against having guidelines for supervision, most of them agreed there should be information for when "*things [can] go wrong*" (Professor of biology, focus group 17, p. 8). Cases where clear guidelines were seen as helpful were how to evaluate the development of a PhD student, or even discontinue the PhD project. One suggestion was to have more than one supervisor or a supervising committee, thus spreading the responsibility amongst several individuals and avoiding claims of bias.

The issue of training for supervisors was not widely discussed, except in the theoretical natural sciences group. Although some universities seem to make available training for supervisors, it is only for professors or researchers with permanent positions, as it is assumed that only they will supervise. However, as a participant noted, post-docs and researchers on temporary contracts do supervision work, albeit not officially. This discrepancy regarding guidelines and practices is an area that deserves attention.

3.3.3 Dealing with breaches of RI

This topic 'Dealing with breaches of RI' focuses on the procedures that RPOs have in place, as well as on the many ways in which these currently fall short of their intended functions. Particular aspects covered include 'Procedures for investigating allegations', as well as mechanisms for protecting both whistle-blowers and researchers suspected (but not yet found guilty) of misconduct. The topic was prominently addressed in two of the experimental natural science groups (Croatia), the theoretical natural science group (Denmark), and the mixed researcher-stakeholder group (the Netherlands). To a lesser degree, it also featured in the discussion during the sorting exercise on one of the experimental natural science group (Spain).

3.3.3.1 Key features of the topic 'Dealing with breaches of RI'

Display 3.3.3: The Natural science groups' views on 'Dealing with breaches of RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI	There is no clarity and transparency. There are no consequences for misconduct			Clarity on the processes Visibility of channels for complaints Transparency of rights
RI bodies in the organisation			Independence from the faculties	Right to anonymity, unless breach is proven
Protection of whistle-blowers	Even in places where there is protection for whistle-blowers, they tend to be on the losing end			Right to anonymity
Protection of those accused of misconduct				

Procedures for investigating allegations	Procedures are very slow			Confidential counsellors
Sanctions				
Other actions (including mobility issues)				

3.3.3.2 Key observations: 'Dealing with breaches of RI'

'Dealing with breaches of RI' was seen as a highly relevant topic in the natural science focus groups. In general, it seems that even though some RPOs have procedures, many researchers are not aware of them. The lack of visibility of the channels and mechanisms in place was seen as an obstacle for raising issues. A way to make these more known in the community could be by giving this information to newcomers, as a participant pointed out,

> "*just a welcome to the university, here is how things; how things go and part of that welcome thing is a section on when things go wrong. And in that section it is talked about exactly as you say, who you can talk to and what should happen. And then, at least […] the procedure, the internal procedure is already very clear and then it helps*." (Research support manager, focus group 18, p. 20).

Another issue, related to the low awareness of how breaches are dealt with, is transparency of procedures. There seems to be no clarity on what steps are taken once a complaint is made, how the rights of those involved are protected, and whether there are consequences if a breach has been verified.

The pace at which organisations investigate breaches was raised in several of the groups. A shared perception was that in many cases the top levels of faculties and universities knew of them yet failed to act on it,

> "'*cause I think there were a few reports in the newspaper […] about serious misbehaviour and it was shocking to me that in all those cases people in the top of universities knew about this and there was no action taken for years*" (Ethical review board member, focus group 18, p. 21).

Especially for cases which are very clear, this tardiness was seen as inexcusable. As one participant noted, "*I am amazed at how slow the universities react in such cases. It is really clear and trivial; you could deal with a case the same day*" (Professor of applied physics, focus group 18, p. 19).

The protection of those involved in cases was seen as highly complex. When it comes to those found guilty of a breach, the question of anonymity raised some conflicting views. On the one hand, those who have committed severe breaches should not benefit from anonymity once the breach has been established. However, for minor breaches, or even honest mistakes, the privacy of the researcher should be respected. As one participant noted, "*So, the action you take should be in balance with the fraud you; that is, that took place. And, just publishing in black*" (Public funding org. representative, focus group 18, p. 18). The risks for whistle-blowers and the damage to their own careers was also discussed in detail. A consensual perception was that they are not well protected, and in many cases they have lost their jobs while the perpetrators remain in their positions or even get promoted.

An issue closely related to the above one, is that of consequences for those who commit misconduct,

> "*The problem is that you, that there are no consequences for the people who are, when you prove that there is, there was misconduct. That's the problem. Not the problem you know, everybody can, can fail. I can fail, you know*" (Senior scientist in geoscience, focus group 23, p. 27).

Besides more transparent and clear procedures, the participants suggested appointing an ombudsperson with whom researchers can raise issues, but who also has power to take steps within the faculty or the university,

> "*what would have been nice was to have some kind of ombudsman. To have some guy or woman you can go to for some legal advice on how to deal with things and what is okay. So if you're a whistle-blower, and you say "this is not, I can see this group is not performing well", there's some place to go to, that's not clear.*" (Associate professor in theoretical physics, focus group 6, p. 6).

The majority of the participants noted that guidelines for this topic would be desirable but that they should focus on preventive measures, for example by fostering an open culture where issues can be freely discussed.

3.3.4 Research ethics structures

The topic of 'Research ethics structures' in the natural sciences focuses on the organization and the activities of ethics committees and ethical review boards. Relevant empirical material for this analysis was generated in the discussions with the three experimental natural sciences groups. Moreover, the topic was discussed briefly during the sorting exercise by the theoretical natural sciences group.

3.3.4.1 Key features of the topic 'Research ethics structures'

Display 3.3.4: The Natural science groups' view on 'Research ethics structures'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research ethics structures	"*It's important that before the research starts everything is well in place and there are good procedures in place for checking that*" (Professor of statistics focus group 17, p. 19)		Interdisciplinary structures	Flexible structures for each discipline Information and standards at European level
Set-up and tasks of ethics committees			Conflicts of interest Resource intensive for small institutes	
Ethics review procedures			Protocols can create administrative and paperwork burden	

3.3.4.2 Key observations: 'Research ethics structures'

Solid 'Research ethics structures' were seen as fundamental for RPOs, not only to avoid misconduct or breaches, but as a basis for doing good research. For all the groups, this topic was seen as highly relevant given that "*to have a good system you need to have rules of course*" (Senior scientist in geoscience, focus group 23, p. 33). Further, ethics review procedures were seen as an opportunity for reflecting on the design of the research, as one participant noted,

> "*It's also a phase where in research you overthink how it's going to be conducted. I think it's important that before the research starts everything is well in place and there are good procedures in place for checking that*" (Professor of statistics, focus group 17, p. 19).

Nevertheless, there was a perceived tension between the ideas behind committees and review procedures and their practical implementation. For all the experimental natural science focus groups, there was the impression that regulations can easily become a formality, a checklist without further implications for the project. As noted by two participants,

> "*Until now these ethic deliverables did not have a strong impact on the project, uhm apart from going through the check lists and making sure there are no sensible issues*" (Senior researcher in water management, focus group 5, p. 9).

> *"[The protocol] being imposed which also creates administrative follow-up where at some point you reach the point where you say to what degree is this still relevant or a thing that looks on paper important but in practice goes beyond what it should be about.*" (Professor of biology, focus group 17, pp. 4-5).

Another concern raised regarding the practical implementation of structures was their effectiveness. Without allocating sufficient resources and enshrining their work into regulations, committees and review boards can become themselves another checklist. As one participant noted,

> "*Yeah, I think every institution, scientific, university, whatever institute should work much harder on the ethical levels and committees. We, we have only this ethical committees at some formal level. Just to have it. But what they are really doing? Nothing*." (Professor of biology, focus group 23, p. 11).

Another challenge mentioned about implementation of research ethics structures was that they should be flexible enough in order to cover the needs of different disciplines. This is even more so

the case for interdisciplinary groups working under one faculty, but carrying out research in different fields and disciplines. While discussing this topic we noted a few national and disciplinary particularities. As the attention on research ethics grows, RPOs in Croatia are discussing whether to continue with committees at a faculty level or institute them at a university level. Meanwhile, the ethical requirements in Spain are not perceived as being strong,

> "*And if we have to do something, we need to justify it very well what we want to do, and why this is important. Uhm but the requirements, as you were mentioning, in Spain are not very strong*" (Senior researcher in biodiversity, focus group 5, p. 9).

Similar opinions regarding the need for and effectiveness of ethics committees and review boards were not shared amongst all the groups. For example, in the theoretical group it was felt that these instruments would have not be applicable to them, "*Well for the, this common denominator is theoretical science. And if it's theoretical, I guess it doesn't have any importance because it's theoretical, it's not on anything living*" (Post-doc in chemistry, focus group 6, p. 16).

3.3.5 Data practices and management

This topic 'Data practices and management' addresses the challenges that the recent introduction of the GDPR have created and the issues concerning RPOs infrastructure and instructions to meet those new requirements. This section also addresses the challenges that open science and the FAIR principles present. The topic was discussed in the three experimental natural sciences focus groups (Belgium, Spain, and Croatia), while the theoretical natural sciences focus group gave feedback during the sorting exercise.

3.3.5.1 Key features of the topic 'Data practices and management'

Display 3.3.5: The Natural science groups' view on 'Data practices and management'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Data practices and management	"*To a large extent, the current procedures*	Data management based on how the data will be analysed	Imposing to many strict pro-	Allow ad-hoc procedures and flexibility in how data is managed

	are pretty heuristic." (Professor of statistics, focus group 17, p. 5)	and the procedures to collect/use it	cedures can render data unusable	
Guidance and support	"*Guidance and support as well as infrastructure is really important and maybe still somewhat lacking.*" (Professor of statistics, focus group 17, p. 17)		Lack of expertise regarding certain types of data by institutional officers	Provide clear guidelines and real support to PhDs on data management
Secure data storage infrastructure			Different platforms and lack of standardised protocols Sharing data with other institutions is sometimes not possible Unclear on how to clean and securely store old data	
FAIR principles				General protocols for storing and sharing for all of Europe

3.3.5.2 Key observations: 'Data practices and management'

The recent introduction of the GDPR has created a significant amount of confusion regarding the extent and implications of these regulations. For the majority of participants, institutions have not provided clear and concise instructions, as exemplified by the following comment,

> "*The implementation of this, quite clear directions is not straight forward, it's being worked on. And I guess that there is still some time needed to implement it better.*" (Senior researcher in water management, focus group 5, p. 16).

The concerns on how to manage data extend not only to the data currently being collected, but to older data as well,

> "*How many other people are unaware that they have data they are storing from before the legislation that is absolutely not in line. What do we do with data trash for example, I've got a lot of old excels with old data I don't use anymore and I didn't take it away, so there was another issue*" (Senior researcher in water management, focus group 5, p. 16).

Although the participants agreed on the importance of safeguarding the privacy of subjects, the GDPR and guidelines prior to it seem to have had negative unintended consequences. Requiring that the use of data should be specified in advance in some cases renders meaningful analysis impossible.

> "*We've had a number of contexts where privacy concerns were so huge we could not get access to any useful information in the end. So the statistical analysis we had to do was pretty useless because we had no access to ages of people, and so forth, which was quite essential to ensure we compare apples with apples. […] In some contexts we had the feeling it was a bit too much because we would know the ages of participants we were breaching privacy*." (Professor of statistics, focus group 17, p. 5).

The message conveyed in general was that institutions need to work more on supporting researchers at different levels, from graduate students to seniors, when it comes to data management.

Storing and sharing data was perceived as having long-term beneficial potential for science, however it had also caused anxieties amongst researchers. Concerning storing data, the problems seem to arise owing to the lack of long-term planning, as one participant noted,

> "*Because in my, for example in geosciences we lost, loose, that was statistically available….30 percent of the historical data because it is not properly managed, you know*" (Senior scientist in geoscience, focus group 23, p. 29).

This lack of awareness of the long-term needs for data management may owe to the division of labour between IT service personnel and researchers. For example, one participant felt that data management is a concern for IT departments and does not involve the researchers themselves, "*So*

I guess it's also keeping the data that whatever you publish, you have to keep for what five years or some years. And it needs to be secure and all that. But that's an IT issue in most cases, I guess" (Post-doc in mathematics, focus group 6, p. 20).

Other problems seem to arise due to the use of non-standardised and even proprietary formats. Beyond the issue of sustainability there is the issue of translating the data between formats. These processes can become expensive if a specific software needs to be purchased, or risky if researchers are compelled to use free tools,

> "*I also had these issues with formats and things I needed some software to extract things from one system to another. And that was also an issue for security, because I was using an online platform that would transform some, one series of data into another format, and it was considered that that was potentially unsafe*" (Senior researcher in water management, focus group 5, p. 16).

Issues of data translation are also present in cases where scientists collaborate with citizen science organisations and organisations that collect different types of data following different methodologies. A participant in the experimental natural sciences group, which collaborates in water policies projects, highlighted the lack of standardised procedures for how to navigate these issues,

> "*We have a huge variety of information, which is, it can be data, it can be qualitative information, it can be data produced by others, it can be qualitative data produced by others, and of a huge variety of backgrounds. So we have to do with interoperability, which is very challenging. […] This is multiplied for us, because it's not only studies from other people or pre-existing information developed by scientific people or methods but also non-scientific […] And of course there are practices which are standardised in the way of doing things. […] But, at least to my knowledge, there is not an EU standardised protocol overviewing and giving advice in this realm*." (Senior researcher in water management, focus group 5, p. 2).

Regarding the sharing of data, there was a perceived lack of standardised protocols and proper infrastructures, which can obstruct collaboration. Sharing data can also be challenged by the use of proprietary software,

> "*Many of those developments are done in code that are commercial, which means that they don't want to put it out because that is what they make their living on. So if you want to have the code, you will have to pay a fee, and you can only get access to that method if you*

buy that program or buy a lesson for that program" (Associate professor of chemistry, focus group 6, p. 10).

Concerning the guidelines themselves, the perception was that the guidelines available do not specifically cover the challenges that researchers face. In the focus groups, there was also the concern that there can be a lack of concerted data management due to different (and perhaps opposing) sets of requirements,

> "*For research data management plans, you should organise your data in such a way you can re-use your data, but as [name] shows, if you want to re-use existing data of patients for other purposes you are stuck with GDPR rules that don't allow you to use the same data again. I think guidelines should be made considering fine-tuning or aligning guidelines of one with guidelines of another*" (Professor of biology, focus group 17, p. 6).

A final important observation on this topic is the expressed need for tailored support. Given the diverse types of data collected and its uses, RPOs would benefit from having experts with a wide knowledge of data management, as was highlighted by one interviewee,

> "*This is a very technical issue so we need clear guidelines to avoid everyone investigating all small details about: GDPR, data management and so on. We need good guidelines and even people who we can rely on to do some data management instead of us*"(Associate professor of bioscience and engineering, focus group 17, p. 16).

3.3.6 Declaration of competing interests

The topic 'Declaration of competing interests' addresses issues in evaluative settings as well as in collaborative projects where academics work with commercial entities. The focus of this topic is on existing or potential policies and guidelines for handling such tensions.

The topic was not covered during the open or in-depth questions and was solely discussed during the sorting exercise by the three experimental natural science groups (Belgium, Spain, and Croatia), with some brief input from the theoretical natural science group.

3.3.6.1 Key features of the topic 'Declaration of competing interests'

Display 3.3.6: The Natural science groups view on 'Declaration of competing interests'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Declaration of competing interests	It seems to be well regulated at international journals			
In peer review				
In the conduct of research				
In appointments and promotions			Unavoidable in small departments	
In research evaluations				
In consultancy				

3.3.6.2 Key observations: 'Declaration of competing interests'

The topic of 'Competing interests' was seen as highly relevant. The perception on how it is managed and the need for more or different regulations was mixed between the different groups, likely owing to national and disciplinary differences.

In general, it was widely recognised that journals and some organizations already have mechanisms in place for handling issues of competing interests in peer review or evaluating committees. The question of whether requesting a declaration of competing interests is an effective measure was discussed at the theoretical natural science group, "*they already have these kinds of statements, whether they work or don't work, we assume they do*" (Professor of biology, focus group 17, p. 18). This issue was also contested in one of the experimental natural science groups, as exemplified by the following statement,

> "*I agree that just signing a declaration of not conflicting interests is not enough, because we see that, we do that when we review papers, we do that when we evaluate projects, but still you find some conflicts of interest, so it is not enough, it's not. I don't know what we will*

> *have to do, but we need more than that*" (Senior researcher in biodiversity, focus group 5, p. 8).

The issue of evaluations was discussed specifically in the experimental natural science group from Croatia, where declarations of competing interests do not seem to be in place for researchers. As one participant noted,

> "*We should maybe declare it when we are in these committees for appointments in promotions. This is something that's, we do not normally put. I mean for example in these committees we have people who are collaborators*." (Professor of physics, focus group 23, p. 32).

Concerning collaboration between commercial or societal stakeholders and academics, only one of the experimental natural science groups (Spain) had experience with such cases. Based on their experience, unpacking competing interests can be quite challenging and failing to do so can have serious consequences. As one participant noted,

> "*I think competing interests is a huge issue, especially in my field, because we design policy that means that there is, in case you are successful, a consequence of our work […]. And that may not please some interests of course. And this is for us a crucial point. I think a mere declaration is not a good tool, because anyone can declare anything, but there is not really a proof behind*" (Senior researcher in water management, focus group 5, p. 7).

For one of the experimental natural science group (Belgium) and the theoretical natural science group, the existing guidelines and regulations were seen as sufficient. The other two experimental natural sciences groups (Spain and Croatia) saw the necessity of RPOs communicating this more clearly to their researchers,

> "*I think what happens there is that people do not have enough information about this and do not know clearly what to do. So I think with more information and a clearer protocol, people can know what to do and what to expect*." (Senior researcher in biodiversity, focus group 5, p. 8).

3.3.7 Research environment

The topic of 'Research environment' focuses on the key factors that play a role in the quality of the environment created by RPOs, such as the "general atmosphere" or "culture" of an institution. The 'Research environment' crucially affects the likelihood that various forms of misconduct and questionable research practices will occur. We specifically discussed the role of academic evaluation criteria, the link between problematic evaluation incentives and misconduct, as well as transparency. The material for this section was generated in open and in-depth discussions, as well as during the sorting exercises, by all four of the focus groups in this field.

3.3.7.1 Key features of the topic 'Research environment'

Display 3.3.7: The Natural science groups' view on 'Research environment'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research environment	The current system seems to be based on distrust and suspicion rather than openness and trust		Balance between a quantified points system and one where the researcher can define how to develop their own career	
Fair procedures for appointments, promotions and numeration		A system where the researcher establishes their own career goals alongside those of the RPO	Consider other activities (teaching, mentoring) besides publication Promotion committees can have conflicts of interest in small countries/institutes/disciplines	Include in evaluation other type of output and activities beyond publication in journals and grants received In promotion committees include people that are not from the same institute

Adequate education and skills training				Create periodical sessions where researcher can discuss progress, issues, and dilemmas
Culture building				
Managing competition and publication pressure	"*The national rules are creating the ethical problems*." (Senior scientist in geoscience, focus group 23, p.17)			Avoid requirements of having X number of papers as first author
Conflict management				Provide training in conflict management for team leaders and those dealing with large consortia
Diversity issues				
Supporting a responsible research process (transparency, quality assurance, requirements)	"*But also, just publishing reproduction studies is a lot harder than exciting new stuff, it's not rewarded in the same way*" (Postdoc in chemistry, focus group 6, p. 12)		Requirements risk being just rubber stamped	Base research evaluation in quality not quantity Specify how data analysis will be approached When presenting results, provide information about how decisions were taken

3.3.7.2 Key observations: 'Research environment'

The topic of 'Research environment' was seen as highly relevant. An overriding issue, that has profound effects on the research environment in RPOs, brought forward was the role of evaluation criteria that focus on publication performance and prestigious grants. According to participants across all of the focus groups conducted, too narrowly defined performance criteria can incentivise various forms of misconduct and ignores the work that researchers actually do.

Regarding the issue of evaluation and promotions, there was ample discussion of the point system that many RPOs follow – where researchers must publish certain number of papers, sometimes even as first authors (Professor of biology, focus group 23, p. 16) – and grants or funding that must be secured in order to qualify for promotion. This system was generally seen as detrimental by participants across the different groups. As one participant noted,

> "I*t gradually started to become a kind of contract where everything was quantified – sometimes to a ridiculous level – especially because it included criteria where, as a researcher, you don't have control over. If you have to write: I will get five projects per year financed, get funding for five PhD's, okay, you can try as hell but you have no guarantee whether you will get them because it's the funding agency who still decides on that, so you create some really bizarre situations where you engage yourself in a contract to do things over which you have no control*" (Professor of biology, focus group 17, p. 9).

Another issue raised during the discussions on evaluations was that often different types of output and performance are ignored. For example, outreach is often not considered, nor is teaching or mentoring post-docs. As one researcher noted, this could become an incentive for unethical behaviour,

> *"[…] As a supervisor involved in teaching management and all other things and less, less and less research, you also depend on productivity research-wise from these post-docs. But in the end if a supervisor is going to apply for a new project then you cannot show publications; you were not on the publications of the post-doc. Then you're shooting yourself in the foot, too. There is an ethical, internal discussion always: What should I do? Should I be on the paper? Generally, I say if I didn't contribute don't put me on a paper but sometime, well, it's not always black and white*" (Professor of biology, focus group 17, p. 13).

The researchers understood why such a point system with formulae was introduced, however the general view was that this focus on quantity is detrimental to the quality of research. As one participant confided, "*Because we are doing science to be elected in the next level*" (Professor of biology, focus group 23, p. 21). One example of how things can be done differently was given by one of the experimental natural science groups (Belgium), where the university has been working on a different system based on trust and which considers the aspirations of their staff. In this pilot, the researchers themselves determine the development of their career and how this fits with the goals of the faculty or department: *"[It] is a system where you say I want to achieve this, this and this*

based on my priorities. Of course, you have to discuss this with your colleagues" (Associate professor of agricultural economics, focus group 17, p. 9).

A more particular issue discussed was that of transparency, especially related to the design of research as well as to the collection and analysis of data. As one researcher noted,

> "*It's all with good intentions: It's partly the researcher who tries to figure out why results are unexpected so I'm not saying it's an attempt to be dishonest, but the fact all of this is not prespecified, also not clear when the analysis is being published, what decisions are made is a weakness in terms of research integrity*" (Professor in statistics, focus group 17, p. 6).

This type of behaviour could be related to the lack of incentives for publishing negative results. Although some researchers highlighted the usefulness of such publications, they also recognised the challenges to do so, "*But that's never the impact, right, it's not the exciting new, you know "yay""* (Post-doc in chemistry, focus group 6, p. 13). This focus on "new and exciting" research also has an effect on reproduction studies, which are not seen as valuable output in a career, "*But if in the, when they put down what they want in the scope right, it says that it has to be really exciting and new and cutting edge, and if it's reproduction, it's not*." (Post-doc in chemistry, focus group 6, p. 13).

In general, guidelines were seen as potentially useful for developing a healthy research environment, although they need to be flexible and there also needs to be support available for smaller institutions. Besides guidelines and support, RPOs should focus on fostering an open research environment where doubts and issues can be discussed. For example, participants in a couple of groups (focus groups 5 and 17) suggested having regular meetings between research groups to discuss research design, as well as data collection and analysis. As one participant highlighted, "*It's about sharing knowledge, not on ethical issues. But let's say once a month we have somebody presenting and speaking about his research, and then you can openly debate on it, no?*" (Senior researcher in water management, focus group 5, p. 11).

3.3.8 Publication and communication

The topic 'Publication and communication' focuses on implications that particular practices such as 'Authorship and 'Open Science' can have on research integrity. The topic was covered during the

in-depth discussions in two of the experimental natural sciences groups (Belgium and Croatia) as well as the theoretical natural sciences group. The other experimental natural sciences group provided feedback during the sorting exercise and while covering some of the subtopics.

3.3.8.1 Key features of the topic 'Publication and communication'

Display 3.3.8: The Natural science groups' view on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication	"*There is a strong pressure to publish as many papers as possible, and if possible, in very strong journals*" (Senior researcher in biodiversity, focus group 5, p. 4) Publication behaviour is negatively affected by evaluative practices		Evaluative requirements that count publication foster a culture of quantity	Diminish the relevance of publication for funding and evaluations
Publication statement				
Authorship	Discipline specific No objective criteria for author sequence	Agreements in advance	Different cultures of authorship sequence	Clear guidelines for complex situations allowing room for ad-hoc agreements
Open science	*"[Publishing protocols] it's a great way to reduce the research waste."* (PhD student in translational biomedicine, focus group 23, p. 14)		Using repositories is time demanding	Make the publication in repositories obligatory but provide enough resources

	It is expensive and time consuming			
Use of reporting guidelines				
Peer review	It is time consuming and not rewarded			
Predatory pub-lishing				
Communicating with the public				

3.3.8.2 Key observations: 'Publication and communication'

The underlying issue discussed was the pressure to publish certain types of research, with positive and novel results, in high impact journals which will be highly cited. These requirements not only incentivise misconduct and questionable research practices, they are also profoundly affecting how research is conducted. As highlighted by one participant,

> "*There is a strong pressure to publish as many papers as possible, and if possible, in very strong journals, I know that this is general in science, not just in our fields. But this creates some biases in the way science is done, like it is provoking some goals for research, like works that are easy to conduct and that do not require to generate data, because the data is already available, these kind of things that move the field in directions that maybe should-n't be the most appropriate, and more or less that's it, and in some cases this pressure can lead to misconduct and fraud*" (Senior researcher in biodiversity, focus group 5, p. 4).

Another recurrent issue within the topic of 'Publication and communication' was authorship con-flicts. Not only does this issue create disagreements and grievances, but it can also be the cause for questionable behaviour. The issues discussed around authorship can be roughly divided in three types: 1) authorship sequence; 2) the inclusion of persons that did not contribute (much) in a paper; and 3) the inclusion or exclusion of paid consultants. These issues do not stand in a vacuum and are closely related to problematic evaluative processes which have been dealt with in section 3.3.7. The following examples provide an overview of the different aspects that guidelines could consider.

Authorship sequencing follows different rules per discipline and field. In some occasions the order is alphabetical, while in others it reflects the level of involvement in the project. It is in the latter

case where conflicts tend to arise, especially when a paper involves several authors from different institutes. Due to the assigned value of publications, and that only the first authors appear in a reference, the first place is naturally the most sought after. As a participant noted, this can be problematic when funding is tied to publication output,

> "*When funding is divided across departments then different publications are very influential. In that sense, if guidelines on authorship are accepted across disciplines to some extent it would be quite valuable*." (Professor in statistics, focus group 17, pp. 7-8).

Another common conflict in authorship is related to those that did not contribute towards the paper, or did not do enough. This is also related to problematic evaluative processes and was mentioned several times, highlighting the annoyance it generates as demonstrated by the following example,

> "*One occasion, we worked with a French group. We did the entire data analysis but the French group wanted to have their statistician on the paper. So now it's printed on the paper this person, who basically contributed nothing, that he's a data analyst on the paper*." (Professor in statistics, focus group 17, p. 8).

Ethical issues regarding contribution can also arise within the same group, especially concerning project leaders or mentors who have less time to do research,

> "*As a supervisor involved in teaching management and all other things and less, less and less research, you also depend on productivity research-wise from these post-docs. But in the end if a supervisor is going to apply for a new project then you cannot show publications […] There is an ethical, internal discussion always: What should I do? Should I be on the paper? Generally, I say if I didn't contribute don't put me on a paper but sometime. well, it's not always black and white*" (Professor of biology, focus group 17, p. 13).

Finally, there is a similar type of conflict concerning contribution, but related to paid consultants, most commonly statisticians or editors. Researchers that have worked on these kinds of papers had mixed feelings on whether to include the paid consultants or not. In one example, the editor had a PhD in the same field and did not only correct the text but,

> "*His language editing was not grammatically only; he really contributed and improved the paper in terms of content. In my opinion, it was completely fair he was co-author although he was paid. But it is his profession. I mean, I'm also a paid professor. It was very difficult*

> *for others to accept he was co-author because of his private company.*" (Associate professor in bioscience and engineering, focus group 17, p. 7).

A similar example highlighted that the discussions on contributions centre on intellectual contribution and who paid the salary of a contributor,

> "*There was big discussion because promoters of the project felt because they paid the person that the person should not be on the author list which I thought was very unfair because someone has to pay the person. […] Also, I think authorship is about intellectual contribution so the fact someone is paid should not mean that person is not involved as an author.*" (Professor in statistics, focus group 17, p. 7).

The true extent of the issues with authorship is hard to establish. For example, when asked if clearer rules could help, several participants noted that the magnitude of the problem is relatively limited. However, It might be that these issues generate so much annoyance that they are perceived to be extremely common. Therefore, any guidelines should be proportionate to the problems they seek to solve and avoid extra administrative work. Some of the grievances noted by participants could be solved by simply talking in advance, as noted by one participant when sharing their experience of working in a different country during a research stay, "*They told me how to write or how to place authorships in order and it was, so we talked we didn't, we didn't proceed [by] any rules, we just talked*" (Postdoc in biology, focus group 23, p. 8)

Such a solution might not be viable with larger teams, or for all situations. Some RPOs and editors' associations have been experimenting with more detailed credits for each type of role, such as the CRediT[4] (Contributor Roles Taxonomy) initiative. In one of the experimental natural sciences group (Belgium), these types of solutions were seen as potentially more burdensome and should only be applied for difficult cases. Issues concerning authorship may well remain a constant, despite guidelines and regulations. As one participant noted, "*Is not the problem of existing guidance. I think this*

[4] https://www.casrai.org/credit.html

is everywhere, almost or maybe everywhere. The implementation is always a problem" (Senior scientist in geoscience, focus group 23, p. 2). This ties into a comment from another participant on the difficulty of making objective criteria to deal with these issues,

> "*Are there objective criteria deciding who will be second, third, last or first author on a paper? What input has more relevance of being considered more at the beginning of the author line or more at the back of the author line?*" (Professor of biology, focus group 17, p. 3).

Another issue discussed for the topic of 'Publication and communication' was 'Open science'. This topic was mostly discussed in one of the experimental natural science groups (Croatia), where the perception was that, although a laudable initiative, it is expensive, and all of its requirements can add yet another administrative layer. As one participant noted, true open science for some is only accessible through illegal websites,

> "*Because if you want to publish as open you need to pay or somebody else, somebody needs to pay this you know. [..] open, science should be open because if you want to do your research you need to read. To have access to everything you know. And you are, we are accessing through SciHub. That is always not good solution. So I don't know which will be solution, to pay to the Elsevier, to the Springer by the government can be done but this is the money issue. And then okay, there are, there are journals which are doing open science but you need to pay the fee normally. At least in my field*." (Senior scientist in geoscience, focus group 23, p. 13).

Another participant noted the possibility of using repositories to share pre-prints and research data, as an alternative to SciHub and similar sites. Discipline-specific and institutional repositories were seen as positive developments, however, as long as researchers are not required to submit to them their use will be limited. As noted by one researcher,

> "*I think in the end it's, it's always the question if it's obligatory for all of us or is it just what you want to do. Or, it also depends on the time of the research. For example, I'm doing systematic reviews and in order to perform it I have to publish the protocol of my review so, it depends. […] But I think it's a great way to reduce the research waste and to spend less money on the research that maybe are not needed so much."* (PhD student in translational biomedicine, focus group 23, p. 14).

Another prevalent concern regarding 'Open science' was that the administrative and publishing costs that it entails would take a sizeable percentage of research funding, which in some regions is already limited. In contrast the participants of the theoretical natural sciences group highlighted the challenges they face for publishing support materials due to the size of these, as noted by one researcher, "*But the problem is that some of those codes are terabytes of data*" (Associate professor of chemistry, focus group 6, p. 10). In these cases, the researchers can explain their methodology, which could become a standard for situations when support materials cannot be (fully) shared, "*So like a common standard for how you sort of disclose what was it exactly that you had the computer calculate here for this problem*" (Associate professor in theoretical physics, focus group 6, p. 9).

The last two issues covered were 'Peer review' and negative results, however they were not discussed in depth. The feedback provided for the former was given by one of the experimental natural science groups (Spain) and the theoretical natural science group. It was noted how difficult it is to get researchers to participate in peer review and to get good reviewers due to time limitations. This sometimes leads to reviews being done by PhDs "*it's often the case that the professors or the associate professors, they are mostly too busy to review them, which means that they end up at the PhDs' office table, and […] you don't get the necessary knowledge to actually evaluate the paper*" (Postdoc in mathematics, focus group 6, p. 4). The latter was discussed in the theoretical natural sciences group, where participants noted that neither negative results nor replications are published, as such studies have little news value and will likely not be referenced.

In general, we noticed that guidance in the form of guidelines and SOPs could be welcomed to tackle some of the issues discussed regarding publication and communication. Yet these guidelines and SOPs must be flexible and should not add administrative burden. The flexibility could rely on the fact that discussions will always be necessary and disagreements may not be completely avoidable.

3.3.9 Collaborative research among RPOs

The topic of 'Collaborative research among RPOs' focuses on collaboration amongst RPOs in and across Europe, collaboration amongst countries with different R&D infrastructures, as well as joint research activities involving both academics and commercial actors. This topic was only discussed

during the sorting exercise by the three experimental natural sciences groups and the theoretical natural sciences group.

3.3.9.1 Key features of the topic 'Collaborative research among RPOs'

Display 3.3.9: The Natural science groups' view on 'Collaborative research among RPOs'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Collaborative research among RPOs	Collaboration is necessary to tackle complex problem and questions			Limit the size of teams to include only those actually working on a project
Among RPOs inside/outside the EU				
With countries with different R&D infrastructures	Different research environments tend to be an issue		Different ways of working	
Between public and private RPOs			Sharing data and responsibility	Share information on the contract and obligations of both parties with researchers involved

3.3.9.2 Key observations: 'Collaborative research among RPOs

The discussions on this topic focused partly on issues with publications amongst authors from different institutes or even countries; however, that was covered in section 3.3.8. Other issues covered during this topic discussion were collaboration with private and commercial entities, as well as collaboration with RPOs both inside and outside Europe. The challenges faced by researchers depend largely on the type of research and the level of collaboration that this demands. Below, two examples of collaboration will be highlighted: one with societal and public/private contributors and one with a commercial company.

One of the experimental natural sciences group (Spain) highlighted some issues they have encountered when working in projects with a consortium of several partners. A recurring issue was the differences in the research environments, as noted by one participant,

> "*My experience for example with other countries in the Mediterranean region is that of course the standards of, behavioural standards, but also local conditions are REALLY influencing the setting. So if you speak about research environment, this is of course an issue. Because you can't pretend that in a project we have generally projects between three or five years maximum. You can't influence or change other people's situation.*" (Senior researcher in water management, focus group 5, p. 17).

The differences are not limited to the partners in a consortium, as each partner has collaborating organisations that deliver data and have their own ways of working, "*And the if all these partners have also relations with other local collaborating institutions the thing increases its complexity*" (Senior researcher in water management, focus group 5, p. 18). Furthermore, due to the evaluative structures in RPOs, there is the risk that people are added to teams for the sake of publication output, generating annoyance for the researchers that do carry out the work. As a participant said during one of the meetings,

> "*One risk is that people just join the groups to get more papers, to get more citations and to promote their CV to get more grants and to get money, because big teams are more capable to get money. And this is not the way I see collaborative work […] but in Europe it happens a lot that these big teams end up just, with a lot of redundancies in the [unclear] of the researchers and just a few researchers are the ones doing all the work. So it's a challenge, it's a necessity that we have to collaborate, especially in Europe, but it's a big challenge at the same time.*" (Senior researcher in biodiversity, group 5, p. 19).

The other example raised concerned collaboration with a private RPO and a commercial entity. In this case, the private/commercial entity provided data and because of this had a say in how the outputs were written. This created discomfort for one of the researchers,

> "*So I felt like they should just shush, like they shouldn't have any say in what I write, because it's my paper, it's my data, but it's also their data, and if I work with somebody in the university, they will also have permission to say that, right. We all have to agree on what it is we say and how that is best [conveyed].*" (Postdoc in chemistry, focus group 6, p. 23).

Here, the framework seems to not have been completely clear for those involved, as noted by one of the participants, "*I didn't even know who to ask, so I thought about it thoroughly and hoped for the best, I guess*." (Postdoc in chemistry, focus group 6, p. 23). The researcher was aware that there was a contract with the commercial/private entity, but did not have access to it, although as they mentioned, given the language of these contracts they might not have understood it at all. As another researcher commented, "*To figure out where these contracts are and what they say, it's just a dark mess of bullshit.*" (Associate professor in theoretical physics, focus group 6, p. 24).

Based on these experiences, the researchers signalled the need for proper guidelines and SOPs on collaboration that cover these and other thorny issues stemming from real cases. More importantly, any guidelines and SOPs, as well as contracts amongst partners, must be drafted in a language that is understandable and not "*unreadable to ordinary people*" (Postdoc in chemistry, focus group 6, p. 24). Thus, RPOs must deliver clear and timely information to their researchers.

In contrast to the experiences and concerns raised above, participants from one of the experimental natural science groups (Belgium) felt collaboration did not require specific guidelines, given that they felt collaboration outside of an institution is essentially not different from one inside the same institution. This different experience highlights the need for flexible guidelines and SOPs that provide clear frameworks, when needed, and do not cause administrative burden.

3.3.10 Heat map of perceived importance – natural science and RPOs

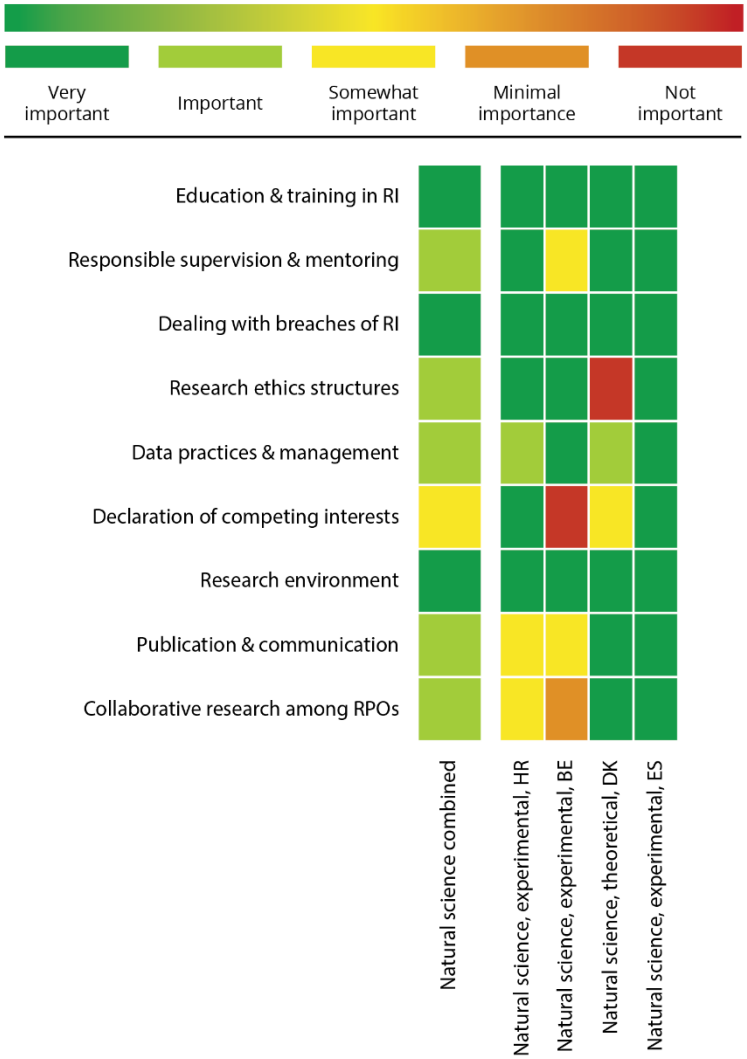


Figure 3.3.10: Heat map displaying sorting exercise results of nine RI topics in the natural science RPO focus groups.

This heat map shows the results of the sorting exercise conducted during the focus group interviews for the natural sciences. It reflects the importance assigned to specific topics in relation to research

integrity. Specifically, the map provides an overview of the areas where participants perceived that guidelines and SOPs could support the RI efforts of RPOs. The topics marked as very important do not necessitate further explanation. Some of the topics marked as important were in general seen as relevant, but there was discussion on whether guidelines are possible such as for 'Responsible supervision and mentoring' and 'Collaborative research among RPOs'. Other important topics were seen as already receiving enough attention such as 'Research ethics structures', 'Data practices and management', and issues surrounding 'Publication and communication'. Finally, the 'Declaration of competing interests' was perceived very differently across the groups, while for some it is a practice that is well-handled, others wondered what the effect is of having such declarations. This could suggest that breaches on this topic are not followed up on, therefore rendering the declarations as formalities.

3.3.11 Concluding remarks regarding natural science and RPOs

Research on RI has often taken the natural sciences as an empirical starting point. Compared to the social sciences and humanities, there is generally a more robust knowledge base available. Consequently, most of the issues covered in our natural sciences focus groups will be recognisable to readers familiar with this literature. Recurrent themes include conflicts about authorship, publication pressure and its negative consequences for RI, power differentials in collaborative work and supervisor relationships, as well as competing interests between academic and commercial collaborators.

The researchers in the focus groups generally seemed to agree that strict formal guidelines and SOPs could be useful in addressing many of the issues. For example, collaboration between academics and commercial partners regularly creates tensions when it comes to publishing papers that involve proprietary data. While the issue is far from new, it appears that researchers keep running into problems, since guidelines regarding how to handle such conflicts are either unclear or cannot easily be found. Similarly, researchers regularly encounter conflicts in relation to authorship in joint writing projects, an issue that is exacerbated when differences in academic hierarchy are involved.

It is our perception, however, that the persistent occurrence of many of these issues means that the problem is not simply a sheer lack of formal guidelines/SOPs – frequently, pertinent guidelines are in principle available. Rather, the problem is partly a lack of shared forums in which researchers

can actively engage with and revisit such available resources. This could, for example, take the shape of more frequent and more comprehensive training events on various aspect of RI. Importantly, such training should be offered to researchers across all career stages. The researchers moreover agreed that any such training and formal guidelines must be tailored to the requirements of the respective discipline, since research practices differ significantly within the different fields. The limits of standardisation also become visible in the concern some researchers expressed at the prospect of over-formalisation in the context of ethical review of research activities, which can easily slip into a box ticking exercise (rather than a serious reflection on ethical implications). Partly in reaction to this, we therefore note (again) an irreducible need many scientists feel for flexible RI-related counselling, ideally on an ad-hoc basis and face-to-face.

Somewhat more recent, and arguably not yet sufficiently addressed by RPOs, are confidentiality and data management issues related to the GDPR. The problem here often appears to be that while the "letter of the law" is well known, its exact implications for scientific practice remain unclear. The very data driven character of much natural scientific research creates additional challenges regarding the GDPR-compliant data storage and sharing of research materials. While the use of large-scale and cross-institutional digital infrastructures is arguably more advanced than in most qualitative fields, RPOs would clearly benefit from further promoting cross-institutional collaboration in the design and harmonisation of digital and administrative infrastructures.

3.4 Medical science

This section addresses the promotion of research integrity in research performing organisations from the disciplinary perspective of the medical sciences. Through a set of focus group discussions, we were able to generate rich material regarding how different researchers within and around the medical sciences understand and prioritise topics such as education and training of RI, tensions arising from collaborative project work, and publication pressure, as well as the question of how to deal with breaches of RI. As in the previous cases, the objective is to increase our understanding of how RPOs may foster and advance RI practices and policies in alignment with the particular needs and interests of the medical science.

Six focus groups were conducted in total. These featured 31 participants from across six European countries and covered no less than 23 medical research disciplines. There were four focus groups composed exclusively of researchers. Two focus groups consisted of a mixed set of stakeholders; involving not only researchers, but also a university administrator, a representative of a public funding organization, as well as members of research integrity offices/ethical review boards.

The results of these discussions are addressed by topic in the following sections and summarised in separate displays. We also provide a heat map at the end of this chapter (section 3.4.10) that visualises the assessed importance of each RI topic for medical research.

Display 3.4. Overview of participants in the medical science focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Researchers/stakeholders represented***	Country	Face-to-face/online interview	Number of participants
10	(researcher only) Clinical nursing Oncology Sexology	Data management** Transparency** Independence from commercial influences**	Senior researcher Associate professor	DK	Online	3

		Publication and communication**				
19	(mixed group) Physiology Clinical medicine Nursing education	Education and training in RI Dealing with breaches of RI	RIO Management position at university Public funding org. representative Professor Lecturer	BE	Online	5
20	(researcher only) Gastroenterology Clinical epidemiology Physiology Vascular surgery (clinical) Neuroscience	Managing competition and publication pressure Supervising/Mentoring Research collaboration among RPOs	Professor Researcher Post-doc	NL	Face-to-face	6
25	(researcher only) Forensic Sciences Histology and Embryology Anatomy	Education and training in RI Publication and communication	Researcher Assistant professor Associate professor Professor	HR	Face-to-face	7

	Neurobiology Physiology	Research collaboration among RPOs				
26	(mixed group) Anatomy Psychiatry Health statistics Gastroenterology Biology Physiology	Publication and communication** Monitoring of funded applications**	Researcher Ethical review board member RI review board member Associate professor	IT	Online	7
30	(researcher only) Medical law and ethics Neurobiology Biophysics	Research ethics structures Dealing with breaches of RI Independence from commercial influences	Professor Researcher	GR	Face-to-face	3

* Participants may represent more than one discipline
** Due to the online format, the topics for in-depth discussion were discussed as part of the sorting exercise
*** Participants may represent more than one type of position

3.4.1 Education and training in RI

The topic of 'Education and training in RI' focuses on the courses and training available at RPOs, as well as their perceived limitations and what could be done to remedy them. The following results draw predominantly on discussions with the two basic medical science groups (Greece and Croatia) and the mixed stakeholder group (Belgium). One of the clinical medical science groups (Denmark) provided input during the sorting exercise.

3.4.1.1 Key features of the topic of 'Education and training in RI'

Display 3.4.1: The medical science groups' view on 'Education and training in RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Education and training in RI	*"At the start of that career as a scientist it's important to have such a training"* (Professor of physiology, focus group 19) *"It's lifelong learning […] [senior researchers] also have to competence develop"* (Associate professor of clinical nursing, focus group 10, p. 22)	Handling different RI issues throughout different courses	Getting senior researchers to follow RI courses	Treat RI topics in different courses.
Pre-doctorate				Make training on RI mandatory
Post-doctorate				
Training of RI personnel and teachers				Introduce the topic of RI in teacher's training.
RI counselling and advice				

3.4.1.2 Key observations 'Education and training in RI'

The topic of 'Education and training in RI' was considered important for the medical sciences. Amongst the issues discussed were the levels at which it must be provided, and whether courses and training should be made mandatory.

In general, participants agreed that education must begin with doctoral students, although attention to RI issues should be given also to bachelor and master students, "*The good scientific methodology class in the broader sense is actually crucial to solving things*" (Research assistant of anatomy, focus group 25, p. 14). It was noted that many students are unaware that some practices are unethical, most notably plagiarism.

Education on RI was seen as a long-term effort which should not be limited to one course. As noted by a participant, "*So you have in every course a little bit of that and it's…in my opinion better because every course takes a little bit of that misconduct and explains it*" (Researcher in forensic sciences, focus group 25, p. 10). This last point highlights the need for teachers to be aware of RI guidelines and how to introduce them in their courses. Further, participants stated that courses and training should also be given to senior scientists, although they agreed on the difficulty of having senior scientists join trainings due to lack of time and the generally poor offerings of training.

The focus groups also generated recommendations on the content of RI courses and trainings. The participants stated the importance of linking courses to problems and issues that scientists face,

> *"[it's] difficult to indeed attract researchers […] because they think they don't need it […]if you focus more on specific topics where they are really, you know, in their daily practice they have issues with it, I think it's easier to attract them*" (Professor of physiology, focus group 19, p. 7).

A number of focus group interviewees suggested making the attendance of courses and training in RI mandatory, provided the content is relevant, "*it should be mandatory, it's a skill that you have to acquire, just as you have to acquire English writing and statistics*." (Professor of physiology, focus group 19, p. 9). Finally, some participants highlighted the need for RPOs to offer an integral support system on RI issues, where besides relevant courses, there are clear and accessible guidelines as well as spaces to raise more specific issues.

3.4.2 Responsible supervision and mentoring

This part of the analysis addresses 'Responsible supervision and mentoring' in the medical sciences. The focus group discussions covered both currently perceived issues in supervisory relationships, as well as possible ways of fostering good practices through guidelines that could be implemented by RPOs. The topic was discussed in depth in both basic medical science focus groups (Greece and

Croatia) as well as in one of the clinical medical science groups (the Netherlands). The analysis is also enriched by some feedback from the mixed medical science focus group (Belgium). The other clinical medical science focus group (Denmark) provided some insights during the sorting exercise.

3.4.2.1 Key features of the topic 'Responsible supervision and mentoring'

Display 3.4.2: The medical science groups' view on 'Responsible supervision and mentoring'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Responsible supervision and mentoring	*"Supervision is about how you can help young researchers"* (Research integrity officer, focus group 19, p. 8)	Having a mentor that is not the supervisor Having an external committee to supervise PhD progress Having an evaluation period before fully accepting a PhD		Having separate mentors and supervisors Introducing a buddy system for PhDs of different levels
PhD guidelines				Provide yearly reports of progress
Supervision requirements and guidelines				Have a minimal number of supervision hours Limit the number of students a supervisor can have Yearly reports on supervisors
Building and leading an effective team				

3.4.2.2 Key observations: 'Responsible supervision and mentoring'

The topic of 'Responsible supervision and mentoring' was considered to be extremely relevant by all of the focus groups on medical sciences. As one participant noted, "*that's one of the important things for senior researchers, like how can I be a good supervisor and what does it mean*" (Professor of clinical medicine, focus group 19, p. 8).

At the same time, participants felt these skills were not perceived as equally relevant by RPOs and funding bodies, specifically when it comes to the allocation of resources, where neither training of supervisors nor time for supervision are taken into account. Several participants lamented the practice of attracting as many students as possible without realistically considering the time a professor can devote to supervise each of them, in addition to carrying out research and overseeing a team. As a participant noted, "*Every student for the university also brings in money, but […] the universities capacity to train all these people is limited*" (Professor of physiology, focus group 20, p. 14). To counter this, participants suggested limiting the number of supervisees per researcher. In order to avoid rigid quotas, this limit could be discussed with each principal investigator. At the same time, a minimum of supervision hours should be accorded to each supervisee.

The focus groups also offered some more concrete suggestions for guidelines on supervision and mentoring. The first is to distribute the mentoring tasks to others than just the supervisors. Some of the examples noted by participants were: a separate mentor from the supervisor, a buddy system between final year PhDs and new ones, strong research teams where senior colleagues can aid the junior ones, and external committees that evaluate the progress of PhDs periodically. A second suggestion was to introduce reports where supervisors and supervisees keep track of the progress of each candidate. A third and final suggestion was to establish a probation period before the PhD candidate is fully accepted.

Finally, participants in one of the medical clinical groups noted that evaluation committees often lack age, gender, and ethnic diversity which contrasts with the demographics of the students and society as a whole.

3.4.3 Dealing with breaches of RI

This topic focuses on procedures, which RPOs apply to deal with breaches of RI, as well as on the many ways in which these currently fall short of their intended functions. Particular aspects covered in the focus groups included procedures for investigating allegations and the challenges they face. The topic was discussed mostly in the two basic medical science focus groups (Greece and Croatia), while the two clinical medical science groups (Denmark and the Netherlands), as well as the mixed medical science one provided some minor feedback.

3.4.3.1 Key features of the topic 'Dealing with breaches of RI'

Display 3.4.3: The medical science groups' view on 'Dealing with breaches of RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI	The pace of investigations is slow The public is unaware that breaches can be due to sloppiness and not only fraud	A research integrity committee on a national level where disagreements can be reviewed		Misconduct by students should be referred to ethical committee of the faculty Communicate better with the public when breaches happen
RI bodies in the organisation			Conflict of interests in small faculties/institutes	Committees should be allowed to act swiftly and should be paid for their work Committees should have external members that are not from the same institution
Protection of whistle-blowers				
Protection of those accused of misconduct				

Procedures for investigating allegations	It is extremely time consuming			
Sanctions	Sanctions (if any) are very light			
Other actions (including mobility issues)				

3.4.3.2 Key observations: 'Dealing with breaches of RI'

The topic of 'Dealing with breaches of RI' was widely seen as a relevant as well as a highly complex issue. Its urgency is especially poignant for the medical sciences because of its effects, "*[If] patients are being treated when it's on the basis of the wrong evidence, it's quite bad of course*." (Research associate in epidemiology, focus group 20, p. 4). The perceived way in which RPOs deal with breaches shows a divide between different countries. In general, the participants of the mixed group in Belgium and the clinical group in Denmark had the impression that breaches are dealt with in a proper way. The clinical group in the Netherlands noted there was room for improvement, while the basic medical science groups in Croatia and Greece felt this is not done adequately in these countries. Most of the observations below come from these two basic medical science groups.

Some of the issues raised are related to the lack of clarity regarding which steps to take when there is suspicion of misconduct, as well as how to treat different levels of misconduct. On the former, some RPOs have begun experimenting with guidelines as to what researchers can do when they suspect fraud. On this point it is worth noting that most participants in the various groups had not experienced this in person and thus assumed it was well organised at their institutions. On the point of how to treat different levels of misconduct, participants in one of the basic groups (Croatia) highlighted the difficulty of dealing with "minor" breaches from students such as plagiarism due to a lack of clear policies, leaving sanctions up to each lecturer.

The investigation of breaches was also seen as problematic because of its slow pace, which can raise the suspicion that the institution does not want to deal with it, as well as being resource intensive. As one participant noted, "*Everybody forgets how time consuming it is to prove misconduct. It takes months of work. You have to analyse data that you are unfamiliar with, it takes a lot of unpaid work, like referring hundreds of papers*." (Researcher in biophysics, focus group 30, p. 3).

Setting up committees is another aspect that, according to some participants, could improve. To ensure that whistle-blowers have confidence in approaching committees, their composition needs to be carefully considered to ensure gender, age, and ethnic diversity. Further, maintaining the independence of committees can be problematic for smaller institutions, academic disciplines, or regions. One interviewee from one of the basic medical science group (Greece) noted that this could be solved by setting up international ethics committees, although this might prove challenging, as evidence material would have to be translated. Another solution could be the setting up of a national or regional "second opinion" committee, which happens in some countries already.

The way in which RPOs deal with breaches can, in the worst case, contribute to a culture of mistrust, as in the following case that was mentioned in one of the medical basic science groups. The case involved a scientist who had committed three instances of misconduct in previous positions at other organisations. This researcher had even received an ERC grant based on the work involving the breaches. The participant sharing this example was under the impression that nobody took any responsibility: the ERC claimed it was not in their competence, while the current institution did not want to suffer reputational damage and was waiting for the papers involved to be retracted by journals without taking any steps. This case exemplifies a lack of clear procedures, sanctions, and transparency during the whole process, which can affect not only the morale, but the trust, in institutions and the wider scientific community.

The issues raised during the discussions signalled the need for clear guidelines and SOPs, "*It's not easy when there is a breach, how to deal with it is not easy. So, if there are guidelines, that would be very helpful for the instances who have to make the decisions*." (Professor of physiology, focus group 19, p. 18). The issues that should be covered are how to handle suspicion of misconduct, the set-up of committees, the procedures and processes that are carried out during investigations, the protection of whistle-blowers, and the type of sanctions for the different types of breaches. This last point is of great importance if RPOs want to convey a message that RI breaches are unacceptable. As one participant noted, "*And then what? And then somebody is banned from getting funding for one year or that sort of punishment which is frankly a joke*." (Researcher in biophysics, focus group 30, p. 3)

3.4.4 Research ethics structures

The topic 'Research ethics structures' in the medical sciences focuses mainly on the organization and activities of ethics committees. Relevant empirical material for this analysis was generated predominantly in one of the basic medical science groups (Croatia) and one of the clinical medical science groups (Denmark). The other clinical group (the Netherlands) provided some insight during the sorting exercise.

3.4.4.1 Key features of the topic 'Research ethics structures'

Display 3.4.4: The medical science groups' view on 'Research ethics structures'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research ethics structures	"*They make work a lot safer and it's a great prevention tool for potential misunderstanding and conflicts*" (Professor of anatomy, focus group 25, p. 4)			Consider the different ethical approvals a project may need
Set-up and tasks of ethics committees				
Ethics review procedures	"*It's a very delicate field, and it's […] patients' experiences, it's sometimes life and death […] it's really something that matters and has a great impact*" (Associate	Clear guidelines and contact person for doubts	The use of old data collected under suspicious conditions	Clarity which information to provide Assign a contact person for doubts

	professor of clinical nursing, focus group 10, p. 10)			

3.4.4.2 Key observations: 'Research ethics structures'

The topic of 'Research ethics structures' in the form of review boards was considered highly relevant by all of the focus groups interviewed. The requirement of seeking approval before a study begins was generally seen as positive for research. As one participant noted of their experience in other countries,

> "*We used to call them risk assessment procedures. And I think they complement each other […] they make work a lot safer and it's a great prevention tool for potential misunderstanding and conflicts, if the rules are explained at beginning, before the process starts*." (Professor of anatomy, focus group 25, p. 4).

Similar to the previous topic of 'Dealing with breaches of RI', some focus groups felt solid ethics structures were already in place, while others felt some regions and organisations still needed to do more work to implement ethic review boards, for example in Croatia. The comments below highlight issues that are lacking or that require some attention.

One issue that was highlighted was the existence of diverse ethical guidelines between different organisations, which can cause confusion. In the medical sciences this can happen to researchers that have joint functions, for example at a hospital and at a university, as explained by one interviewee, "*The rules, even though we have to follow the same guidelines, for us it's often an issue of who to contact, who is my person, am I applying as a university employee or am I hospital based today*" (Associate professor of clinical nursing, focus group 10, pp. 2-3). This confusion can be exacerbated when studies are funded by various bodies with different requirements, for example,

> "*An EU funded study, Horizon 2020 so within that there are also some, as you know, some other EU regulations that we have to follow on top of the local, regional, national requirements for ethics, so just to say that the mix of who we are and where we work influences, it makes a lot of, I don't know, confusion somehow*" (Associate professor of clinical nursing, focus group 10, p. 3).

Another issue regarding ethical reviews that was referred to was the lack of clarity on how to proceed for certain types of data. Below, the topic of data practices and management is analysed in

depth, however the two cases mentioned here relate to that topics as well as the one of ethics review boards. In particular, participants mentioned historical data that has been obtained under suspicious circumstances (specifically breaching human rights conventions) and data from patients that die during a study. Researchers noted that these cases of types of data and similar cases are not covered by review boards, nor is there a proper channel to raise these kinds of issues, suggesting the need for a contact person with whom these kinds of doubts can be shared.

In general, participants agreed that review procedures must be swift, provide clear information about the procedure, and have checklists on what to send. Ethics review boards should also have a contact person for ad-hoc questions and doubts. These are aspects that should be considered for future guidelines and SOPs.

3.4.5 Data practices and management

This section focuses on data practices and institutional data management in the medical sciences. It particularly addresses the challenges that privacy requirements and the sharing of data present, as well as the efforts of RPOs to provide support and instructions to cover these. The topic was discussed in the two clinical medical science groups (Denmark and the Netherlands).

3.4.5.1 Key features of the topic 'Data practices and management'

Display 3.4.5: The medical science groups' view on 'Data practices and management'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Data practices and management	"*Data integrity is essential*" (Researcher in biophysics, focus group 30, p.2) "*It's [an] enormous hurdle*" (Professor of			A central data repository on a national level

	physiology, focus group 20, p. 15)			
Guidance and support			Legal departments have legal experts who are not knowledgeable of medical sciences	Provide support on IT and legal issues
Secure data storage infrastructure	"*Storage of data is not facilitated in general*" (Professor of physiology, focus group 20, p. 4)		How to encrypt data	
FAIR principles	There is lack of support and resources to share data		Sharing data between different countries	

3.4.5.2 Key observations: 'Data practices and management'

The topic of 'Data practices and management' was seen as relevant for RPOs to address and a topic that has huge consequences for the medical sciences. In general, there was a perceived mismatch between regulations and the daily data practices of researchers. There are many different regulations and even data sharing plans that scientists must sign, however the necessary infrastructure and support to realise this is lacking, as one participant noted,

> "*We have to solve everything as a scientist and it doesn't stimulate to exchange your data and resources with other groups. […] people think of regulations but they don't think what's needed, including the money to help the scientists*" (Professor of physiology, focus group 20, p. 15).

A recurring issue raised during the discussions on this topic was the sharing of data and the many challenges this presents. One challenge is related to the consent forms that must cover all of the uses for the data collected, "*So, there are so many problems right now, to share data to get data from patients and the patients have to sign so many forms. You don't know even what they are*

signing for anymore" (Researcher in endovascular surgery, focus group 20, p. 15). The other challenge has to do with collaborations between countries; due to different approval and data protection processes, sharing data can be impossible, as one participant noted, "*We had so many problem[s] sending the samples that we actually gave up at the end of the day, and that would've been a fantastic collaboration if we had all paperwork in place*" (Associate professor of biomedicine, focus group 10, p. 6).

Ethical approvals that involved different types of data collection were discussed in the previous section. An addition to that discussion (that is particularly pertinent to the data practice of the medical sciences) is that due to privacy concerns specific data cannot be sent through electronic communication. An interviewee shared an experience in which they would write the identification number of a patient on a piece of paper in order to check more details of the patient's development in another department, making the researcher doubtful of how to perform their work, "*so what do I do here. How do I solve this issue*" (Associate professor of biomedicine, focus group 10, p. 8).

The need for clear guidelines was shared amongst the groups, "*And all of the sudden comes all these big rules that you need to do […] we need proper guidelines […] that we can follow as easy as possible*" (Associate professor of biomedicine, focus group 10, p. 7). Beyond clear instructions, RPOs with research teams that collaborate with organisations at a national or international level must provide a support team of legal advisors and IT personnel.

3.4.6 Declaration of competing interests

The topic of 'Declaration of competing interests' covered mostly the issue of independence of researchers from commercial interests. This topic was briefly discussed in one of the clinical medical science groups (the Netherlands) and in one of the basic medical science groups (Greece), while the other clinical medical science group (Denmark) provided some input during the sorting exercise.

3.4.6.1 Key features of the topic 'Declaration of competing interests'

Display 3.4.6: The medical science groups' view on 'Declaration of competing interests'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Declaration of competing interests	*"it's self-explanatory […] it just needs to be enforced"* (Associate professor of biomedicine, focus group 10, p. 14)			
In peer review				
In the conduct of research				
In appointments and promotions				
In research evaluations				
In consultancy				

3.4.6.2 Key observations: 'Declaration of competing interests'

The topic of 'Declaration of competing interests' was seen as relevant. However, the general perception was that this issue is already well addressed when needed and thus the perceived importance of the topic was less than that of other topics. Participants noted that this topic is an integral part of scientific integrity and because of journal requirements *"it's written everywhere"* (Associate professor of clinical nursing, focus group 10, p. 14).

One of the comments on this topic pertained to the issue of assessing or evaluating the work of colleagues. When discussing other topics with the medical sciences groups, some participants felt that working in small institutions or fields could create conflict of interests, as researchers will unavoidably know each other. In one of the medical clinical science groups (Denmark) this was not experienced as a problem as long as researchers were conscious of this,

> "*So I think the fact that we are forced to reflect and argue that "in this case I believe it is okay, or in this case I believe it is not okay", […] it's already […] something we have to deal with*" (Associate professor of clinical nursing, focus group 10, p. 14).

Nevertheless, some participants felt explicit guidelines are needed, especially to ensure junior researchers are aware of it.

3.4.7 Research environment

The topic 'Research environment' focuses on key factors such as the general atmosphere or culture of an RPO. The research environment crucially affects the likelihood that various forms of misconduct and questionable research practices will occur. This analysis discusses the role of academic evaluation criteria and the link between problematic evaluation incentives and misconduct. Relevant material for this section was generated in the two clinical groups (Denmark and the Netherlands) and the two basic groups (Greece and Croatia). Some input was also provided by the mixed group held in Italy.

3.4.7.1 Key features of the topic 'Research environment'

Display 3.4.7: The medical science groups' view on 'Research environment'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research environment	"*Systems are more focusing on individual parts […] I think it is certainly an incentive for sloppy behaviour.*" (Professor of gastroenterology, focus group 20 p. 6)		Short term contracts pressure people to skip processes	
Fair procedures for appointments, promotions and numeration				Focus on quality rather than quantity Value teaching

Adequate education and skills training		Lab meeting to discuss issues and results		
Culture building				
Managing competition and publication pressure	Researchers are under huge pressure of delivering a high impact factor		Pressure to publish from funding bodies outside of RPOs	
Conflict management				
Diversity issues				
Supporting a responsible research process (transparency, quality assurance, requirements)	"*Having an environment where it's okay to share, […] to be […] wrong, […] to ask for advice, it's […] pivotal for being able to publish, for being able to complete PhD students, for growing as research group*" (Associate professor of clinical nursing, focus group 10, p. 20)			

3.4.7.2 Key observations: 'Research environment'

Generally, all the groups interviewed found a healthy research culture and environment extremely relevant,

> "*We have to be fertilised with good energy to make some good projects, and if there's no culture where there's fair procedures from appointments, where there's adequate education and skills training, […] if none of these things are in place, there's no need for us to do what we're doing*." (Associate professor of clinical nursing, focus group 10, p. 20).

An overriding issue that seems to negatively influence almost all of the other aspects of a research environment, is the problematic role of narrow evaluation criteria, which incentivises various forms

of misconduct and does not foster an open and collaborative environment. According to several participants, the focus is on the individual rather than on teams,

> "*A basic science team should have experts, technical experts, that means that you need to have a certain number of technicians that are sort of the memory of a group […] There is an incentive to have a lot of PhD students, but there is not really an incentive to have a balanced group*." (Professor of gastroenterology, focus group 20, p. 10).

Evaluation criteria focus strongly on publication performance as judged by high impact factor of journals and the number of papers (which can be pre-agreed per period). The pressure to publish is in some RPOs increasing to the extent that even master students need to produce papers or co-author them in order to proceed with a PhD. Another issue highlighted was the lack of incentives and rewards for publishing replication studies or studies based on previously collected data. An example given in one of the clinical groups (the Netherlands) was the rejection of a paper by reviewers because it had analysed samples which had been used in another paper by another team. This response came from a journal, but the pressure to publish novel studies is felt also inside RPOs.

This narrow focus on publication output was also seen as detrimental to research in general, "*It is not improving quality of science. Just piling up*." (Professor of physiology, focus group 20, p. 7). A related issue, focusing on specific output, that was highlighted was the prerequisite of producing a PhD thesis in order to become a clinical specialist, "A*t the [redacted] centre I would say that almost 50% of the people they are just doing a PhD because they want to get there thesis, so that they can become a neurologist*" (Junior researcher in neuroscience, focus group 20, p. 10). This issue was only raised in the group in the Netherlands; thus, it could be a characteristic of that national research culture.

According to the participants, the focus on publications undervalues other activities such as teaching, affecting the quality of education, "*For most scientists it is an ancillary activity […] Something you do extra on the side, and it should not take too much time, because it is, it's not validated properly*" (Professor of physiology, focus group 20, p. 12).

Across the focus groups the issue of time pressures was also raised, "*Time is very important, if we have time there is no reason to go towards misconduct […] the programmes should be longer and money should allow people to get time*" (Researcher in neurobiology, focus group 30, p. 5). This pressure is particularly poignant for junior researchers, "*Especially when your PhD contract is almost finished. So, maybe at some point, you don't do this extra analysis, you don't extra check these*

outputs […] is more like sloppiness a little bit." (Junior researcher in neuroscience, focus group 20, p. 7).

During the various group discussions, the topic of fostering a more open and transparent research culture was a recurrent discussion item. As a participant in one of the basic medical science groups (Greece) noted, this can best be approached as a long-term strategy where spaces for discussion and interaction are established.

3.4.8 Publication and communication

The topic of 'Publication and communication' focuses on various practices particular to the medical sciences, as well as on existing and potential future RPO guidelines to regulate such practices. This analysis covers 'Authorship', 'Open Access' and 'Open Science', the role of researchers as journals editors, and 'Communicating with the public'. The topic was explicitly discussed in both medical clinical medical science groups (Denmark and the Netherlands), one of the basic medical science groups (Croatia), and one of the mixed groups (Italy).

3.4.8.1 Key features of the topic 'Publication and communication'

Display 3.4.8: The medical science groups' view on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication	The focus lies on novelty		Difficulty of publishing studies with negative results	
Publication statement				
Authorship	It is highly problematic in very competitive disciplines	Defining authors in advance	Difficult to establish for collaborative projects	Define authors in advance Researchers of all levels should be aware of the guidelines

Open science			Additional work by preparing data	It needs to be encouraged and supported by RPOs
Use of reporting guidelines				
Peer review				
Predatory publishing				
Communicating with the public		Acknowledging the other researchers, the team, the university, and partners of a research project		Researchers should not give misleading or exaggerated statements

3.4.8.2 Key observations: 'Publication and communication'

A recurrent issue that popped up in the discussions around 'Publication and communication' were conflicts and misconduct related to authorships. Most of the examples mentioned were not particular to the medical sciences. Similar to discussions in other disciplines, several participants noted the issues are often caused by a misbalance of power and fear of confrontation, "nobody dares saying "*Ah did you really do that?*" (Professor emeritus of physiology, focus group 25, p. 29).

The issues concerning authorship are interlinked with problematic evaluative processes, which were already discussed under the previous topic. Nevertheless, the practice of crediting researchers who did not collaborate as authors was acknowledged as being necessary and common. For example, participants of one of the clinical medical science groups (Denmark) recognised the need to do so because of evaluative criteria,

> "*It's about being flexible, and sometimes that means that you add someone on to the paper, who really did not do anything much, however it is actually important for the paper, and it's important for that department. And for us it's about giving and taking, you really have to give and take*" (Associate professor of clinical nursing, focus group 10, p. 18).

In contrast, participants in one of the basic medical science groups (Croatia) shared examples in which relatives of senior researchers were added to their papers in order to improve the CV of

those junior researchers. The participants confided that many people were aware of these practices, but there were no mechanisms in place to raise these kinds of issues.

Another issue raised concerning publications, was the role that researchers play in editorial boards. While they are generally seen as prestigious, such functions could potentially bring disrepute to RPOs, for example when it involves predatory journals. Researchers in one of the clinical medical science groups (the Netherlands) suggested that these positions should be reviewed and known by the head of each department.

On the issue of 'Open Science' we noticed that the concept is still not well understood by many researchers. In general, the participants were positive about OA initiatives but agreed that clear guidelines, as well as infrastructure and support, are still lacking.

Finally, the issue of 'Communicating with the public' was highlighted as potentially problematic due to some scientists overstating potential results and journalists' tendencies to exaggerate and simplify. Interviewees in one of the clinical groups (the Netherlands) and one of the basic groups (Croatia) noted that this is also a vital part of a researcher's integrity and, therefore, RPOs should consider this in training and guidelines.

3.4.9 Collaborative research among RPOs

The topic of 'Collaborative research among RPOs' for the medical sciences focuses on three specific aspects: collaboration in and across Europe, collaboration amongst countries with different R&D infrastructures, as well as joint research activities involving both academic and commercial entities. The topic was discussed in depth by the two clinical medical science groups (Denmark and the Netherlands), while one of the basic medical science groups (Greece) provided some input during the discussion of other topics.

3.4.9.1 Key features of the topic 'Collaborative research among RPOs'

Display 3.4.9: The medical science groups' view on 'Collaborative research among RPOs'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Collaborative research among RPOs	"*Collaboration is one of the main things of our, all our activity*" (Associate professor of clinical nursing, focus group 10, p. 5)	More general consent forms for use of medical data for scientific purposes	Slow pace of contract	A well-staffed and knowledgeable legal department
Among RPOs inside/outside the EU			Lack of clarity on responsibilities between partners	Clearer rules concerning ethical approvals
With countries with different R&D infrastructures			Pace for ethics approvals	
Between public and private RPOs			Lack of clarity on how partners contribute towards patents	Each RPO should keep a registry of private-public collaborations The head of institute or department should approve private-public collaboration

3.4.9.2 Key observations: 'Collaborative research among RPOs'

The topic of 'Collaborative research among RPOs' was seen as highly relevant for the medical sciences. This is especially true for the medical clinical sciences, as collaborating with national and international partners, both public and private, is vital for the advancement of research as well as for its translation, "*they can make it into a product and eventually the world profits*" (Professor of gastroenterology, focus group 20, p. 16).

One of the most commented issues during the focus groups was the lack of guidelines concerning the setting up of contracts and delineating responsibilities amongst the teams. Notably, there is a lack of concerted ethics approval processes and oversight of patient safety. This last point is not only the case between countries with different R&D systems, but also applies for RPOs inside the same country. The implications of the different ERBs can affect the sharing of data as well as the publications of a project, "*We have to make sure that […] if we want to publish papers afterwards that we are doing the right thing according to ethics*" (Associate professor of sexology, focus group 10, p. 5).

Collaboration between academia and industry was generally seen as positive, although two concerns were highlighted. The first refers to the sharing of data where public RPOs are expected to have open data while commercial entities are not, as noted by a participant,

> "*Being very open and sharing data that's what, in academia that's sort of our purpose, right? But, with industry it's not; because they can do it but only after IP has been protected. And, that collaborating between industry and academia, I find it difficult*." (Professor of gastroenterology, focus group 20, p. 16).

The other issue mentioned in relation to academic-industry collaboration was the lack of oversight, which can result in several researchers of the same department participating in commercial studies at the same time,

> "*No one is regulating all these collaborations with these industries or partners. So, maybe it's also good that the head of the department or someone knows about it and then approves before you do some kind of a collaboration*." (Researcher in vascular surgery, focus group 20, p. 19).

Collaboration with industry was not seen as particularly prone to RI breaches, as long as researchers upheld their scientific integrity,

> "*For example, a confidentiality agreement can be a huge problem for RI. If you sign such a thing with a company that funds your research, you are essentially moving away from science*." (Researcher in biophysics, focus group 30, p. 9).

Clearer guidelines and SOPs were seen as necessary for the medical sciences. Nevertheless, some participants noted that too many regulations can also become a hurdle and obstruct collaboration. Therefore, RPOs should also provide legal and ethical ad-hoc support.

3.4.10 Heat map of perceived importance – medical science and RPOs

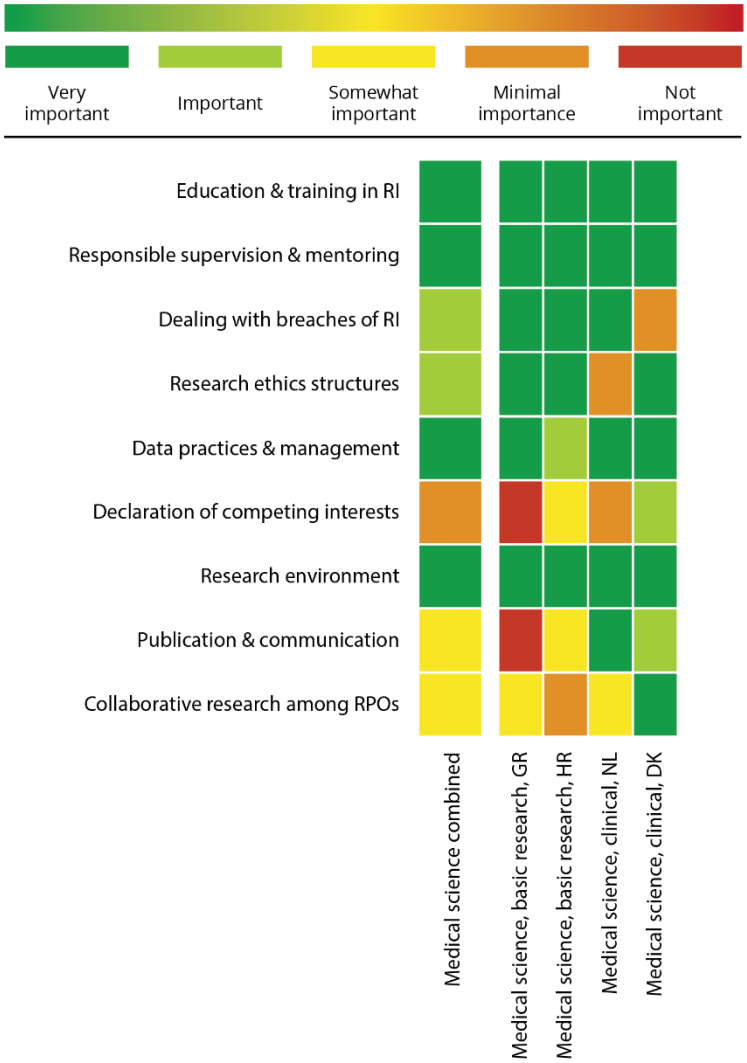


Figure 3.4.10: Heat map displaying sorting exercise results of nine RI topics in the medical science RPO focus groups.

This heat map shows the results of the sorting exercise conducted during the focus group interviews in the medical sciences. It reflects the importance assigned to specific topics in relation to research

integrity. Specifically, the map provides an overview of the areas where participants perceived that guidelines and SOPs could support the RI efforts of RPOs. The arrangement of the topics shows some differences, although these are necessarily due to the different disciplinary fields. From the topics perceived as very important, 'Education and training in RI', 'Data practices and management', and 'Research environment' were highlighted as cornerstone areas that affect other areas. The topics 'Research ethics structures' and 'Dealing with breaches of RI' were perceived as being an integral part of a research environment and therefore not assigned as very important. The latter was also seen as being well-handled. Similarly to the perception in the natural sciences, declaration of competing interests was seen as being a mere formality. 'Publication and communication' and 'Collaborative research among RPOs' were seen as somewhat important in relation to the other topics, and overall seen as relevant by the clinical medical science groups.

3.4.11 Concluding remarks regarding medical science and RPOs

The medical sciences consists of a set of disciplines with significant experience in handling RI questions. Consequently, few of the issues we touched upon during our focus group discussions present fundamentally novel insights. They do, however, allow us to address areas where researchers and stakeholders see room for improving existing practices and procedures through a refinement of formal guidelines.

Firstly, researchers are particularly aware of supervision issues, arguably because of the highly collaborative structure of medical research and the particularly pronounced publication pressure in the field. Participants variously called on institutions to provide more detailed guidelines and additional measures for PhD supervision. This could include expanding mentoring systems and codifying auxiliary roles for senior researchers who are not formally supervisors, but who effectively carry out supervisory tasks.

Related to supervision concerns, are perennial conflicts about authorship. In the medical sciences, authorship questions are handled more liberally than in many other fields, for example in the sense that authorship is accorded as a favour to colleagues (but without them having substantially contributed to the published research). Again, many researchers kept calling for clearer formal guidelines by their institutions in this regard.

It is furthermore well known that the often close collaborative connections between academic researchers and commercial stakeholders in the pharmaceutical industry create tensions with respect to RI. This pertains to a lack of clarity in the handling of data sharing questions – e.g. who has the right to access what kind of material in a public-private project? – as well as the intrusion of commercial objectives into academic research activities.

Finally, another issue that appears more frequently in medical research than in other fields concerns the lack of clarity that arises from lack of harmonisation amongst existing guidelines and responsible authorities in RI. Given the need to protect patients and other vulnerable stakeholders, medical researchers have significant requirements and facilities in place when it comes to seeking formal approval for ethical review as well as handling questions regarding data management and data sharing. Sometimes the respective requirements are raised by multiple institutional actors, for example by universities as well as funding bodies. This can create the impression of a "bureaucratic jungle" for medical researchers that makes it difficult to determine who exactly should be approached for the respective question/concern. This points to a need for greater harmonization of RI-related administrative structures.

Less distinctive for medical research, but no less relevant, are the following: Calls by discussants for (more) mandatory RI training across career stages; calls for clearer guidelines when it comes to handling suspected cases of misconduct; as well as concerns about the tension between publication-focused evaluation criteria as well as the time and care that is perceived to be necessary to cultivate good RI standards.

3.5 Cross-case analysis of RI topics in RPOs – perceptions and perceived importance of topics across main areas of research

The preceding within-case analyses provide thorough insights into how the different main areas of research perceive the selected nine RI topics and prioritise them in terms of the importance of having and implementing SOPs and guidelines in RPOs to support a research integrity culture. The heat map and cross-case analysis below shed some light on emerging patterns and contextual variation across the four main areas of research in relation to the perceived need for RI policies and procedures in RPOs.

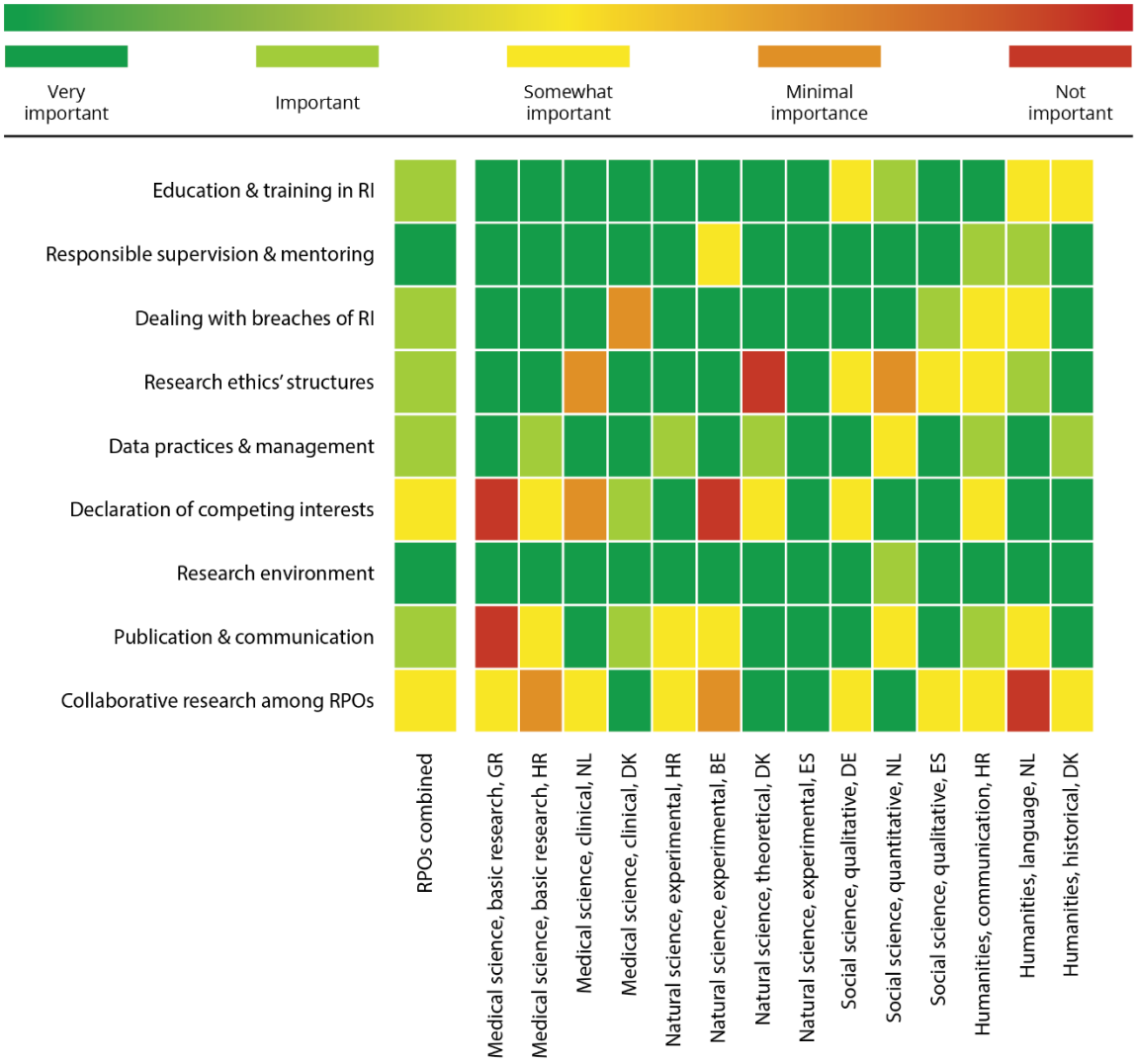


Figure 3.5: Heat map displaying sorting exercise results of nine RI topics across the 14 RPO focus groups.

As highlighted throughout the within-case analyses, each field of research has specific perceptions of the topics and needs for SOPs and guidelines. However, the heat map above displays that several topics are widely seen as important across research areas: 'Responsible supervision and mentoring'

and 'Research environment'. Specifically, the topic of 'Research environment' appears to be a constant across all groups as an area that needs attention in RPOs. A majority of focus groups highlighted the importance of the topic due to its severe impact on the other RI topics and as a foundational issue in tackling research integrity problems. The research culture/environment was a consistently appearing factor in many focus groups throughout the discussions. Issues such as competitiveness, performance pressure, power imbalances, and so forth, were highlighted in many variations.

The heat map also displays that most other topics are seen as important. However, two topics stand out as being considered less important. 'Declaration of competing interests' is largely seen as a formality that is not monitored properly, while 'Collaborative research among RPOs' seems to be less of a concern for most areas.

A cross-cutting finding across the main areas of research is that variation exist within and across the different areas of research and this influences the perception of and needs for RI practices and guidelines. Variation in research practices result in different challenges with regard to data practices, ethical considerations, authorship issues and so on. Standardised SOPs and guidelines lacking disciplinary proximity do not sufficiently support researchers. Consequently, tailoring their SOPs and guidelines to research disciplines is perceived as vital for the RPOs.

Another finding cutting across disciplines, is the aversion towards policies and procedures in RPOs which create unnecessary administrative burdens and bureaucracy. RPOs should avoid making procedures that turn into unworkable checklist exercises for researchers. Instead, procedures and policies should be pertinent to the concrete research, displaying a flexibility towards the specific needs and issues of the scientists and their research.

4. Findings from RFOs – Perception and prioritization of RI topics

This next part of the report focus attention on research funding organisations (RFOs). One of the challenges in the work conducted so far in SOPs4RI has been that there are very few SOPs and guidelines for RI aimed at RFOs. This part of the report therefore explores the need for research integrity policies and the potential use of SOPs and guidelines by RFOs. As in the previous part of this report, this RFO part examines the new policies, SOPs and guidelines in relation to all four main areas of research (humanities, social science, natural science, and medical science). The results are presented in four subparts, each covering one main area of research. Within each subpart, all 11 topics selected for Version 1.0 of the toolbox (D4.2, see link in references) are examined to assess the main area of research' understanding of the topic, the challenges related to it, and the importance ascribed to it. All topics are examined in relation to RFOs. The results therefore shed light on which policies and procedures the different main areas of research in particular would like to see funders focus on and, consequently, where RFOs could aim their RI efforts.

This part of the study is based on 16 focus groups consisting of a mix of researchers and stakeholders within the four main research areas (see section 2.2 for the characteristics of the RFO focus groups). The 16 focus groups were conducted across Europe; the Netherlands, Denmark and Greece each had three focus groups; Spain and Croatia each had two; and Germany, Belgium and Italy had one each. Each focus group consisted of a mix of researchers, representing different core disciplines within the main research area, together with relevant stakeholders. The stakeholders included representatives from research integrity committees, ethical review boards, public and private funders, industry, RI trainers, confidentiality counsellors, journal editors, university managers, RIOs, and research ethics officers (see section 4.1, 4.2, 4.3 and 4.4 for an overview of participants in the 16 focus groups).

In the RFO focus groups, the following 11 topics and related subtopics of research integrity (stemming from the first version of the toolbox, D4.2, see link in references) were discussed:

Topic	Subtopic
1. Dealing with breaches of RI	a. RI bodies in the organisation b. Procedures for breaches by funded researchers c. By review committee members d. By reviewers e. By staff members f. Protection of whistle-blowers and the accused g. Sanctions/other actions h. Communicating with the public
2. Declaration of competing interests	a. Among review committee members b. Among reviewers c. Among staff members
3. Funders' expectations of RPOs	a. Codes of conduct b. Assessment of researchers c. Education and training for RI d. Processes for investigating allegations of research misconduct
4. Selection and evaluation of proposals	a. RI plan b. Methodological requirements c. Plagiarism d. Diversity issues
5. Research ethics structures	a. Research ethics requirements b. Ethics reporting requirements
6. Collaboration within funded projects	a. Expectations on collaborative research b. Research that is co-financed by multiple funders
7. Monitoring of funded applications	a. Financial monitoring b. Monitoring of execution of research grant c. Monitoring of compliance with RI requirements
8. Updating and implementing the RI policy	No subtopics
9. 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
10. Publication and communication	a. Publication requirements b. Expectations on authorship c. Open science (open access, open data, transparency)
11. Intellectual property issues	No subtopics

All topics are explained in further detail in the introduction to each topic under the different main areas of research (see subsections in 4.1, 4.2, 4.3 and 4.4). Here, the particular aspects of the topic that was given attention in the topic discussion are also addressed. For example, if a specific sub-topic is granted much attention, it will be highlighted. As it is also explained in section 2.2.3, each focus group discussed two to three RI topics in-depth and addressed all the topics displayed in the list above in the sorting exercise. There are some minor differences between the discussed topics in the in-depth discussion part and the sorting exercise part. The wording of some topics differed slightly, and the topics 'Funders' expectations of RPOs', 'Collaboration within funded projects', 'Updating and implementing the RI policy' and 'Intellectual property issues' were only attended to in the sorting exercise. Finally, 'Education and training for RI', a subtopic under 'Funders' expectations of RPOs', was singled out as a topic for an in-depth discussion.

In the following, it is explored how the humanities, social sciences, natural sciences and medical sciences understand the RI topics listed above in relation to RFOs. Under each topic for the research area in question, the emerging perceptions, main perceived challenges, best practices, ideas and suggestions for guidelines and procedures for RFOs will be presented. A heat map displaying the sorting exercise results concludes the within-case analysis of the individual four main areas of research. Following the four within-case analyses, a cross-case analysis on emerging patterns across disciplines and the perceived need for policies and procedures in RFOs the promotion a strong research integrity culture will be presented.

4.1 Humanities

Overall, the focus group study aims to explore how the main disciplinary fields of research perceive and relate to a number of research integrity issues relevant to both RPOs and RFOs, to understand the potential disciplinary variations in experienced challenges and in needs for institutional guidelines and SOPs to enhance research integrity. In this section, we delve into the promotion of research integrity in research funding organisations from the disciplinary perspectives of the humanities. As a general field of research, the academic literature on research behaviour and research integrity within the humanities remains limited, particularly when compared to other disciplinary fields, such as the biomedical and social sciences (Haven et al. 2019; John et al. 2012; Steneck 2006).

In the following, we explore some of these knowledge lacunas by asking how different researchers and stakeholders within and around the humanities, such as researchers, REC and RIO members, editors and funding organisation representatives, understand and prioritise RI topics such as dealing with RI breaches, selecting and evaluating research proposals and handling conflicts of interest. The objective is to increase our understanding of how RFOs may foster and advance RI practices and policies in alignment with the particular needs and interests of the humanities.

Four focus groups within the humanities discussed and prioritised the 11 different main RI topics, whereas a selected number of topics were discussed in depth by the different focus groups (as shown in display 4.1 below). Representing a number of disciplines within the humanities, 18 different stakeholders across four European countries discussed the current landscape of RI from their point of view and reported on potential roadblocks and negotiable ways to promote research integrity. The results of these discussions are sections addressed in the following sections by topic and summarised in separate displays. We also provide a heat map at the end of this chapter (section 4.1.12) that visualise the assessed importance of each RI topic for the humanities.

Display 4.1. Overview of participants in the humanities focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Stakeholders represented**	Country	Face-to-face/online interview	Number of participants
2	Law and legal history	Research ethics structures	Researcher	ES	Face-to-face	4

	Linguistics Medieval studies	Selection and evaluation of proposals	Member of research ethics committee Member of research integrity committee PhD programme coordinator Public funding body representative			
12	Media and Culture Archaeology Religion Philosophy Legal Philosophy	Education and training in RI Dealing with breaches of RI	Researcher Confidential Counsellor RI Committee member	NL	Face-to-face	5
13	Computer science (science communication) Migration and Integration Digital humanities	Publication and communication Monitoring of funded applications	Editorial Director Researcher Gender and equality commissioner	DE	Face-to-face	5

	Sociology (gender, open science)					
27	Philosophy Philosophy (architecture) Philology	Independence from commercial influences Conflict of interest	Researcher Member of research ethics committee	GR	Face-to-face	4

* Participants may represent more than one discipline
** Participants may represent more than one type of stakeholder

4.1.1 Dealing with breaches of RI

'Dealing with breaches of RI' as a topic for RFOs concerns structures and procedures necessary to deal with RI breaches, especially which initiatives RFOs should have an eye on regarding RI breaches, such as which procedures to adhere to in case of acts of misconduct by funded researchers. The topic was discussed across all four of the humanities focus groups, and especially focus groups 12 and 2 had some lengthier discussions on the topic, which also related to the procedures in RPOs. Hence, parts of these discussions are also used in the corresponding topic for the humanities for the RPOs (see section 3.1.3).

4.1.1.1 Key features of the topic 'Dealing with breaches of RI'

Display 4.1.1: The mixed humanities groups' views on Dealing with breaches of RI

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI				
RI bodies in the organisation		Cross-organisational forums		
Procedures for breaches by funded researchers				Structures, bodies and persons who can deal with this at

				RPOs, e.g. trust persons
By review committee members				
By reviewers				
By staff members				
Protection of whistle-blowers and the accused			System is being misused for power and competition purposes Conceptions of misconduct (self-plagiarism is not necessarily misconduct in the humanities)	Make a simple, fair and fast procedure at RPOs
Sanctions/other actions			Mobility – people who have been involved in misconduct move to another university and/or country	Establish European register of researchers who have been involved in misconduct
Communicating with the public				

4.1.1.2 Key observations: 'Dealing with breaches of RI'

In the Spanish group (focus group 2), the challenges of researcher mobility in relation to researchers who have been involved in misconduct was discussed. In a concrete case of plagiarism, a PhD student moved to another RPO in another country after having been involved in plagiarism in a Spanish RPO, "[…] *in the case that I experienced, the person dropped out of our programme. And then I discovered years later that she got a PhD in the UK where no one was controlling what she was doing*." (Professor of linguistics, focus group 2, p. 22). A European register for researchers who have been involved in severe misconduct was discussed as a possible solution to this problem. Such a register could be used by both RPOs and RFOs to check possible candidates.

The interviewees in the Spanish group further pointed out that it would be a good idea to have a mandatory course on RI as a part of the PhD programme. The interviewees also discussed possible disciplinary differences in conceptions of misconduct. The idea of self-plagiarism as misconduct was discussed as a special challenge for the humanities. An interviewee said,

> *"I publish quite a lot in German and I feel free to publish this again […] in another language. And it's never the same, because I mean I'm not doing a technical translation […] It is true that this is basically the same line of thought, and in the humanities we still have some respect for diversity of languages, and I use different languages and so I think self-plagiarism in the humanities needs also to be assessed in a different way. It's not just that we publish the same numerical results again and again, but we tell a certain story in different languages."* (Research professor in medieval studies, focus group 2, p. 23).

The discussion in the Dutch group (focus group 12) quickly evolved into a discussion of the system at place in the Dutch RPOs. Here, it was pointed out that there is a risk of misuse of the system – that a researcher (for reasons related to power struggles or competition) falsely accuses colleagues of misconduct. In this way, the system can be used to damage a competitor's reputation. It was therefore pointed out that it is very important to protect the accused person and secure a fair handling of the case.

Based on good experiences with RI advisors meeting up regularly to discuss difficult cases, it was suggested that a similar national system could be set up, where misconduct cases could be discussed anonymously. It was also pointed out that the time interval from accusation to decision was crucial in these cases. Finally, it was suggested that the so-called confidential counsellor could be used actively in cases of suspicion of breaches of RI. Of these ideas, it seems to be the idea of creating cross-organisational forums for dealing and/or discussing possible misconduct cases that is most relevant for RFOs.

4.1.2 Declaration of competing interests

The topic, 'Declaration of competing interests', addresses the kind of procedures RFOs could implement to reduce issues of competing interests e.g. 'Among review committee members'. In the in-depth discussion, the topic was framed as 'Conflict of interests'. For the humanities, the topic

was discussed in-depth in the Greek focus group, while in the other groups it was loosely discussed in terms of importance in the sorting exercise.

4.1.2.1 Key features of the topic 'Declaration of competing interests'

Display 4.1.2: The mixed humanities groups' views on 'Declaration of competing interests'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines
Declaration of competing interests				
Among review committee members/among reviewers	*"There are very suspicious conflicts of interest there within the academia. And that thing multiplies on the level of committees' members, the European grants committees, and even, I don't refer even to Greek committees which are another huge problem […]. It's a conflict of interest within the academia, and that's the most dangerous thing, in my view"* (Professor of philosophy, group 27, p. 10)		Conflicts of interest within academia Small (national) pools of relevant reviewers Different 'schools of thought'	Committee members, particularly at the European level, should change with every call Greater efforts to engage international reviewers Possibility for the applicant to indicate whether a reviewer would be seen as disqualified
Among staff members			Lack of 'funding ethics'	Short courses on funding ethics to potential funding stakeholders

4.1.2.2 Key observations: 'Declaration of competing interests'

Within the humanities, conflicts of interest was mainly problematised in terms of assembling and appointing review committee members and external reviewers. While this focus appeared across the humanities group, it is evident that national funding structures influence the perception of this topic. The humanities group in Greece pointed to small research communities, conflicts of interest within academia, and a *"country of networking"* (focus group 27, pp. 12-13) as barriers to avoiding conflicts of interest when assessing research proposals. It was suggested to implement procedures for higher reviewer turnover, at least at the European funding level, as well as largely appointing international reviewers when assessing national research proposals (see display 4.1.2 above). Due to a *"lack of funding culture in Greece"*, it was also suggested that academia could offer short courses on 'funding ethics' to potential funding stakeholders to enhance and improve RI practices and to interlink industry with potential funders (Professor of philosophy, focus group 27, p. 13). The idea to bring in international reviewers was also proposed by the Spanish group but, in turn, it was also problematised that a strict implementation of an inhability criteria may block for qualified reviewers (focus group 2, p. 28). As a topic, 'Conflicts of interest' was both seen as a mere standard tick off issue and rather self-explanatory, while at the same time being vague in designation and open to interpretation.

In addition to conflicts of interest in review processes, the humanities groups pointed out two other issues 1) That funders may and have been seen to have too much influence on particular research ideas (focus group 12); and 2) that conflicts of interest may arise in collaboration with different types of funding stakeholders (focus group 27). Although less pertinent in the humanities focus group interviews, one interview participant explicitly pointed to an experienced case of conflicts of interest when collaborating with a private company and a public society. While the stakeholders did not interfere with the research content, both had their own interests and wants in terms of the project's public dissemination. Hence, the researcher interviewee called for "*specific policies on public dissemination*" of research projects in order to clarify requirements and uphold "academic quality" (Assistant Professor in philosophy of architecture, focus group 27, p. 11). This topic is greatly related to that of 'Independence' in preventing interference from commercial influences (see section 4.1.9 below). It shows that conflicts of interest may pertain to various parts of the research process and – while perhaps less prevalent than in other main areas of research – industry/academy collaborations also take place within the humanities and require tailored SOPs and guidelines addressing this matter.

4.1.3 Funders' expectations of RPOs

'Funders' expectations of RPOs' covers a number of policies and procedures on research integrity that RFOs may anticipate being in place in RPOs. These may include the implementation of 'Codes of conduct', guidelines for 'Assessing researchers' and 'Processes for handling misconduct allegations'. For the humanities, the topic was discussed in-depth in the Spanish group, while it was merely assessed in terms of importance in the other three focus groups.

4.1.3.1 Key features of the topic 'Funders' expectations of RPOs"'

Display 4.1.3: The mixed humanities groups' views on 'Funders' expectations of RPOs'

Topic/sub-topics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPS
Funders' expectations of RPOs	*"I think that many of our staff members they do not know the role that [the] funding organisation has in research and innovation. We just take the presumption that it is institutions or researchers themselves who have the primary responsibility for ethics and research integrity"* (Public funding org., focus group 2, p. 8)		The need to prioritise requests to RPOs	Funders requiring RPOs to document that RI/RE policies are in place and implemented within the institution
Codes of conduct				
Assessment of researchers				
Education and training for RI				
Processes for investigating allegations of research misconduct				

4.1.3.2 Key observations: 'Funders' expectations of RPOs'

The in-depth discussion on 'Funders' expectations of RPOs' suggested that research institutions should be able to document the existence and implementation of RI policies in order to receive funding.

> *"… The first year, everybody would get very nervous and they would try to copy what the UK department or whatever are doing, but afterwards this would get into the staff, people would start working. So I think this would be a good idea, but I do believe, because I am a lawyer, I have to believe that these guidelines or these regulations, you know, they should be published somewhere, they should be communicated properly"* (Professor in public law, focus group 2, p. 6).

While the group agreed to this recommendation, they also pointed to a number of challenges that may impede its implementation. One is internal, as communicated in the quotation above. Policies may exist on paper and be available at an administrative level, but are not always put into practice and communicated downwards in the institution. The representative from the public funding body agreed to the suggestion but problematised the recommendation of increased documentation, as the funding organisation has experienced RPOs' and researchers' resistance towards added requirements. Hence, funders already need to prioritise in their requests to funding applicants and this may pose a challenge to increase the expectations on RPOs RI documentation. The fear of adding more bureaucracy to institutions and individual researchers remained a cross-cutting theme, and acted as the reason the German humanities group assessed this topic of funders expectations as 'somewhat important',

> "*… Maybe we need to readdress were the bureaucracy is focused, when it comes to these things. So this is why I am struggling. So I think I am just going to put them both [topic of 'funders expectations' and 'selection and evaluation of proposals'] in the middle. In the non-committal way*" (Associate researcher in digital humanities, focus group 13, p. 18).

The four focus groups were equally divided between viewing the topic as very important and somewhat important. The Spanish focus group (focus group 2) found the topic to be very important but pointed to a number of additional challenges: 1) The representative from the public funding body emphasising that their primary staff expertise is within administrative law and not within research and innovation policies. 2) This first point interlinks with the indistinct division of responsibilities

between RFOs and RPOs, which complicates the introduction of new RI requests and an assessment of their relevance and feasibility. Consequently, clearer role responsibilities and expectations between RFOs and RPOs are recommended as a means to cultivate research integrity. Contrary to this suggestion, mandatory RI training for funding applicants was not seen as a viable road to enhance integrity as it could signal a general lack of trust and merely add to the administrative requirements.

4.1.4 Selection and evaluation of proposals

The topic 'Selection and evaluation of proposals' includes the criteria for research integrity issues that could or should be integrated and assessed when RFOs select and evaluate research proposals. Such criteria could include attention to diversity issues and an 'RI plan' specifying a data management plan and training in RI issues, amongst other topics. The topic was discussed by all four focus groups, either as part of the first open question or as part of the in-depth question, as well as in connection with the sorting exercise.

4.1.4.1 Key features of the topic 'Selection and evaluation of proposals'

Display 4.1.4: The mixed humanities groups' views on 'Selection and evaluation of proposals'

Topic/sub-topics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Selection and evaluation of proposals	Discussed both in terms of specific RI elements and their relevance for the humanities and discussed as part of a broader problematisation of general funding structures	Written CVs – focus on quality rather than quantity	Requirements to add application elements not relevant to one's field of research may result in practices that do not promote RI	Expertise from the humanities could be increased in selection committees Transparency in selection and evaluation procedures, processes, agendas, and interests should be a strong focal point A more careful selection and distinction of im-

				portant vs. less important application elements Broader conception of measurability and impact to fit the humanities better General flexibility in RI protocol requirements
RI plan			Lack of resources and trained staff within RFOs Lack of administrative staff within RPOs	The EU Commission could act as a front-runner. Change in RI practice and culture would possibly influence national and institutional procedures.
Methodological requirement				
Plagiarism				
Diversity issues				

4.1.4.2 Key observations: 'Selection and evaluation of proposals'

The topic was discussed on a specific level in terms of particular RI elements that are and could be included in funding applications. One participant from the Dutch stakeholder group was very critical of the general humanities funding system in the Netherlands, but also pointed to positive changes in terms of the selection process, where there "*are changes in play, so the shift to the CV now being an written one, right so the sort of emphasis on quality over quantity*" (Professor in media and culture, focus group 12, p. 5).

As indicated above, the discussion regarding 'Selection and evaluation of proposals' also tapped into a broader meta-level discussion of funding structures that relate to the availability of funding for research within the humanities, and to the structural conditions of being able to comply with high standards of research integrity. The former issue of funding availability was also an issue that

was brought forward by the German stakeholder group, where a participant within the digital humanities voiced frustration with the EU Commission's low success rates and comprehensive application process, along with a lack of internal RPO infrastructures to assist with building up applications. As examples of the second issue of structural conditions, the same focus group pointed to a) too short deadlines to respond to funding calls as a barrier to write thorough research plans; b) a lack of a "longevity plan" that specifies the sustainability and access to data beyond the time span of a research project (Junior research group leader in science communication, group 13, p. 4). Both examples were seen as challenges towards implementing high RI standards, and as issues where RFOs could play a significant part.

Both the Spanish and German focus groups suggested that RFOs could make a clearer distinction between important and less important issues in order to reduce the requirements for applications. This could also potentially enable new RI elements to be included.

> "*One aspect is for the applications themselves, I think it doesn't apply so much to the ERC, but on the regional and national level I would say and in the humanities, sometimes we are asked to provide information which nobody really knows what this information is […]. So you find yourself with applications where you know you have to fill in something, because they want to have the quartiles and the rankings and the so and so and so and so*" (Research professor in medieval studies, focus group 2, p. 4).

The same professor pointed to the potential research integrity consequences of having to fulfil standard requirements not relevant to one's research field. "*That makes you feel bad, but also, once you get into these dynamics, I think then a kind of wall is broken, and it gives way to more and more tales you start inventing about the research, and one should not*" (Research professor in medieval studies, focus group 2, p. 5.).

The issue of adjusting funding criteria to distinct research areas relates to the issue of how research quality is measured within the humanities. In both the Spanish and Greek focus groups, interviewees said that research impact and research output should be understood and dealt with in a much broader fashion by RFOs than what is currently the case. Hence, a professor of philosophy in the Greek group suggested that RFOs implement a "broader conception of measurability" and address the "practical impacts" of humanistic research projects rather than focus on "commercial influence" (Professor of philosophy, focus group 27, p. 3). A general call for flexible RI requirements in relation to research protocols, in order not to hinder the accomplishment of important research,

was also put forward as a request in the Spanish research group (focus group 2, pp. 17-18).

A lack of administrative resources within both RPOs and RFOs poses a significant challenge to the implementation of RI plans within funding proposals, according to the Spanish focus group. The representative from the public funding organisation suggested that the EU Commission act as a forerunner in implementing RI plans, as changes in practice and culture in European projects tend to have a trickle-down effect and influence national and institutional practices.

Both the Spanish and Greek focus groups rated the topic as very important. The German group placed it under somewhat important due to the existing level of bureaucracy associated with the selection and evaluation processes and the fact that transparency may be secured by other means. The Dutch group rated the topic to be of none or minimal importance, as the RI plan was seen primarily to be an RPO matter. This group was the only humanities group to briefly discuss the issue of diversity and they did not reach an agreement in terms of its importance in funding applications.

4.1.5 Research ethics structures

In the discussion on 'Research ethics structures', the various stakeholders discussed existing institutional and national ethics review systems, as well as the ethics requirements that RFOs could set up with regard to applying for and receiving funding. This concerns, for instance, requirements regarding the reporting of ethical issues in applications and reports. The topic was discussed in-depth in the Spanish group and in connection with the sorting exercise for the remaining focus groups.

4.1.5.1 Key features of the topic 'Research ethics structures'

Display 4.1.5: The mixed humanities groups' views on 'Research ethics structures'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research ethics structures	Standard RFO ethics guidelines and rules are not necessarily tailor-made to the humanities		Compliance with GDPR pose a challenge for	Awareness and consideration of the difference between vulnerable populations and non-vulnerable populations

	Different research ethics structures across countries as well as different requirements for mandatory ethical reviews when working with human subjects		some types of research Lack of transparency in RPO options for ethical reviews	
Research ethics requirements				
Ethics reporting requirements		Awareness of ethical issues in mid-term reviews	Lack of resources for ethical monitoring in RFOs	Clear and transparent systems of ethical institutional review boards (IRBs) could reduce the need for RFO monitoring and/or release resources for own RFO ethical procedures

4.1.5.2 Key observations: 'Research ethics structures'

In regard to 'Research ethics structures', it was observed that cross-country differences exist in terms of ethics reviews on both an institutional and national level. Several focus groups made a comparison to the much stricter ethical institutional review board (IRB) structure in the United States and noticed in general that different mandatory requirements exist when working with human subjects across different fields of research. Based on own research experiences, a professor in linguistics recommend the following to be taken into consideration by RFOs, "*I think one of the important distinctions that one, a funding organisation needs to take into account is the difference between working with vulnerable populations and non-vulnerable populations*" (Professor in linguistics, focus group 2, p. 4).

A representative from a public funding organisation stated that their funding organisation has focused much on "general ethics" in terms of animal and (bio)medical research and has not focused on particular ethical issues within the humanities; "… *normally our, you know, guidelines and rules are standard for everybody*" (Professor in public law, focus group 2, p. 11). In terms of monitoring,

the funding body also primarily assess projects from a financial perspective. Nonetheless, the funding body does take into account ethical issues in mid-term and final reports in two of their calls. The European Commission enables this monitoring and the representative evaluated the mechanism to be an effective way to introduce this type of monitoring into the funding institution. However, lack of resources would pose a significant challenge if this monitoring were to be a standard practice within all calls (Public funding body representative, focus group 2).

Two researchers from two different focus groups pointed to the challenge of complying with the recent introduction of GDPR when, for instance, sharing data such as video interviews or processing bibliometric data. The last example was brought forward as an example of too general and top-down directives that may actually hinder the conduction of some types of research. The researcher participant advocated for the benefits of the United States' IRE system (institutional review entity), where decision-making remains close to the actual research being performed,

> *"…In the US, the tendency in the last couple of years was to say: there is also certain types of studies where the impact on the subjects is really minimal. And so they reduced the load for going through that IRE process. And I think that's also good. There is certain type of research where there is less risk involved and the procedures need to be less strict, but then there is other research where it should be more strict. You know like, so, but these kind of decisions that are close to the research is something that these boards can take and I think it, it seems to be a more appropriate system" (*Junior research group leader in science communication, focus group 13, p. 15).

According to this focus group participant, the request for a more transparent and tailor-made review system could reduce the need for RFO monitoring and release resources for their own ethical procedures. Three of the four focus groups considered the topic of ethics structures to be very important. The last group considered it to be somewhat important, as they – as to some extent also reflected in the observations above – considered strong research ethics structures to be the primary responsibility of RPOs.

4.1.6 Collaboration within funded projects

'Collaboration within funded projects' refers to the potential task of RFO's of clarifying their expectations and guidelines for collaboration amongst multiple organisational partners, and setting expectations and RI requirements in case of co-financing by several funders. In the focus groups, the topic was discussed as part of the sorting exercise.

4.1.6.1 Key observations: 'Collaboration within funded projects'

As a topic, it was only granted little attention by the humanities groups. Three groups assessed the topic to be "somewhat important" and the fourth humanities group placed it in the category of "none or minimal importance". The assessment suggests that establishing guidelines and SOPs for internal project collaboration is not as immediate a concern compared to other topics discussed during the focus group sessions. As a topic of discussion, it was briefly discussed as a collaboration amongst different disciplines, and the participant raising the issue called for funding organisations to look more positively at interdisciplinary collaborations (Professor in linguistic, focus group 2, p. 31). For another group, the topic resulted in a brief discussion of exchanging guidelines on authorship (for a detailed discussion of this topic, see section on publication and communication, 4.1.10).

4.1.7 Monitoring of funded applications

'Monitoring of funded applications' covers policies and processes that funding organisations may have in place to monitor the research they fund, e.g. the funded projects' consistency with research integrity principles. Other monitoring aspects, such as financial or research grant execution monitoring, are also covered. The German group discussed this topic in-depth, but the topic was granted quite some attention across all the humanities groups throughout the focus group interviews.

4.1.7.1 Key features of the topic 'Monitoring of funded applications'

Display 4.1.7: The mixed humanities groups' views on 'Monitoring of funded applications'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas guidelines and SOPs
Monitoring of funded applications	Important to monitor funded projects, but weight is on financial monitoring		Much of monitoring is meaningless or too rigid Avoid waste of resources	Avoid monitoring for monitoring's own sake Divide work between RFOs and RPOs – who monitors what? Avoid meaningless checkboxes
Financial monitoring				
Monitoring of execution of research grant		Oral presentation and on-site visits		
Monitoring of compliance with RI requirements			Lacking knowledge and guidelines on how to do this Costly, in terms of human resources and money	Should be checked by people who have the expertise to do this, e.g. by IRBs – who could then send their decision to the funders

4.1.7.2 Key observations: 'Monitoring of funded applications'

This topic led to lively discussions in all the groups. Both researchers and stakeholders had strong opinions on this issue. 'Monitoring of grants', the financial side, as well as compliance with RI requirements, was seen as an important task. As one participant put it, *"Personally, if I was the funder, I would have put the monitoring as very important because I think that's the key of being a funder. You want to know what happens with your money"* (Professor of legal philosophy, RI committee member, focus group 12, p. 21).

However, it was also pointed out that monitoring of grants should be carried out in a meaningful, flexible and respectful way. As an example of a less meaningful type of monitoring of financial costs, EU grants were brought up,

> *"[…] On the European level, for instance, you have to do these famous time sheets. For every day you have to say what you have been doing, the whole group we did that. And then when it came to the auditing, the European administration said 'well that's very nice, but you cannot have more than eight hours per day, so redo that', you know, for two years. And we redid that and from that point onwards, we just say we put every day the same thing for the entire lifetime of the project. What is the impression that I as a PI but also the project members get from this? That it is not only allowed to lie, but that you have to lie because the regulations are such that you find yourself in a conflict of different evaluations, and your workday has to be eight hours. It doesn't matter what you did or how you did it, it has to be eight hours."* (Research professor in medieval studies, focus group 2, pp. 9-10).

This interviewee felt morally compromised by this form of monitoring. He wanted to do the right thing and to fill out the forms in the right way, but the rigidity of the form prohibited it. He felt he was forced to lie about what had actually been done in the project.

There were different opinions on who should carry out the monitoring of funded research projects. In the Spanish group (focus group 2), it was clearly seen as a task for the funders. However, they felt that they were lacking knowledge and guidelines on how best to do this. They also lacked the human and financial resources to monitor more than the financial side of funded projects. In the German group (focus group 13), it was suggested that something like the Institutional Review Boards (IRBs) at American RPOs were the right bodies to monitor compliance with RI requirements. Here, the necessary disciplinary and research expertise is present, so that a too bureaucratic or instrumental monitoring (e.g. generic checkboxes) can be avoided.

In other groups, different good monitoring practices such as on-site visits and oral presentations to avoid wasting resources (e.g. on reports nobody reads) were also mentioned (focus group 2).

4.1.8 Updating and implementing the RI policy

This topic refers to a regular evaluation and revising of existing RI policies within RFOs. It also covers the translation and implementation of policies into practice. Across the groups, the topic was discussed as part of the sorting exercise, and the observations below are based on comments made during these discussions in the focus groups.

4.1.8.1 Key observations: 'Updating and implementing the RI policy'

Consensus existed amongst the humanities groups that it is of foremost importance that RFO's have RI policies in place, and that is it necessary to keep them updated on a frequent basis. Yet, compared to other topics, participants agreed that updating and implementing RI policies does not *"need to be flagged out"* (Junior research group leader in science communication, focus group 13, p. 19) as a particular pertinent topic of interest.

4.1.9 Independence

'Independence' as a topic covers policies and action that research funding organisations can take towards hindering unjustifiable interference from funders, as well as political and commercial influences, so that researchers can maintain their independence. The Greek focus group covered the topic in an in-depth discussion, with heavy emphasis on commercial influences. However, in general the topic was addressed in discussions across the humanities focus groups.

4.1.9.1 Key features of the topic: 'Independence'

Display 4.1.9: The mixed humanities groups' views on 'Independence'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Independence				
What counts as an unjustifiable interference?	Violation of academic freedom	Create transparency in terms and	Too high output expectations from funders can harm RI	Specifying and ensuring academic freedom

	Academic freedom includes the right to 'slow science' and to publish negative results Funders influence science through the choice of topics	conditions of the concrete funding	Careful with generic output and impact demands across disciplines: Main output of humanities are not commercial products, but enlightenment. The humanities are driven by the wish for 'understanding', not 'explanation' General lack of humanities funding in some countries	through guidelines
Preventing unjustifiable interference by the funder	Who should protect RI in funded projects? RFOs or RPOs?		Protection of PhD students with multiple funders	
Preventing unjustifiable interference by political or other external influences			Fear of funding punishment for politically active researchers	
Preventing unjustifiable interference by commercial influences			Delicate balance between researchers' interest in academic freedom contra funders' interest in measurable, commercial results	

4.1.9.2 Key observations: 'Independence'

Display 4.1.9 above summarises the results of the focus group interviews regarding 'Independence'. Across the focus groups, violation of academic freedom was seen as the main problem for independence. A participant expressed it in this way,

> *"Suppose that the industry had a huge interest in Philosophy and wanted to come to me and say 'Professor T., now we will give you as much money as you want, tell us what you want to do and what are your terms and conditions?'. This is the question, what are the terms and conditions. The first and, perhaps, the ground of my terms and conditions would*

be academic freedom. Or freedom of research. And I wouldn't compromise it for a moment. Freedom of research." (Professor of philosophy, focus group 27, p. 5*).*

With academic freedom, the interviewees were thinking of the freedom to find the best way to design, conduct, and report on research projects, but also of the right to use the necessary time for the study and for publishing negative results, "*[…] among my terms and conditions would be the obligation to publicise my negative results. There are many, many private…, especially in clinical trials, that don't want to publicise any negative results"* (Professor of philosophy, focus group 27, p. 6). It was also emphasised that transparency about the funding is very important: everybody should be able to see who has funded the research.

The different focus groups agreed on the importance of protecting researchers' independence/academic freedom, e.g. in the form of guidelines, *"[…] to develop some guidelines or toolboxes or whatever to ensure this independence of researcher that would be very important"* (Publishing editor, focus group 13, p. 19). Here, it was suggested that the EU take the lead with its own research funding. It was also pointed out that it would be a good idea to create transparency around the terms and conditions of the funding. Not just to protect the researcher, but also to protect the integrity of the funding organisations, *"Well, independence is a must, it's a must from the perspective of the universities and from science but I think it also must be a must for funding organisations"* (Professor of Arabic and Islamic studies, focus group 12, p. 20).

Funders' requirements for measurable results was discussed as a special problem for the humanities. The interviewees, especially in the Greek group (focus group 27), were not comfortable with understandings of impact coming from other fields of science (e.g. bibliometric measurements or commercial measurements). They emphasised the public's massive interest in the humanities and suggested a shift in focus for measuring impact of humanities research, away from bibliometric and commercial measurements and towards what could be termed 'outreach'. Focus should be on public outreach activities such as public lectures, MOOCs etc. In relation to this subject, it was underlined that there are two research cultures at a university; one that is interested in 'explaining' and another that is interested in 'understanding'. The humanities belong to the latter group and expectations of output should consider this difference. Related to this discussion, a worry was also expressed about the potential harm which too high output expectations from funders can have on RI. Furthermore, funders must be aware that they greatly influence research activities through their choices of funding topics.

Of other challenges related to 'Independence', a general lack of funding for the humanities was brought up in the Greek group (focus group 27). Consequently, the humanities must open up to other funding sources, e.g. funding from industry. Here, it is especially important to be aware of possible problems with independence according to the interviewees. Another challenge is the need to protect PhD students who have more than one funder for their projects. The different funders can have different expectations, *"Sometimes there's more than one standard and PhD students can be crushed by this system because all the funders have a claim on the PhD candidates […]"* (Professor of Arabic and Islamic studies, focus group 2, p. 3). Finally, a worry about unjustifiable interference from the political system in the science system was expressed in the Spanish group (focus group 2, p. 30). Here, the feeling was that a political active researcher could end up being punished with less funding if his or her political activities were not supportive of the local and/or national government.

4.1.10 Publication and communication

'Publication and communication' concerns funding organisations' specifications of expectations regarding publication and dissemination of the research in their funded projects. This could for instance be guidelines and initiatives on promotion of 'Open science'. The topic was discussed in-depth in the German group, whereas the remaining groups briefly discussed it during their sorting exercise.

4.1.10.1 Key features of the topic of 'Publication and communication'

Display 4.1.10: The mixed humanities groups'' views on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication				
Publication requirements	Too high output expectations may threaten RI			Have realistic expectations of output Making your data openly available should be recognised as an important output

Expectations on authorship				
Open science (open access, open data, transparency)	Avoid research waste – share data Disciplinary differences within humanities Open science has been practiced for centuries through public libraries, but electronic world has changed the conditions for open science	Respecting different types of data	Burden on researchers in figuring out how to perform open science Costs of publishing open access Difficulties in anonymising interview material	Longevity plans/sustainability plans of research projects Funders could provide information on similar funded projects to other beneficiaries Develop intelligent search systems Disciplinary tailored guidelines within the humanities

4.1.10.2 Key observations: 'Publication and communication'

'Publication and communication' and especially the subtopics 'Publication requirements' and 'Open science' were discussed in the groups. Most fruitful was the discussion on 'Open science'. The interviewees mainly discussed open science as open data/sharing one's data, and saw this as a very important area to focus on. To share one's data was understood as a way to avoid wasting resources. According to the interviewees, RFOs have a crucial role to play in ensuring that data are stored in a good way and made openly available for other researchers. It is also important that other researchers are made aware of already existing data and that new projects builds on such data, instead of collecting them once again. One challenge here is the enormous amount of existing data. Accordingly, developing intelligent search tools that can help researchers identify already existing data, was seen as an important thing to focus on.

The discussion on open data also revealed significant disciplinary differences that are important to bear in mind when formulating guidelines and SOPs within this area. For example, to make qualitative material, especially interview material, openly available can be challenging due to anonymisation issues,

> "*The interview transcripts that we have are impossible to anonymise. That might be in other social science contexts different, where you say: 'Okay, we can anonymise that and then we can share that'. But in these cases, the information is so specific. By the time you've removed everything that would identify this person […] you can't use that material anymore.*" (Junior research group leader in science communication, focus group 13, p. 10).

There are also differences in open data perceptions and practices between different disciplines within the humanities. As one participant explained,

> "*I've never met people who sit on their research as much as historians sit on their research and we're often talking about material that is very, very old. It's not like contemporary research that they are doing at the moment. However, I think in the digital humanities the notion of openness is absolutely essential and integral because we couldn't do the work that we do if our stuff wasn't connected. It's really that simple, like you can't, a digital humanities project that doesn't have a basis in open science, either in the data or the content, is like a closed book that sits on the shelf and it doesn't really go anywhere.*" (Associate researcher in digital humanities, focus group 13, p. 8).

Furthermore, it was pointed out that open science is not a new thing: it has been practiced for centuries via libraries. However, the digitalisation of the humanities changes the conditions, demands, and expectations of open science. For example, there are new costs to take into consideration when it comes to publishing in open-access journals. According to the interviewees, funders have to balance their expectations of open science with the costs related to not just publishing in open-access journals, but also the costs related to archiving data,

> "*Yeah, maybe also in the context of data sharing, open science, and these kind of expectations that now are being added on everything, that's another component. So, it's not just the effort in terms of money for a student assistant to data clean or something which gets archived. It's the researchers, who have to figure out how to best archive data, or share data, or how to anonymise, or whatever. And that's additional time, that's not just more money, it's also adding a year or something. I feel we are facing more and more expectations without the time for actually, for realising that, being available.*" (Junior research group leader in science communication, focus group 13, p. 6).

One last point brought up in the discussion on open science was the lack of credit given to researchers for publishing their data after the project end,

> *"[…] the problem is that those kind of places are not recognised necessarily as outputs by the people who you need to convince of your outputs. So you can have a beautiful Github repository with all sorts of complex stuff in it, or you know have your stuff sitting in Zenodo, but it doesn't count as a top tier publication and "why bother?" tends to be the attitude of a lot of people."*(Associate researcher in digital humanities, focus group 13, p. 9).

The interviewees pointed out that it would be good if funders would ensure 'longevity plans' for funded projects. This is important to avoid waste of resources (i.e. that data just disappears when the research projects end). Openness standards should also be adjusted to the different disciplines within the humanities – there is no 'one size fits all', *"[…] if the openness is going to work, we also need to look at the standards of openness that exists in those disciplines and decide when it's going to be appropriate for us and when it isn't."* (Associate researcher in digital humanities, focus group 13, p. 10).

Regarding publication requirements, funders have to think about possible negative consequences of too high publication expectations, *"The first is 'publication requirements', which I think are quite important because they, well they pressure or press you in a certain direction where you can find yourself in a conflict that also compromises ethics."* (Research professor in medieval studies, focus group 2, p. 31).

Finally, the interviewees in the German group pointed out that authorship guidelines from other topics might work in the humanities, but that it is important to respect disciplinary differences within the humanities when implementing such guidelines.

4.1.11 Intellectual property issues

'Intellectual property issues' refers to policies that research funding organisations may have in place, i.e. regarding ownership of intellectual property rights in funded research. The topic was discussed as part of the sorting exercise in the four groups. The observations below are based on comments made during these discussions in the groups.

4.1.11.1 Key observations: 'Intellectual property issues'

From the comments to the sorting exercise (and the results, see section 4.1.12), it is clear that the mixed humanities focus groups attached less importance to this topic than to many of the other topics. For example, this was expressed as, *"I think that it's very important in terms of reviewing academic research integrity but I think in terms of comparing it to those other things for example, I wouldn't say it's that important"* (Postdoc in Archaeology, focus group 12, p. 20).

In one group (focus group 2, p. 26), some humanities scholars said that they do not have any IPR related conflicts in their research. The scholars seemed to have difficulties relating to the question of IPR issues, because they do not deal with patents and the like. Here, the discussion of Intellectual property rights led to a discussion of authorship issues and plagiarism.

4.1.12 Heat map of perceived importance – humanities and RFOs

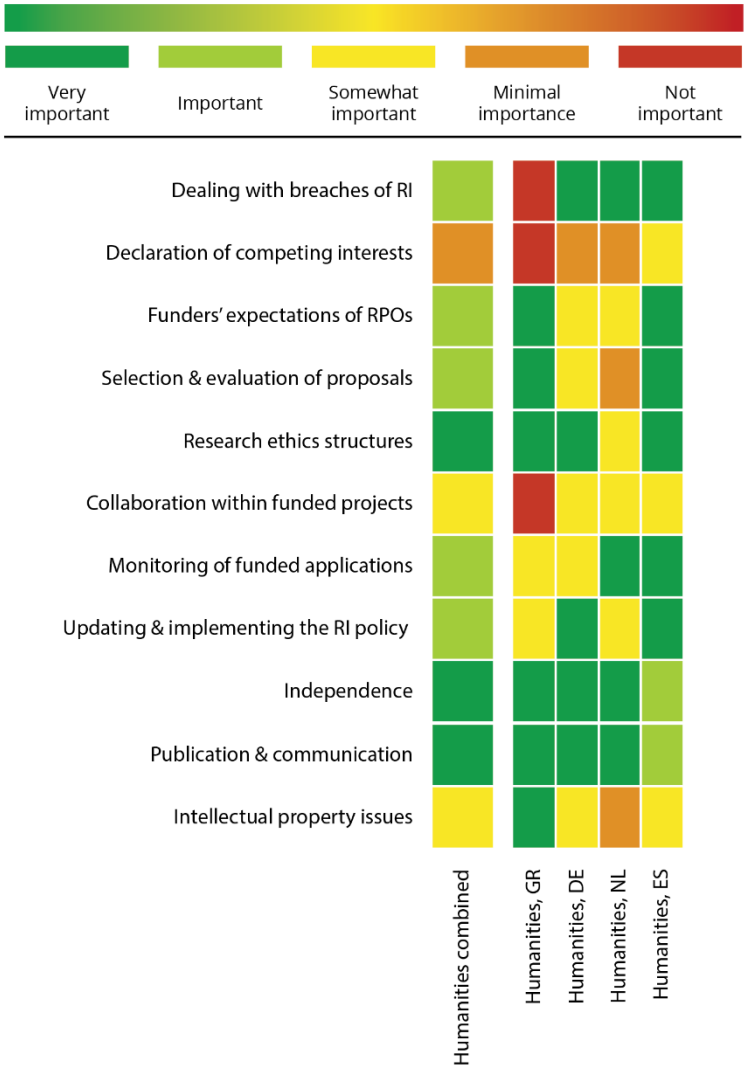


Figure 4.1.12: Heat map displaying sorting exercise results of 11 RI topics in the humanities RFO focus groups.

This heat map shows the results of the sorting exercise conducted during the focus group interviews for the stakeholder and researcher groups from the humanities. It reflects the importance assigned

to specific topics in relation to research integrity. The map provides an overview of the areas where participants perceived that RFOs could support the development of a strong research integrity culture with SOPs and guidelines. There are a few topics where it is clear that guidelines and SOPs could be useful; these include 'Research ethics structure', 'Independence', and 'Publication and communication'. In general, participants were concerned with an increase in bureaucracy and often did not agree if RFOs should also be involved in certain topics such as 'Dealing with breaches of RI'. For other topics, it was stated that good measures already are in place, such as for 'Declaration of competing interests'. Finally, 'Intellectual property issues' and 'Collaboration within funded projects' seemed not to be so important for the humanities.

4.1.13 Concluding remarks regarding humanities and RFOs

In this chapter, we have examined the understandings, prioritisations and recommendations of the four mixed (researchers and stakeholders) focus groups within the humanities in relation to the 11 selected RI topics. The groups were carried out in four countries (Spain, Greece, Germany, and the Netherlands) with researchers from these countries, as well as other countries. Overall, 18 interviewees participated, representing a broad range of disciplines within the humanities as well as RIOs, funders, ethical committees, RI committees, editors etc.

The heat map and discussions in the four groups show that apart from 'Declaration of competing interests' and to a lesser degree 'Collaboration within funded projects', all topics were considered important for RFOs to focus on and to develop policies for in the humanities. However, no topic was placed in the 'very important' category in the sorting exercise within all the groups. Likewise, no issue – also not 'Declaration of competing interests' – was placed in the 'none or minimal importance' category in all groups.

This shows how difficult it is to speak about the humanities as a coherent unit, across disciplinary, institutional and national differences. The examination of the single topics above, for example, gives many examples of differences between disciplines within the humanities that can explain some of the differences in the assessment of the importance of the single topics. Institutional and national differences clearly also play a role, and finally, the many subtopics within most of the 11 discussed topics also have to be factored in. In some groups, emphasis was put on one subtopic, in others on another. This can give different results. For example, the topic 'Selection and evaluation of pro-

posals' was considered very important in the Greek and Spanish based groups, as somewhat important in the German based group, and of none or minimal importance in the Dutch group. As the examination of the topic reveals (see section 4.1.4), the low score of this topic in the Dutch group has to do with a general critique of the national funding system in the Netherlands and an emphasis on the subtopic 'RI Plan' in the card exercise (a topic that the participants understand as a responsibility of RPOs, not RFOs).

The examination of the single RI topics provides rich material that can be used in the SOPs4RI project and by RFOs to understand the special needs and challenges of the humanities. The material shows that the humanities deal with many of the same issues as other main areas of research, but that the humanities also have distinct problems that need to be taken into account when RPOs formulate RI policies for the humanities. One example of this could be the challenges some disciplines within the humanities experience with the concept of self-plagiarism, for example, when reusing the *"same line of thought"* in different publications and/or languages (see discussion on 'Dealing with breaches of RI', section 4.1.1). Another example could be the need for a broader understanding of the impact and measurability of humanities research (see discussion on 'Selection and evaluation of proposals' in section 4.1.4). On the other hand, researchers within the humanities had more or less the same understandings as researchers from other main areas of research when it comes to some of the other discussed topics. A good example of this is the discussion of 'Independence' (see section 4.1.9).

4.2 Social science

The focus group study aims to explore how the main disciplinary fields of research perceive and relate to a number of research integrity issues relevant for both RPOs and RFOs, to understand the potential disciplinary variation in experienced challenges, and their needs for institutional guidelines and SOPs to promote research integrity. In this section, we explore the need for research funding organisations to address different topics of research integrity in relation to the social sciences. Compared to the humanities, more studies exist on research behaviour and research integrity within the social sciences. However, most of the research integrity literature across the different fields of disciplines focuses on the perception and prevalence of detrimental research practices within RPOs (Bouter et al. 2016; Fanelli 2009; Haven et al. 2019).

In the following, we examine how different stakeholders within and around the social sciences, such as researchers, REC and RIO members, editors, and researchers in management positions understand and prioritise RI topics such as 'Monitoring funded applications', 'Declaration of competing interests' and 'Research ethics structures'. The aim is to increase our understanding of how RFOs may advance research integrity amongst researchers through the development of policies that are in alignment with the particular needs and interests of the social sciences.

Four focus groups within the social sciences discussed and prioritised 11 different main RI topics, whereas a selected number of topics have been discussed in depth by the different focus groups, as shown in display 4.2 below. Representing a number of disciplines within the social sciences, 16 different stakeholders across four European countries discussed and reported on their perceptions of the different topics, the main challenges related to them, and ideas and good examples of how to support RI practices and procedures within each distinct topic. The results of these discussions are addressed by topic in the following sections and summarised in separate displays. We also provide a heat map at the end of this chapter (section 4.2.12) that visualises the assessed importance of each RI topic for the social sciences.

Display 4.2. Overview of participants in the social science focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Stakeholders represented**	Country	Face-to-face/online interview	Number of participants
3	Economics (health, business) Political science	Research ethics structures Selection and evaluation of proposals Independence from commercial influences (discussed briefly)	Research ethics coordinator (REC) Member of research ethics committee RIO Management position at university Researcher	DK	Face-to-face	4
14	Psychology (Developmental, methodology, cognitive, organisational) Political science	Education and training in RI Dealing with breaches of RI Publication and communication (discussed briefly)	Researcher Management position at university Member of research ethics committee Journal editor RI course teacher	NL	Face-to-face	5
22	Sociology Pedagogy	Publication and communication	Management position at university Researcher	HR	Face-to-face	5

	Maritime Studies Psychology	Monitoring of funded applications Dealing with breaches of RI	Researcher (industry) Former journal editor			
28	Sociology (RE/RI) Linguistics	Independence from commercial influences Conflict of interest	Researcher (industry) Member of research ethics committee	GR	Face-to-face	2

* Participants may represent more than one discipline
** Participants may represent more than one type of stakeholder

4.2.1 Dealing with breaches of RI

The topic 'Dealing with breaches of RI' relates to structures and procedures that funding organisations can adopt to deal with cases of misconduct by funded researchers. The topic was discussed in-depth in the Dutch and Croatian focus groups, but with special attention paid to the structures and procedures for dealing with research misconduct at universities. Hence, parts of these discussions are also used under the corresponding topic for the RPOs' social science groups (see section 3.2.3).

4.2.1.1 Key features of the topic 'Dealing with breaches of RI'

Display 4.2.1: The mixed social science groups' view on 'Dealing with breaches of RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI			Legal framework not in place in many countries	Funders should require that institutions have procedures in place

			Inaccessible systems in RPOs	Culture with room for mistakes Focus on procedures for prevention of misconduct rather than prosecution Counselling and open office hours where researchers can seek advice
RI bodies in the organisation				
Procedures for breaches by funded researchers				
By review committee members				
By reviewers				
By staff members				
Protection of whistle-blowers and the accused			Small research communities – everybody knows each other	
Sanctions/other actions			Cases are very different, standardisation is difficult Difficult to figure out what has happened	Thorough investigation before jumping to conclusions and sanctions
Communicating with the public				

4.2.1.2 Key observations: 'Dealing with breaches of RI'

Participants in the Greek, as well as the Croatian group, said they would like to see funders ensuring that RPOs have sufficient and good procedures in place for 'Dealing with breaches of RI'. A participant in the Croatian focus group expressed it in this way,

> *"[…] it might be a good idea from funders to require that institutions do have procedures in place. That way that way institutions could not compete for grants unless they do have. And then also it would be excellent if there was some common good practice so that we… that each institution doesn't invent the wheel from the beginning*." (Associate professor of psychology, focus group 22, p. 17).

However, from the conversations in the different groups it also became clear that 'Dealing with breaches of RI' is a very difficult topic to deal with. First, it can be very difficult to find out what exactly happened: thorough investigations are often needed for determining this. Second, there is no legal framework for misconduct cases in many countries. Third, there are a great number of cases in the grey area of questionable research practices. These cases can be more or less severe and, in these cases, researchers could more or less intentionally have violated good research practices. Accordingly, when potential cases of misconduct are thoroughly investigated, they often turn out to be more about mistakes, misunderstandings, or lack of knowledge and training, than deliberate attempts to cheat. As one of the participants in the Dutch group explained,

> "*I can share my experience as an ethics committee member. I've run into a few instances where I thought, where I find out that things were done differently than was told and we just talked about it with this person and in most cases it was a misunderstanding or it was something that someone didn't realise and you just solve it together.*" (Associate professor of organizational psychology, focus group 14, p. 31).

Instead of focusing on sanctions for violation of good research practices, participants argued in favour of paying particular attention to better procedures. Focus should be on preventing breaches instead of punishing them. According to one participant, sanctions can also be counterproductive since they may signal that everything that cannot be sanctioned is considered to be ok,

> *"[…] Sanctions is nine out of ten times not the proper way to deal with mistakes that are made, but also because there is a very perverse effect. It's extremely hard to sanction people*

and if you cannot do that, then by implication you say "Okay, this is apparently, this is allowed". Which is absolutely not the case." (Professor of political science, focus group 14, p. 34).

One way of focusing on procedures instead of sanctions, would be to create a culture where mistakes are allowed, where people dare to report and talk about their own mistakes and doubt, "*You should not discourage people from reporting that they've made mistakes.*" (Associate professor of cognitive psychology, focus group 14, p. 34). One element in building such an environment could be to have RI offices at the RPOs where researchers can pop in at open office hours and discuss their cases. It was likewise seen as very important that the RI and ethics committees are accessible and not hidden away behind rigid bureaucratic procedures.

4.2.2 Declaration of competing interests

Under the topic of 'Declaration of competing interests' the social science stakeholders discussed which kind of competing-interests issues they find to exist within social sciences, for instance amongst review committee members. The topic was discussed in-depth in the Greek group, and the remaining groups assessed it in terms of importance in the sorting exercise.

4.2.2.1 Key features of the topic 'Declaration of competing interests'

Display 4.2.2: The mixed social science groups view on 'Declaration of competing interests'

Topic/sub-topics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Declaration of competing interests	Competition amongst organisations (e.g. private firms) causing conflict of interest	Preserving academic integrity by being transparent about one's affiliations	The competitive nature of academia	
Among review committee members	Stealing ideas for patents			Avoid conflict of interests in committees by not letting people from the same organisations

				review each other's work
Among reviewers	"Tempted" to promote colleagues and disadvantage academic competitors			
Among staff members				

4.2.2.2 Key observations: 'Declaration of competing interests'

The participants in the mixed social science groups understood conflicts of interests as situations where one could be accused of promoting colleagues and friends, or disadvantaging academic competitors. The interviewees had not themselves encountered severe conflicts of interests, but they had, for example, heard stories from colleagues about how reviewers had tried to steal ideas for patents in the review process, "*I have heard of, also, people in review committees reading papers, then rejecting them, and trying stealing patents, things that have not been patented yet*." (Researcher in speech and language, focus group 28, p. 8).

It is very important that reviewers are not brought into potential conflicts, because, as one of the participants explained,

> "*[…] it's only human that you may be affected by this, or, for example, the colleague you very much like and you'd like to help and all that. I try to, I personally try to distance myself from the situations, I honestly do, I've asked to be excluded from reviews of work of people that I particularly disliked, not because of something personal, but because of their overall academic, you know, performance and all that.*" (Researcher in research ethics and research integrity, focus group 28, p. 8).

The participants in this group argued in favour of some basic guidelines that should make sure that people from the same organisations did not review each other's work. However, they also underlined that the researcher has a personal responsibility for being as transparent as possible with his or her affiliations, so that conflicts of interests could be avoided.

The main challenge for conflict of interest-issues is the general competition in academia and amongst private firms. As one of the participants expressed it, *"[…] if we reduce the level of competition, life can potentially be more ethical […]*" (Researcher in research ethics and research integrity,

focus group 28, p. 9). However, this interviewee also made it clear that we have a personal responsibility for avoiding conflicts of interests.

4.2.3 Funders' expectations of RPOs

'Funders' expectations of RPOs' concerns which policies and expectations funding organisations can put forward to the RPOs, whose researchers apply for money from the funding organisations. This, for instance, includes structures and procedures in RPOs to deal with research integrity and misconduct issues. Across the social science focus groups, the topic was discussed as part of the importance assessment in the sorting exercise.

4.2.3.1 Key features of the topic 'Funders' expectations of RPOs'

Display 4.2.3: The mixed social science groups view on 'Founders' expectations of RPOs'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Funders' expectations of RPOs	Funders can make an impact, but fear of a random focus			Funders creating awareness and encouragement for researchers to reflect upon their research practices Build up national systems for checking if the right RI structures are in place at the RPOs (something like the Netherlands' Board on Research Integrity (LOWI))
Codes of conduct				
Assessment of researchers				Move away from box checking to stimulating change and good practices
Education and training for RI				

Processes for investigating allegations of research misconduct	Responsibility does not lie with the funders			Funders make sure that recipient organisations have RI mechanisms in place, e.g. whistle-blower-protection

4.2.3.2 Key observations: 'Funders' expectations of RPOs'

According to the interviewees, funders can without doubt make an impact on the RI standards of RPOs, "*I think if there are more funders who actually say that it's important, then that's an incentive for researches to do so.*" (Researcher in developmental psychology, focus group 14, p. 39). However, the participants in this Dutch group feared that the different RPOs will focus on random corners of RI. One of the interviewees therefore suggested that we establish national bodies that can oversee the RI policies and procedures of the RPOs, something like LOWI (the Netherlands' Board on Research Integrity).

In the Danish group, an international scholar who had spent many years in the United States and United Kingdom, said that in small countries like Denmark you could expect a relative high (and almost identical) standard of RI in all RPOs, but that this was not the case in e.g. the United States, where you have a much more diverse RPO landscape. The interviewee therefore felt it was very important for funders to check that RPOs had the necessary policies and procedures in place. This wish was also expressed in the Greek group, *"[…] should make sure that the recipient organizations have mechanisms to observe ethics and research integrity, and that should include a mechanism for the protection of whistle-blowers. I think this is important for all organizations who receive funding."* (Researcher in research ethics and research integrity, focus group 28, p. 2).

In the Danish group, a wish for moving beyond box checking towards stimulating better practices was expressed,

> "*I think it's important for funders to move a bit beyond just obtaining compliance, just have recipients of funding tick a box, 'yes, I'm aware of this and that, and I'll live up to'. It's important also for them to, well to create awareness, but to encourage people to actually think about the way they conduct their research, and that I think the basic premise is not to be suspicious, and that's the balance, but also to have some kind of trust in what these researchers are going to do.*" (Coordinator of RI training, focus group 3, p. 3).

4.2.4 Selection and evaluation of proposals

In the discussion of 'Selection and evaluation of proposals' the focus groups discussed how funding organisations can introduce different criteria for promoting responsible research in their procedures on selection and evaluation of proposals. For example, this could be requirements for RI plans from funding applicants. The topic was mainly discussed in the Danish focus group, but the Greek group also granted the topic quite some attention. The Dutch and Croatian groups discussed the topic's importance in connection with the sorting exercise.

4.2.4.1 Key features of the topic 'Selection and evaluation of proposals'

Display 4.2.4: The mixed social science groups view on 'Selection and evaluation of proposals'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Selection and evaluation of proposals	RFOs have an impact in creating sound research environments with focus on RI			RFOs give clear instructions to reviewers Avoid tick-box exercises RFOs must emphasise originality of research ideas
RI plan			Difficult to make standard requirements across social science Risk of bureaucratisation	RI reflections afterwards in first deliverable from granted project Necessary adjustments happening post-grant Stimulate self-reflections on proposals
Methodological requirements				
Plagiarism				

Diversity issues				Funders setting standards for gender and other social justice balance issues

4.2.4.2 Key observations: 'Selection and evaluation of proposals'

This issue led to a lengthy discussion on the responsibility of RFOs in the Danish focus group (focus group 3). Here, interviewees pointed out that funders have a key role to play in putting more focus on RI. This should not be done as box ticking exercises, but as real reflections on RI issues in a research project by the grantee. In order to avoid waste of resources, interviewees suggested to move such a reflection away from the proposals, and instead make it the first deliverable of the funded project,

> "*I think it's also a question of what should be part of the application and what should be a deliverable, because it doesn't make sense to have people, as important as it is, it doesn't make sense to have people spend hours and hours and hours on planning something that they then will not get funding for*." (Research ethics coordinator, focus group 3, p. 7).

In the selection of proposals, it was stressed that funders should avoid putting too much emphasis on metrics like researchers' H-index. It was also seen as important to give the reviewers of proposals clear instructions as to what to look out for in proposals. Here, the originality of the proposal was emphasised as the most important thing.

In the discussion, it was also pointed out that it is important to have structures in place at the RPOs to back up RI plans for single projects, which points back to the topic of 'Funders' expectations of RPOs' (see section 4.2.3). Otherwise, the risk is that it will be hard for the grantee to live up to the promises made in the RI plan,

> "*I think it needs to be backed up by requirements for an organizational set up to deal with these issues, because it is not enough to have people comply who is 'well we are following the Vancouver rules', the problem will arise once they get into the actual research. So a set up for dealing with any issues and also for keeping the attention to for instance ethical aspects."* (Coordinator of RI training, focus group 3, p. 4).

The participants further said that the requirement for RI considerations in funded projects should be set up in such a way that they allowed for disciplinary differences, not just between main areas

of research, but also within the social sciences where disciplines, according to the interviewees, can have different challenges when it comes to RI, *"[…] where I work, you have everything from people doing hard-core, big-number crunching, you know, correlates of war-type research, all the while anthropology, right, you know, you need the ethical framework if you're applying it on war studies that basically can match that range, right*". (Associate professor in political science, focus group 3, p. 4).

Of concrete things that could go into a RI plan, an interviewee in the Greek group suggested that funders could have standards for gender and other 'social justice balance issues',

> "*And a third thing would be, for funders, to set standards for gender and other social justice balance issues. And not only for the inclusion of more women, this is not the only issue, but also for what their results mean and what their research means for say gender, say socially excluded groups, are these groups included in the fund, in the research, will the results be useful to these people, and things of that sort."* (Researcher in research ethics and research integrity, focus group 28, p. 3).

4.2.5 Research ethics structures

The topic of 'Research ethics structures' considers what kind of ethical requirements that funding organisations can set for funded researchers, for instance obtaining of ethical approvals. The topic was discussed at length in the Danish focus group, but it was also granted a lot of attention in the other three groups throughout the focus group interviews. Aside from ethical requirements that funders can implement, the focus groups also discussed research-ethics issues in social science in general.

4.2.5.1 Key features of the topic 'Research ethics structures'

Display 4.2.5: The mixed social science groups' view on 'Research ethics structures'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research ethics structures	Ethics approval procedures have become very complicated Research ethics considerations are beneficial especially when working with vulnerable groups Flexibility in procedures, respecting the individual project	The Norwegian system	Balance of getting people to consider ethical issues without making systems too bureaucratic Consent forms from vulnerable groups Blurriness in social science on "what is good enough?" in terms of ethical considerations.	Guidelines for when to apply for ethical approval Guidelines for how to consider ethical issues in your research
Research ethics requirements				Funders make sure that recipient organisations have ethics observing mechanisms Funders require ethical reviewing of research National ethics bodies for industry research and independent researchers
Ethics reporting requirements				Guidelines important

4.2.5.2 Key observations: 'Research ethics structures'

According to the participants in the focus groups, the main challenge when it comes to ethical requirements is to find the right balance between requiring enough, but not requiring too much. A stakeholder working in a RIO expressed the challenge in this way, *"[…] the things we run into is this, bringing together the needs of the researchers and the necessities of ethics reviews for example, that you, keep it down to earth. Keep it simple, but not too simple […]"* (Research ethics coordinator, focus group 3, p. 20).

Apparently, it is hard to find this balance. At least, many researchers in the groups expressed a feeling of being over-burdened with ethical approval procedures,

> "*This is just one of many other admin producing activities currently and my job has dramatically changed. If I think back when I started. I had an idea, I programmed the experiment, I drove down to the university, would hang up a few ads, and then next morning there would be all the participants and I would have one more day and I had all the data. And now, I would never become a researcher again. Never, ever, I would not recommend to anyone to do this under these circumstances. And this is not just a few forms, it's dramatically different. After you have to typically, you have to invest three or four weeks in order to get through all this shit.*" (Professor of cognitive psychology, focus group 14, p. 6).

Nevertheless, both researchers and stakeholders across the different groups acknowledged that some minimum standard of ethical considerations are necessary and beneficial. A participant in the Danish focus group expressed it in this way,

> "*I think part of the problem that we have with the research, that we do right now, is that we probably don't think about it enough, right. You know, I come out of a, I spent almost a decade in the British system, where, you know, this is done, I would say do not replicate what they do, because it's super bureaucratised, right, you know. But at least, right, they have very basic ideas, right, you know. So when I was working in [a university in the UK], I had to basically say 'what ways', you know, 'does the research harm the researcher, does it harm the subject of the research or could it possibly harm the university's reputation', right.*" (Associate professor in political science, focus group 3, p. 5).

This was seen as a good and necessary exercise by this researcher, who particularly emphasised the need for protecting vulnerable groups/participants in research projects. An ethics committee member expressed a similar view,

> *"I think at some point it's good to have a certain sort of more general discussion of what you're planning to do […] I see from being, having been in an ethics committee for a while now, and also I learned myself from this experience, right? Sometimes we overlook things that are important for participant'' wellbeing or just, that you don't want to have people undergo research that is not giving, bringing anything, right"* (Associate professor of organizational psychology, focus group 14, p. 8).

In these reviews, interviewees underlined that it is crucial to have respect for disciplinary and project differences. In some projects, you might not be able to get signed consent forms from participants, for example, even though they still would like to share their experiences with you. According to one interviewee, this was the case in his research amongst indigenous people. The participants also underlined that not all research projects need to go through formal ethical approval procedures. However, guidelines on when a research project must be submitted to an ethics committee for approval would be very beneficial, especially within the social sciences where borders can be quite blurred. In relation to this discussion, the Norwegian system was highlighted as an example of best practice, *"I quite a lot fancy the Norwegian system, because they have an ethical committee system that covers all major disciplines, and you are not obliged to seek approval, but they have some quite good guidelines […]"* (Coordinator of RI training, focus group 3, p. 11).

One of the things that the interviewees stressed across the different groups, was the huge differences between institutions and countries when it comes to procedures and structures for ethical approval of research projects. Interviewees expressed a wish for a more harmonised system, also when it comes to the many different guidelines that exist within this area. Further suggestions for what funders could require included that funders make sure that beneficiary institutions have research ethics structures in place. They could also require that projects are put through ethical reviews (when necessary). Finally, they could make sure that national ethical review boards are established for independent and industry researchers in countries where such procedures are not in place.

4.2.6 Collaboration within funded projects

'Collaboration within funded projects' concerns funders' expectations and guidelines for collaborative research. The topic was discussed by all four social science focus groups during the sorting exercise, primarily as a part of a very general discussion on problems in collaborative work.

4.2.6.1 Key features of the topic 'Collaboration within funded projects'

Display 4.2.6: The mixed social science groups' view on 'Collaboration within funded projects'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Collaboration within funded projects	Difficulties relating to topic, as collaborative work is quite uncommon to participants		Differences in national rules, tendencies choosing rules with the least bureaucracy	
Expectations on collaborative research				Need for management plans
Research that is co-financed by multiple funders				

4.2.6.2 Key observations: 'Collaboration within funded projects'

For many of the participants, it was difficult to relate to this question, since many of them did not have any experience with projects funded by multiple funders, or with collaboration across institutions.

Those with experience with such projects pointed out that one of the challenges with cross-national projects is that there are different standards in different countries. Here, the interviewees problematized the tendency to choose the rules of the country with the least bureaucracy, instead of the country with the best rules.

In collaborative research projects, it is (according to the participants) an advantage to have a management plan that clearly outlines the responsibilities of the partners,

> *"It's important that there is some sort of idea of how the project is organised, also in the management of the project, so that, when, who is to contact about certain issues and in particular if many partners are involved in the project. I think that this is an important topic to consider. How to be, who is the, yeah, responsible for the organisation of the project."* (Associate professor in health economics, focus group 3, p. 14).

4.2.7 Monitoring of funded applications

The topic of 'Monitoring of funded applications' covers which monitoring policies and procedures funders could implement in relation to funded projects, for instance, in terms of financial and grant execution monitoring. Both the Croatian and Danish groups had some thorough discussions on the topic, whereas the two other groups discussed the topic's importance in the sorting exercise.

4.2.7.1 Key features of the topic 'Monitoring of funded applications'

Display 4.2.7: The mixed social science groups' view on 'Monitoring of funded applications'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Monitoring of funded applications	*"It's one of those things where there must be a happy medium"* (Associate professor in political science, focus group 3, p. 17)		Massive drain on researchers' resources Different requirements from different actors	*"make it as much as is necessary or maybe as little as is necessary"* (Associate professor in political science, focus group 3, p. 17) Create alignment in requirements
Financial monitoring			Over monitoring that may take time away from research	RPOs should have mechanisms overseeing the use of funds

				Monitoring of compliance with auditing requirements, but no more than that
Monitoring of execution of research grant	A nightmare for all researchers Need for flexibility			In case of major changes to plan, some sort of output to explain why the research didn't turn out as planned
Monitoring of compliance with RI requirements				

4.2.7.2 Key observations: 'Monitoring of funded applications'

While interviewees across the focus groups agreed that some monitoring was necessary – especially financial monitoring, which was suggested could be done by the RPOs – they also agreed that we could easily end up having too much monitoring. Some participants already felt over-monitored, and some even expressed a feeling of being under surveillance by a massive bureaucratic system as, for example, expressed in this way in the Croatian group,

> *P1: "I fully agree. And I think we are creating way too much burden, administrating, which could be used for actual productive scientific work.* (Associate professor of psychology, focus group 22, p. 14).
>
> *P2): "Exactly. There is whole… sorry… whole army of people who administrate something. We are at the lowest level, we are reporting to somebody, somebody is monitoring us. Then we are reporting to the next level. The next level is reporting to the… the highest one. So the whole army of this bureaucratic, administrative forces are actually I don't know just watching if there is something wrong in the procedure, if the, the receipt or the invoice looks like it should be and it's really burden to a researcher."* (Management position at university, focus group 22, p. 14).

It is therefore important that the monitoring of grants take the costs for researchers into account and try to find a "happy medium". As a Greek interviewee expressed it*, "[…] but what do you have to do, right, in terms of the monitoring requirements, you know, I mean, it's just so much, so it's one of those things where there must be a happy medium there. You know, you check in once in a while,*

but otherwise assume they're getting on with what they're doing right." (Associate professor in political science, focus group 3, p. 17). In the same group a wish for "as little monitoring as possible" was expressed. This wish is shared across the focus groups. Every time researchers have to use time on issues related to monitoring, it takes time away from research.

When working with guidelines and SOPs for monitoring the execution of grants, it is also important to allow for some flexibility, to make sure there is room for unforeseen outcomes and for research projects that turn out differently than expected. These deviations could then be explained in an output, a report, to the funders at the end of the grant period.

Across cases, interviewees felt monitoring was a burden, and one interviewee even called the monitoring of ERC grants a nightmare. Interviewees also requested more aligned requirements for auditing and monitoring across institutions, organisations, and countries, *"[…] there should be some form of consensus of what is being monitored […]"* (Associate professor of psychology, focus group 22, p. 15).

4.2.8 Updating and implementing the RI policy

The topic concerns which procedures funding organisations could have for updating and implementing their RI policies. It was briefly discussed as part of the sorting exercise.

4.2.8.1 Key observations: 'Updating and implementing the RI policy'

This topic generated very little discussion amongst the participants. Before putting the card in the 'somewhat important' group in the sorting exercise, one participant in the Danish focus group explained his choice by saying, *"i'm a bit undecided about the updating because if you have a good policy, you do not need to update it, and of course you should implement it …"* (Research ethics coordinator, focus group 3, p. 17). However, another participant in focus group 22 (Assistant professor in sociology, p. 28), pointed out that technological developments (e.g. enabling new visual methods) could lead to the need for updating RI policies.

4.2.9 Independence

'Independence' concerns policies and actions that can be taken by RFOs to hinder unjustifiable interference from, for instance, funders themselves or political or commercial influences. The topic was discussed in-depth in the Greek focus group, with a heavy focus on commercial interests and interference. The Danish and Croatian groups also granted the topic quite some attention throughout their focus group interviews.

4.2.9.1 Key features of the topic 'Independence'

Display 4.2.9: The mixed social science groups' view on 'Independence'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Independence	Independence issues of less important in social science		Private companies having more money and better data access	
What counts as an unjustifiable interference?	Interference with experiment design, e.g. in industry funded PhDs Some interference can be good, e.g. on gender issues			
Preventing unjustifiable interference by the funder	RPOs protecting young researchers Should RPOs have clear policies on researchers' collaboration with private funders?			Be transparent about funding sources Signing agreements up front with funders
Preventing unjustifiable interference by political	Interference from NGOs and political lobbies			

or other external influences				
Preventing unjustifiable interference by commercial influences	Researchers are truth-seekers, whereas industry has commercial interests. Industry has a legitimate right to focus on their commercial interests. RPOs protect their researchers from unsound interference			

4.2.9.2 Key observations: 'Independence'

Across the focus groups, 'Independence' – especially from commercial interests – was not seen as a big problem within social science. This was expressed in different ways,

> *"[…] it's not as tricky as for example big pharma interfering with medical research. But could be*." (Associate professor of psychology, focus group 22, p. 30)
> *"[…] in my kind of research I don't really have to deal with that*." (Assistant professor of cognitive psychology, focus group 14, p. 41)
> "*Well, being a social scientist, you know, my interactions with industries and SMEs are limited*." (Researcher in research ethics and research integrity, focus group 28, p. 7)

Nevertheless, participants in the mixed social science groups had good examples of problems relating to interference, both in collaborations with private companies and other types of organisations. A social scientist could, for example, run into unjustifiable interference from political parties or organisations as well as NGOs,

> "*Well, our researchers were doing research on a major […] NGO and got into all kinds of interviews, did all the things right, and then the sort of major administrative body of the NGO caught wind that it was happening, and told her that she was not allowed to publish anything unless they had approved exactly what was going to go into the journal, you know. So that created, I think, right, otherwise they were basically going to poison the well and she wouldn't get anybody else to talk to her. So again, just to think about these issues that we're dealing with, where pressure can come from*." (Associate professor in political science, focus group 3, p. 10).

Although it is not as common in social science as in the other main areas of research, social scientists work together with commercial partners from time to time. Here, the general differences between private companies' commercial interests and researchers' 'truth-seeking' can be the source of problems. One participant, for example, said, *"I can see, however, how industries and SMEs would appear as intervening and restricting academic freedom, or whatever, and impose commercial influence. Well, industry and SMEs that's what they do."* (Researcher in research ethics and research integrity, focus group 28, p. 7).

Another participant gave a concrete example of where a researcher's independence had been threatened,

> *"I know of a PhD project here that was a complete mess because a private funder wanted to determine which, it was some kind of testing, which company, or which product that should be the control in some kind of experiment they set up. And it's definitely, clearly beyond what they should interfere with, because that's research. And the PhD student got into trouble because her supervisor was a good friend of that private funder, and so she had to give up the project, because she didn't want that kind of interfering."* (Coordinator of RI training, focus group 3, p. 9).

Some interviewees also argued that private companies have a legitimate interest in the commercial side of knowledge, and that they cannot be blamed for that. It is therefore the responsibility of the RPOs to protect the independence of researchers, *"[…] the responsibility of academia is to make sure that they collaborate with the industry on terms that they can, the academics, the researchers, they are feeling comfortable with."* (Researcher in research ethics and research integrity, focus group 28, p. 8). Here, there seems to be a special need for protection of PhD students and young researchers. Having clear policies of independence, and guidelines in place, would also make it easier for researchers in such collaborations, i.e. not leaving it to them to negotiate the terms and conditions. However, no matter how good the guidelines are, the imbalance between the financial resources that big private companies have compared to most RPOs can cause problems. One interviewee gave the example of RPOs having problems competing with private companies for data and the best candidates within the field,

> *"… the most advanced achievements will always be from companies like Google or Amazon, who are the owners of computational power, because what the field has become lately is finding as much data as possible and designing very complex algorithms and trying to model*

> *human language in that way. So we recently see that academia cannot really come to the same standards with commercial teams, groups, so this possibly leads more people leaving academia if they want to be on, let's say, top research, state-of-the-art research, and trying to find a research job in industry*." (Researcher in speech and language, focus group 28, p. 6).

It was also pointed out that researchers always have to disclose their funding, *"I'd say that transparency would be number one. I can get money from big corporation but as long as I publish that I was funded by them that's I think better."* (Associate professor of psychology, focus group 22, p. 4). Another good practice would be to sign an agreement up front, before the research begins*, "[…] signing the agreement regarding research aims and regarding biases, discriminations and any kind of aims that are not in core of research and scientific work."* (Assistant professor of sociology, focus group 22, p. 4). Finally, one interviewee also said that not all interference is bad. To this interviewee, an example of a legitimate form of interference would be to demand a fair gender balance in funded projects.

4.2.10 Publication and communication

'Publication and communication' has three subtopics, 'Publication requirements', 'Expectations on authorship', and 'Open science (open access, open data, transparency)'. It concerns how RFOs can potentially set requirements and guidelines on the publication and dissemination aspects of funded research. All three subtopics were discussed thoroughly in the focus groups, especially 'Open science'. The Croatian focus group had an in-depth discussion on this topic, and the other three groups discussed the topic throughout their focus group interviews.

4.2.10.1 Key features of the topic 'Publication and communication'

Display 4.2.10: The mixed social science groups' view on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication			Too much focus on empirical rather than methodological and theoretical research	Good guidelines for reviews of applications, papers etc.
Publication requirements	Publication pressure Need for fewer, but better papers		A lot of bad papers published Overpromising of research	Clause in calls stating that negative results are of equal value
Expectations on authorship	Unawareness of social science guidelines		Disciplinary differences Guidelines are no insurance against conflicts	Requirement for reflection on authorship issues in application
Open science (open access, open data, transparency)	Taking responsibility by sharing data Different perceptions of preregistration. It's not automatically good science Open access is a must in public funded research	Guidelines from American Sociological Association	Some disciplines having problems with open data sharing Open-access publication fees Dilemma between open science and researchers to protect their research ideas	Guidelines on open science procedures

4.2.10.2 Key observations: 'Publication and communication'

Regarding publication requirements, participants across the focus groups pointed out the problem of a strong focus on quantity – number of papers – and argued in favour of putting more focus on the quality of papers. There is not a need for more papers, but for better and more relevant research and papers. Reviewers and editors have an obligation to reject bad papers – and here, good guidelines for reviews (of applications, papers etc.) could be beneficial, *"When I do a reviewer report on some paper I always have on the right side of me some basic guidelines. Not to forget something. Like main criteria for a good paper. So, it helps me to be a better reviewer."* (Associate professor of pedagogy, focus group 22, p. 21).

Some participants also felt that there is too little room for research and papers that deal with methodological or theoretical questions,

> *"P1: So I think that maybe the emphasis to do the empirical research maybe not the issue but it could be less empirical research. More methodological research.*
>
> *Interviewer: Do you think that funders, as the one who are giving the money to…yeah, do you think that change can also start with them? What can you do in that sense?*
>
> *P1: Yeah, but we probably need research for some kind of applicable aim. I don't think that they would be very interested in theoretical and methodological work."* (Assistant professor of sociology, focus group 22, p. 12).

According to the interviewees, there is a tendency to overpromise results when applying for grants. A tendency that again may lead to an unsound hunt for positive results, which eventually could jeopardise RI. Here, it was suggested that funders should recognise the existence of negative results, "[…] *as a funder, you give direction to research. And that's why they have responsibility to make sure, I don't know, it could be a clause even in the call of proposals that say that negative results are of equal value or something to that effect."* (Researcher in research ethics and research integrity, focus group 28, p. 3).

Only a few of the interviewees had knowledge about authorship guidelines for social science, but guidelines were discussed as a possible way forward, especially to protect PhD students from having difficult conflicts with their supervisors over who is going to be an author. However, guidelines are no insurance against conflicts, *"[…] they want to have more forms and more guidelines and i'm not sure whether it's actually going to protect these PhD situations because with any new rule that*

you make, people will always find some kind of way to interpret it in a different way and make sure that they get their way." (Assistant professor in psychology, focus group 14, p. 10).

Special attention should be paid to collaborative projects across disciplines, because authorship traditions are very different from discipline to discipline. Here, it was suggested to make it obligatory to address this question already in the application, *"[…] it could be very helpful if there were some guidelines or some, that we needed to live up to even in the application to show that this is something that is taken care of in the steering committee or whoever is the principal investigator […]"* (Associate professor in health economics, focus group 3, p. 4).

Across the focus groups, open science was seen as a positive thing. As one interviewee put it,

> "*Sharing stuff is taking responsibility because by putting your code online, by putting your data online, you give others the possibility to rerun your analysis and to make sure that you did a good job. You don't do that because you want to show 'Look, I'm perfect'. You do that because you want to be sure that you did a proper job.*" (Assistant professor of cognitive psychology, focus group 14, p. 29).

However, open science does not solve all problems: just because a study has been preregistered, for example, does not automatically make it good science. In many cases, you can preregister without any form of peer review. Therefore, the real test of quality is still in the end when the paper is submitted to a journal and going through peer review. Another problem with open science (open data) for social science is disciplinary differences. For example, some disciplines like anthropology can have difficulties sharing their data, because of anonymisation issues and long-term relationships built up with the communities that are studied.

To publish in open-access journals was generally also seen as a good thing, and it was pointed out that it is especially important that results of public funded research are made public, "*It's a must. It's public money. And the results of your research, they belong to the society. So it's, it should be the core of, or the purpose of this public funding."* (Assistant professor of sociology, focus group 22, p. 7). There are also problems in open-access publishing, especially the costs are a challenge, *"So it costs anywhere from thousand to four thousand Euro. The publication that we had. So the better the journal, the more money. […] So when we talk about social sciences, you know, I mean it's really rare that you'll get this kind of money to be able to publish in top journals."* (Associate professor of psychology, focus group 22, p. 6).

Finally, a challenge was pointed out in the movement towards open science. For, although science will benefit from more openness, this is not necessarily the case for single researchers, who can have good career (competition) reasons for not sharing data, ideas etc.

4.2.11 Intellectual property issues

'Intellectual property issues', concerns RFOs potential policies for tackling IPR issues in funded projects, was briefly discussed with researchers and stakeholders from the social sciences as part of the sorting exercise.

4.2.11.1 Key features of the topic 'Intellectual property issues'

Display 4.2.11: The mixed social science groups' view on 'Intellectual property issues'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Intellectual property issues	Difficulties understanding the topic. Not common in social science, but some experiences within development of measuring instruments (e.g. psychometric instruments)		Stealing of ideas	

4.2.11.2 Key observations: 'Intellectual property issues'

Most of the interviewees had difficulties relating to the topic. Only in one group (focus group 22), did they immediately understand what intellectual property rights could be. Here, the development of psychometric instruments was used as an example of an issue in which Intellectual property rights were at stake. In this group, the issue was considered very important, whereas the topic was considered less important in the groups were the participants had difficulties relating to the issue.

In the Dutch group, the discussion of Intellectual property rights led to a discussion on the stealing of ideas in general, which was considered a serious problem – and something that is driving new forms of publications,

*P1: "I think that also the open science movement can contribute here, because here for instance what you were discussing before when you, I don't know, share your ideas with other people now that is what we constantly do at conferences for instance. But now, more and more people are making online all their presentations, posters, and this is a way also to, I don't know, guarantee that your intellectual property is preserved. Or not to guarantee, because then you never know, someone can steal your idea, but. (*Assistant professor of cognitive psychology, focus group 14, p. 37)

P2: I mean, there is a lot of stealing. I hate to say it, if you see papers and particularly from Asia and China, a lot of them are simply stolen." (Professor of political science, focus group 14, p. 37).

4.2.12 Heat map of perceived importance – social science and RFOs

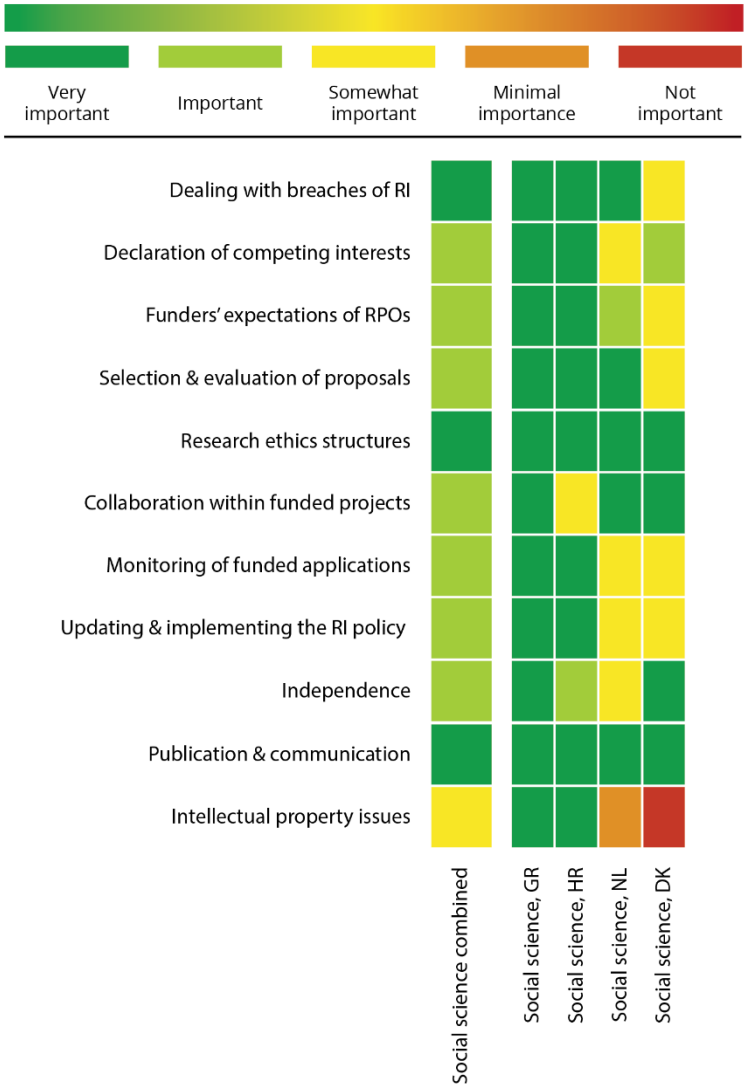


Figure 4.2.12: Heat map displaying sorting exercise results of 11 RI topics in the social science RFO focus groups.

This heat map shows the results of the sorting exercise conducted during the focus group interviews for the stakeholder and researcher groups from the social sciences. It reflects the importance assigned to specific topics in relation to research integrity. The map provides an overview of the areas where participants perceived that RFOs could support the development of a strong research integrity culture with SOPs and guidelines. While most of the topics were sorted as important and a few as very important, there were distinctions in how they were perceived. For example, 'Funders' expectations of RPOs' and the 'Selection and evaluation of proposals', were both seen as topics where there could be a positive contribution from RFOs, while 'Collaboration within funded projects' and 'Monitoring of funded applications' were seen as a propensity to increase red tape.

4.2.13 Concluding remarks regarding social science and RFOs

This chapter examines the understandings, prioritisation and recommendations of the four mixed focus groups within the social sciences in relation to the 11 selected RI topics. The groups were carried out in four countries (Croatia, Denmark, Greece, and the Netherlands) with researchers from these countries as well as other countries. In all, 16 interviewees participated in the focus groups and they represented core disciplines within social science such as psychology, political science, economics, and sociology. Both qualitative and quantitative researchers took part in the discussions, as well as representatives from e.g. RIOs, ethical committees, and journal editors.

The heat map and discussions in the focus groups show that interviewees across the groups considered it important for RFOs to address all 11 topics in relation to the social sciences. Hence, all topics were placed in the 'very important' category by at least two groups. Of these 11 topics, six topics were placed in the very important category by three groups and two topics were placed in this category by all four groups ('Publication and communication' and 'Research ethics structures').

'Intellectual property issues' was the only issue that was placed in the category 'none or minimal importance' by two of the four focus groups. This happened in two groups (in the Dutch and Danish groups). However, the two other groups placed it in the 'very important' category. The differences here probably have to do with the lack of experience with and understanding of intellectual property issues amongst the participants in the Dutch and Danish groups, whereas a concrete example of IPR with relevance to the social sciences (psychometric instruments) was discussed in the Greek group.

The discussion in the social science groups revealed large national differences and a wish for a more harmonised system, especially when it comes to legal frameworks for dealing with breaches of RI. Interviewees also expressed that it is difficult to make standard RI requirements across disciplines in the social sciences, including across qualitative and quantitative approaches. The interviewees further pointed towards a number of challenges in academia, which they felt could jeopardise research integrity: very intense competition, open science dilemmas, overpromising outcomes, too many low-quality papers etc.

Although participants in general were positive towards RFOs developing policies for the discussed topics, they also warned against the possible negative bureaucratic consequences of added RI requirements. They also expressed the view that guidelines and SOPs are not a guarantee against research misconduct.

4.3 Natural science

The focus group study aims to explore how the main disciplinary fields of research perceive and relate to a number of research integrity issues relevant for both RPOs and RFOs, to understand the potential disciplinary variation in experienced challenges and their needs for institutional guidelines and SOPs to promote research integrity. In this section, we explore the promotion of research integrity in research funding organisations from the disciplinary perspectives of the natural sciences, including technical science.

Most studies on research behaviour and RI have been performed within the behavioural and (bio) natural sciences, as already mentioned above (Anderson et al. 2007; Hofmann and Holm 2019; John et al. 2012; Steneck 2006). Hence, akin to the humanities, natural science and technical science are not equally represented as fields of research in the academic literature on RI. In addition to studies that focus on misconduct and questionable research practices (QRPs), some studies exist that, for instance, address variation in "styles of doing science" also within the natural science as a field of research (Penders et al. 2009), or examine what "integrity looks like in practice" for researchers within the natural science (Davies 2019, 1238). However, in general, evidence from the natural and technical sciences on RI practices and perceptions of them remain limited (Haven et al. 2019).

In the following, we examine how different stakeholders within and around natural science, including technical sciences, such as researchers, REC and RIO members, trade union and funding representatives understand and rank RI topics, such as publication and communication, selection and evaluation of proposals, and research ethics structures. The aim is to increase our understanding of how RFOs may foster and advance RI practices and policies in alignment with the particular needs and interests of the natural and technical sciences.

The four focus groups within natural and technical sciences discussed and prioritised 11 different RI topics, most of the topics were discussed in depth by the different focus groups as shown in display 4.3 below. Representing a number of disciplines within natural and technical sciences, 24 different stakeholders took part in the focus group conducted in four European countries. They discussed and conveyed their considerations on the different RI topics, key barriers related to them, and best practice cases on how to improve RI practices and procedures within each distinct topic. The results of the discussions are addressed by topic in the following sections and summarised in separate displays. We also provide a heat map at the end of this chapter (section 4.3.12) that visualise the assessed importance of each RI topic for the natural and technical sciences.

Display 4.3. Overview of participants in the natural science focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Stakeholders represented**	Country	Face-to-face/online interview	Number of participants
7	Indoor environment Geometry Wind Energy	Research ethics structures Selection and evaluation of proposals	RIO RPO codes of conduct working group Researcher Trade union representative RI course teacher	DK	Face-to-face	5
18	Health research Technical health research Physics Bionatural engineering Nanoscience	Education and training in RI Dealing With Breaches Of RI	Medical coordinator, RPO Privacy coordinator, industry Compliance review member Ethical review board member Public funding org. representative	NL	Face-to-face	8
24	Physics Chemistry	Publication and communication	Researcher Researcher, industry	HR	Online	6

		Monitoring of funded applications	Management position at RPO			
29	Chemical Engineering Mathematics Geology Physics Engineering	Independence from commercial influences Declaration of competing interests	Researcher Management position at RPO Public funding org. representative	GR	Face-to-face	5

* Participants may represent more than one discipline
** Participants may represent more than one type of stakeholder

4.3.1 Dealing with breaches of RI

'Dealing with breaches of RI' is about policies and procedures that funding organisations could have in place in order to address research integrity breaches. The natural and technical science focus groups, for instance, discussed which procedures funding organisations themselves can implement compared to existing structures in RPOs, and how they can handle sanctions for misconduct. The topic was discussed in-depth in the Dutch group, and the Danish group also granted the topic thorough attention. The Croatian and Greek groups only discussed the topic in their sorting exercise.

4.3.1.1 Key features of the topic 'Dealing with breaches of RI'

Display 4.3.1: The mixed natural science groups' view on 'Dealing with breaches of RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI	Current systems of dealing with misconduct works quite well		Lacking transparency Power disparity in filing complaints	Everybody should know where to go with their issues Powerful independent person to approach with one's issues
RI bodies in the organisation	*" […] Very important that we don't sort of overrule existing structures […] we have actually a legal framework for dealing with this"* (RIO, focus group 7, p. 22) National differences			Funders take a bigger responsibility in countries without national procedures and legal systems for dealing with misconduct
Procedures for breaches by funded researchers	Many pitfalls, funders should talk to RPOs before making policies Accusations of misconduct can be political or personal		Black and white understandings in RFOs	
By review committee members				
By reviewers				
By staff members				
Protection of whistle-blowers and the accused			Difficult to protect	

			whistle-blowers Risk of career destruction	
Sanctions/other actions	RPOs worried about having to pay back funding		Funders quarantining researchers accused of misconduct	
Communicating with the public	Universities can be hesitant to expose cases publicly			RPOs exercise transparency and responsibility when they encounter a case of misconduct

4.3.1.2 Key observations: 'Dealing with breaches of RI'

The discussion on how to deal with breaches of RI revealed huge differences in national systems. Some countries have systems in place, whereas others have not. In one of the countries, where a legal system for dealing with misconduct cases exists, interviewees were hesitant towards the idea that RFOs should build up their own systems for dealing with breaches,

> *"[…] in Denmark we have actually a legal framework for dealing with this. It's not something WE invented at [name of RPO], it's a standard for all Danish universities. So we also need to respect our system, we might not completely agree with the system, but then we need to work on changing the system but not having this overruled by a funding agency."* (RIO, focus group 7, p. 22).

On the other hand, funders might need to take a bigger responsibility for these issues in countries, where there are no national procedures or legal system for handling these issues, "[…] *from a funder's perspective if you for instance were funding research in Italy or Greece, then from a funder's perspective there might be a need for you to deal with breaches of research integrity, because there might not be any system at the university."* (RIO, focus group 7, p. 22).

In the focus group conducted in the Netherlands, it was pointed out that most people probably do not know whom to contact if they want to report (or just discuss) issues related to breaches of RI. It can also be a problem that the structures are set up in such a way that one's PI will be notified, or that complaints have to go through the PI, "*I was a Postdoc here and it was a long time ago, so I am confident and I hope that things are different. But, when I did have to make a complaint, I was told that the only way to formalise the complaint was to go through my PI who was; who I also saw was part of the problem."* (Research support manager, focus group 18, p. 21). It was recommended that RPOs made sure that all employees are made aware of the existing structures and procedures for 'Dealing with breaches of RI', including whom they can contact in case they want to report or discuss issues related to breaches of RI.

As will also be discussed in the section on 'Funders' expectation of RPOs' (see section 4.3.3), the interviewees warned against funders formulating too black and white policies for dealing with breaches of RI. There are many pitfalls related to this subject. For example, some funders might threaten to stop the funding of a project if a person, who is maybe only one out of many researchers working on that project, is accused of misconduct. In large, collaborative projects, it can cause severe problems for the RPOs if funding is stopped on this basis for the whole project. Before making policies like this, it is therefore important that funders talk to RPOs to learn more about research practices. For example, they have to be aware that many accusations of research misconduct might have more to do with personal or political disagreements than research misconduct. If funders have quarantine policies for researchers who are accused of misconduct, accusations can also be used to harm one's competitors, *"The personal conflict is often sort of a starting point, so if you want to get rid of the competition when you're applying [for funding from a particular funder, who has a quarantine policy], you can just make anonymous accusations."* (RIO, focus group 7, p. 6).

Interviewees took the view that universities have a special responsibility to be transparent about cases of misconduct internally, as well as externally. However, when dealing with accusations of breaches of RI, it is very important that both the whistle-blowers and accused researchers are treated fairly. It can destroy researchers' careers if they are wrongly accused of misconduct – or if their names are associated with convicted researchers.

4.3.2 Declaration of competing interests

'Declaration of competing interests' relates to issues of conflicts of interest amongst: a) review committee members, b) amongst reviewers, and c) amongst staff members. It addresses the kind of procedures that RFO's could implement to handle conflict of interests. The Greek focus group discussed the topic in-depth, and the remaining three groups assessed its importance in the sorting exercise.

4.3.2.1 Key observations: 'Declaration of competing interests'

The discussion on competing interests is interwoven with the discussion on 'selection and evaluation of proposals' and analysed in detail in section 4.3.4. As described in this section, the discussion largely outlined the difficulties of appointing knowledgeable but independent reviewers in small research communities. Recommendations for blind review procedures and evaluations of evaluators were proposed as actions to reduce conflicts of interests and enhance transparency and accountable review procedures (for specifications, see section 4.3.4). The Dutch focus group ranked the topic as somewhat important, whereas the remaining focus groups (Greece, Denmark, and Croatia) assessed the topic to be very important for RFOs to address.

4.3.3 Funders' expectations of RPOs

'Funders' expectations of RPOs' comprises policies and requirements that funding organisations can put forward towards the RPOs whose researchers apply for funding from the RFOs. The topic was discussed in all groups. However, in the Dutch group, the discussion was mostly focused on education and training in RPOs. This part of the discussion in the Dutch group has therefore been moved to the analysis for the natural sciences groups on the topic 'Education and training for RI' in RPOs (see section 3.3.1).

4.3.3.1 Key features of the topic 'Funders' expectations of RPOs'

Display 4.3.3: The mixed natural science groups' view on 'Funders expectations of RPOs'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs

Funders' expectations of RPOs	Policies and expectations from funders should be in line with how research is organised and carried out in RPOs Funders should ensure that procedures exist in RPOs – but not be too involved in them		Funders keen on ensuring own interests	Funders must discuss their codes and guidelines with RPOs before implementing them
Codes of conduct	RPOs have the main responsibility for researchers' compliance		Codes of conduct not helping researchers in their daily work People not reading declarations of integrity	
Assessment of researchers				
Education and training for RI	RI training relevant at all levels	American funding agencies		Funders can require teaching in good scientific practice
Processes for investigating allegations of research misconduct	*"The universities they have the major role to play"* (public funding org. representative, focus group 18, p. 3)			

4.3.3.2 Key observations: 'Funders' expectations of RPOs'

Across the groups, interviewees expressed the view that it is up to the RPOs to ensure a high standard of RI amongst their researchers. The role of funders is primarily to monitor that standards and structures are in place, *"[…] this is actually just expectations that we as a university have these procedures in place, they [funders] shouldn't be involved in the procedures, but they should ensure*

that they are there." (RIO, focus group 7, p. 24). One of interviewees in the Dutch group, who represented a RFO, also stressed this in a discussion on what to do about processes for investigating allegations of research misconduct, *"[…] at [name of funding agency] we have our own procedure to send in complaints when you think that something is going wrong, and we ask all our funded projects to comply with this code. But in general we think, in the Netherlands the universities they have the major role to play […]"* (Public funding org. representative, focus group 18, p. 3).

It is also very important that funders discuss and coordinate their policies with the RPOs before implementing them, as RFO and RPO policies have to be in accord in order to be effective and have a positive influence on researchers. One of the interviewees gave an example of a proactive funder, who had formulated a new code of conduct,

> *"[…] instead of publishing the code of conduct and sending a notification to us as a partner with the [name of funder], saying 'oh, and we have made this wonderful code of conduct', and then we read it, or I read it, and I see that there are some passages that are problematic, it would be really good since they are new, why don't they ask? Say, 'alright, if we, we want to write this, are there something that you can see from a university point of view that could be problematic?'"* (RIO, focus group 7, p. 6).

Interviewees also felt that funders were currently very busy trying to protect themselves – e.g. in cases of misconduct – and therefore made their documents on RI too black and white, i.e. not suitable for the reality of knowledge production at RPOs, "[…] *they are so keen on ensuring their own 'behind' that they forget how the universities really work. I actually think it's a very American code of conduct from my perspective, this by covering yourself and then show the monkey at someone else…"* (RIO, focus group 7, p. 5). Instead of fixed black and white documents, the interviewees pointed out that codes of conduct and similar RI documents had to be seen as living documents that could be changed.

Another problem pointed out by the interviewees, was that codes of conduct rarely help researchers in their daily practices. This partly is the result of researchers not reading these documents, but it also has to do with the aggregated level of such documents. Some translation work therefore needs to be done at the RPO in order to give such documents impact.

This translation work could be part of the education and training in RI at the RPOs. Here, it was pointed out that such training had to be carried out on all levels,

> *"[…] good scientific practice or training in research integrity, it should happen on all levels. I think these ongoing discussions, because we, when you're a PhD student it's certain topics you're concerned about. I mean the authorship is the same for everybody, but then when you're more senior then there might be collaborations with more companies for instance uhm, other political organisations, at [name of RPO] we have many commercial activities that affect our research*." (RIO, focus group 7, p. 13).

According to the interviewees, funders could make it a requirement for RPOs who receive funding to have good teaching and training systems in place. The teaching also needs to be very thorough and it should consider field specific problems. Here, American funders were highlighted as best practice examples, "[…] *we see it from American funding agencies that they have this requirement, and sometimes you see if you have to go to, from post doc to associate professor for instance, then you sort of have to pass a test, to even obtain that degree, on good scientific practice. We don't have anything like that implemented in Denmark."* (RIO, focus group 7, p. 13).

4.3.4 Selection and evaluation of proposals

The topic 'Selection and evaluation of proposals' includes the criteria for research integrity issues that could or should be integrated and assessed when RFOs select and evaluate research proposals. Such criteria could include attention to diversity issues, an RI plan specifying a data management plan, openness concerning publishing and training in RI issues, amongst other topics. The topic was discussed by all four focus group, either as part of the first open question or as part of the in-depth question as well as in the sorting exercise.

4.3.4.1 Key features of the topic 'Selection and evaluation of proposals'

Display 4.3.4: The mixed natural science groups view on 'Selection and evaluation of proposals'

Topic/sub-topics	Main topic per-ceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs

Selection and evaluation of proposals	Key focus on the qualification requirements of researchers and the qualifications of reviewers	Reviewers may suggest budget cuts (not the RFO) and they have to suggest project modifications, too RFO exclusion of long publication lists in connection with research proposals	Too many controls and checks from the funder may create distrust and result in standard 'tick box' answers RFO cut in research budget may affect the project quality Long response rates to submitted proposals	Implementation of an evaluation of proposal evaluators (and sanctions for unaccountability) Greater use of reviewers that academically are close to the application topic, for instance by increasing the use of international reviewers Increase deliverable reviews on sensitive issues Implementation of blind evaluation procedures Less focus on CVs and metrics that result in exclusion and potentially QRPs RFO application requirements should allow for project specific clarifications
RI plan				
Methodological requirements				
Plagiarism				
Diversity issues				

4.3.4.2 Key observations: 'Selection and evaluation of proposals'

The issue of selecting and evaluating funding applications gave rise to extensive discussions across the four focus group interviews.

In both the Greek and Dutch focus groups, the strong focus on merits through CVs and performance metrics in funding processes was considered a problem, because this could exclude younger researchers and non-established researcher groups from funding, and in some cases it may also push them into the grey area of questionable research practices (QRPs). As a public funding representative from the Dutch group said,

> *"We want to select the best research proposals of the best researchers. But the best researchers, what are they? We do not ask at [name of funding organisation] anymore for a full publication list, we only want small numbers of the most relevant publications with regard to research proposals. So, not to have, let us say, ten Nature publications on the list. So, to reduce this pressure. This is; it is enormously important to do something about that in Europe, especially the young PhDs and Post Docs who are really suffering from short-term contracts, and trying to get a scientific job. They are really under pressure to perform and to give their best results. So, when you come in the grey-area they are stretching the grey-area maybe"* (Public funding org. representative, group 18, p. 8).

In the Greek natural science focus group, they – as in the Greek humanities and social science group – brought up the issue of small research communities which, consequently, result in a small pool of potential funding application reviewers. As one participant remarked, "*The village is small and, even worse, the passions are big*" (Public funding org. representative, group 29, p. 15). In this group, it was suggested to: a) increase the use of international reviewers to enhance the reviewer expertise on the particular proposal topic; b) implement blind review procedures; c) implement an evaluation of evaluators and employ sanctions if reviewers do not act accountable and in compliance with ethical and integrity standards; and d) evaluate the outcome of the funded projects in accordance with "sensitive issues" and not merely as to whether the project produced the stated output. The public funding representative in the group mentioned that the use of international reviewers implies that proposals need to be written in English and that the RFOs have experienced objections to this from the research community. The lack of contextual knowledge, for instance regarding the Greek economic situation, was also stated as a potential challenge when using international reviewers. The funding representative also objected to the use of blind review procedures, as it may be difficult for the reviewers to assess proposals without CVs. In this regard, another interviewee suggested implementing a first evaluation stage with no references and with a "pure proposal" in order to secure a "two-way blind procedure" (Assistant professor in Engineering, group 29, p. 15). In this group, very long response rates from funding organisations were also problematised as they can

be a challenge to sustaining research groups. Furthermore, another interviewee called attention to the challenge of RFOs cutting funding of the projects in the last part of the approval phase, "… *the Greek state announces a significant cut of the budget and I think this affects the quality and the type of the research*" (Assistant professor in mechanical engineering, group 29, p. 5). The funding representative responded that their practice is that the reviewers can make suggestions for budget cuts and not the RFO. The reviewer then has to justify the suggested budget reductions and make recommendations on how to modify the proposal.

In the Dutch stakeholder group, one participant brought forth the perspective of excessive bureaucratisation, which is also seen as a cross-cutting theme in the focus group study at large (see section 5). If RFOs implement too many rules and procedures related to research ethics and integrity, it may create "*more distrust towards researchers, instead of the thing you want to achieve [which] is to have responsible researchers*" (Medical coordinator, focus group 18, p. 5). This view was partly backed by the RIO representative in the Danish group, as extensive RFO procedures may lead to the request by researchers to have 'standard' application text that probably may not promote independent RI reflections and practices. According to this RIO, requirements should be implemented, such as data management plans, but they should be implemented in a way that allows for reflection on how RI requirements (such as GDPR) are relevant for, translated into, and managed in the individual projects.

The groups were equally divided between assessing the topic as very important (Greece, the Netherlands) and somewhat important (Croatia, Denmark). The rationale in the Danish group was that subtopics such as procedures for plagiarism and guidelines on diversity are in place. It was, however, noted – as in the Greek group – that funders should keep a strong focus on how and why review committees are appointed.

4.3.5 Research ethics structures

'Research ethics structures' concerns ethics requirements that RFOs can set up for researchers when applying for and receiving funding. The participants also discussed challenges in existing institutional and national ethics review systems. The topic was mainly discussed in the Danish and Dutch focus groups, whereas the Croatian and Greek focus groups dealt with it in their sorting exercise.

4.3.5.1 Key features of the topic 'Research ethics structures'

Display 4.3.5: The mixed natural science groups' view on 'Research ethics structures'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research ethics structures	Ethical approval whenever doing research with humans DPO expertise necessary Funders should not get involved in this		Guidelines and codes are no guarantee against unethical behaviour Different set-ups across Europe Lacking institutional structures Existing structures not fitting the emerging problems in the discipline	Make CV and publication list less important for getting the grant - promote ethical behaviour in research
Research ethics requirements				
Ethics reporting requirements				

4.3.5.2 Key observations: 'Research ethics structures'

Both the Danish and Dutch groups pointed out that it is important to have ethical structures in place in the RPOs, mainly to check the safety of the people who participate in a research project. A problem here is that not all RPOs have these structures in place, and that the established structures in some countries do not always fit the emerging problems within, for example, biotechnology,

> *"I think ethical requirements is not a big problem if it's ethical issues in relation to the legal framework, so working with research animals, human test subjects and all this. But we have many, within engineering research you have many, many research topics coming out in biotechnology all of these where you actually need an ethical permission or approval, but you do not follow within the scope of the ethical committee system in Denmark, because you are not injecting anyone*." (RIO, focus group 7, p. 24).

A further problem is the different rules that exist in different countries on when you need ethical approval for your study.

Besides having to do with the protection of humans, the Dutch group stressed that the issue of ethical structures is also linked to data protection, that is to the protection of personal data.

Across the groups, the interviewees did not see a need for funders to get involved in this topic beyond checking if the RPO that receives the funding has an ethical structure in place, *"I am thinking, I am not really sure and I don't really see; I don't really know if it would be a good idea to have this kind of responsibility; responsibility with the funder to be honest."* (Researcher in medical and social sciences, ethical review board member, focus group 18, p. 4).

Finally, interviewees pointed out that guidelines and codes of conduct are no guarantee against unethical behaviour. If you want to cheat, there is always a way, *"[…] having a code is very good to remind people to be, yeah, true etc., etc. But, in the end if I am a clever researcher and I want to fraud, play; make fraud, I think I can get away with it to be honest."* (Privacy coordinator, industry, focus group 18, p. 6). Funders could remove some of the motivation for cheating by focusing less on the CV and publication list when they fund research.

4.3.6 Collaboration within funded projects

'Collaboration within funded projects' relates to RFOs' expectations regarding research integrity issues in collaborative research between multiple organisations or in research projects that are co-financed by multiple funders. This topic was only discussed as part of the sorting exercise in the four groups.

4.3.6.1 Key observations: 'Collaboration within funded projects'

The interviewees generally agreed that the topic is important, *"I think it's more important than IPR and that's because collaborations is sometimes where projects they die, if something goes wrong."* (RIO, focus group 7, p. 17). However, the issue only sparked an extended discussion in the Danish group. Here, it was pointed out that collaboration issues are the project manager/management's responsibility, "*But I would say, this is the problem of the project manager, he should take care of that. It's not the funding authorities that should do that.*" (Professor in wind energy, focus group 7, p. 17). The interviewees pointed out that it is up to the RPOs to make sure the project manager is properly trained and has the necessary institutional back up, *"We have a, all projects have a small group, background group that discuss that. We never go to the funding authorities to discuss these issues."* (Professor in wind energy, focus group 7, p. 17). A funder's role could be to check that there is a sound management structure around granted projects and that the project manager is properly trained, "*But they can, they can check if there's a description of the project management structure and if they have an education"* (Researcher of indoor environment, focus group 7, p. 17).

4.3.7 Monitoring of funded applications

Under 'Monitoring of funded applications' the focus group participants discuss several aspects of monitoring that funding organisations may perhaps implement for the research they fund. This could include monitoring of financial, grant execution, or RI compliance aspects. The topic and its subtopics were discussed at length in the Croatian and Greek groups, but also touched upon in the Danish and Dutch groups.

4.3.7.1 Key features of the topic 'Monitoring of funded applications'

Display 4.3.7: The mixed natural science groups' view on 'Monitoring of funded applications'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Monitoring of funded applications	More administration for PIs		Lack of deliverable evaluation	

Financial monitoring	Funding organisations should trust universities and researchers more			
Monitoring of execution of research grant	Flexibility needed because of unpredictability of research			Clarifications of output expectations beforehand Simplicity and clarity in the final reporting
Monitoring of compliance with RI requirements				Ex ante reflections and evaluations on RI in grant applications

4.3.7.2 Key observations: 'Monitoring of funded applications'

In the Greek group, it was pointed out that it is very important to have some kind of evaluation of the deliverables from projects. At least, funders have to make sure that grantees deliver what they promise. As it is now, you can promise as many deliverables as you want in your applications without being held accountable for them, "*You can give an endless list of deliverables and you don't have to deliver them; no one will judge you. Nationally, it will not be taken into account for your next proposal.*" (Professor in applied mathematics, focus group 29, p. 4). This makes people promise way too much in their applications. This was seen as a problem in national [Greek] applications, whereas the EU projects are monitored much more closely when it comes to deliverables, *"So, there [in Horizon2020 projects] is actually an evaluation of the deliverables. And in some cases, some deliverables may return back, may be rejected and have to be redrafted in order for the 2nd period of funding to be able to start."* (Project interviewer, focus group 29, p. 4).

Across cases, some level of monitoring was considered necessary. But it was also pointed out that more monitoring means more administrative work for the researchers, especially the PI, "*The first thing that comes to my mind is more administration for principle investigator.*" (Assistant professor of chemistry, focus group 24, p. 13). It was also important for the interviewees that monitoring takes the shape of interest instead of control, *"[…] we don't want control systems, it would be good with some interest, but we would like to deal with some things ourselves."* (RIO, focus group 7, p. 25). In the Danish group, freedom from interference was seen as a positive thing; too much monitoring was seen as a signal of lack of trust in researchers and RPOs,

> "*I think it would be good also to throw in the American way of thinking when we talk funding because if we look to Harvard and MIT, they are funded a lot. The money that follows are not in the same sense, or at least as far as I know, are not earmarked in the same way as they are when you get an ERC grant after a specific application or funding from Novo Nordisk or Willum [two big, private Danish RFOs] or whatever. And this of course is a matter of trust, right.*" (Researcher of geometry, focus group 7, p. 14).

If we look at the monitoring of the execution of research grant, it was pointed out that some flexibility in the monitoring is necessary, because research avenues are unpredictable, "[…] *funding agencies that monitor projects should be more flexible. Because it's not easy to predict what, what your, which results will bring your research in next, three, four or five years. And, so more flexibility in monitoring is also required."* (Professor of physics, focus group 24, p. 14). However, clarifications of output expectations beforehand, like in EU-funded projects, could be a good thing – if there is room for flexibility. It was further emphasised that the final reporting should be kept as short and to the point as possible, "*But these final forms are usually too administrative. […] what's really important to the funding agency, like European funding agencies should be made much more clear and much more simple, I would say. I think this would be the best monitoring."* (Physicist, researcher, industry, focus group 24, p. 14).

Finally, regarding monitoring of compliance with RI requirements, it was suggested to have ex ante evaluations of this as part of the evaluation of the research grant applications.

4.3.8 Updating and implementing the RI policy

This topic concerns procedures that funding organisations may put in place regarding updating and implementing policies on research integrity. It was discussed as part of the sorting exercise in the four groups.

4.3.8.1 Key observations 'Updating and implementing the RI policy'

This topic did not generate any lengthy discussion in the groups. Only the Danish group touched upon it shortly. Here, it was pointed out that it is important for funders to have policies that are regularly updated in dialogue with the RPOs, so that the funders and RPOs' policies are in line with each other.

4.3.9 Independence

'Independence' as a topic, addresses guidelines that funding organisations could implement to prevent unjustifiable interference from the side of for instance funders and commercial interests. The participants also discussed the overall importance of researchers maintaining their independence. The topic, with a special focus on independence from commercial interests, was discussed in-depth in the Greek group. Independence and its subtopics were further discussed as part of the sorting exercise in all four groups.

4.3.9.1 Key features of the topic 'Independence'

Display 4.3.9: The mixed natural science groups' view on 'Independence'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Independence	Independence connected with trust in researchers and autonomy Commercial interests and research manipulation are central issues		Exaggeration of outcome expectations in order to attract funding	
What counts as an unjustifiable interference?				
Preventing unjustifiable interference by the funder	Funders' interference through goal-setting for projects can jeopardise integrity Funders should be aware of possible side effects of making very specific calls			
Preventing unjustifiable interference by political				

or other external influences				
Preventing unjustifiable interference by commercial influences	Researchers and private companies have different outputs and interests. Funding from commercial actors involves delivering specified things. There can be interests in results manipulation and publication embargos. Collaboration with industry necessary to develop real-scale models		No official way to influence SMEs' research integrity	Guidelines on ensuring RI in collaborations with industry before signing funding contracts

4.3.9.2 Key observations: 'Independence'

'Independence' was understood as autonomy; that a researcher must be free to choose the design, methods, outputs etc. that make most sense scientifically. Independence also has to do with trusting researchers, "*Well, independence shows that you trust your researcher which is important and they feel; I mean that is why you become an academic, right? You want to; yeah, have your own research lines and make your own impact.*" (Research support manager, focus group 18, p. 23).

Interviewees across the focus groups pointed out that researchers have to be careful with who funds their research and under what conditions the funding is given. Too close collaboration with industry can have a bad influence on research integrity, "*We all think that avocados are healthier than red meat, but I understand that the research that proved that avocados are healthy was funded by the California avocado industry. So, it is just as lousy as all these other things. Probably it is a little bit healthier anyway, but still.*" (Professor of applied physics, focus group 18. p. 23).

According to the interviewees, private companies could have an interest in manipulating the science in projects they fund (methods, results, outputs etc.). The project interviewer mentioned food products as an example where you could manipulate results in order to boost your sale, *"[…] in these cases you can manipulate somehow the results, get some profit in the meantime, and then the market will show whether you were successful or not."* (Project interviewer, focus group 29, p. 11). An interviewee in the same group supplemented that with an example from another type of

industry, "*A colleague of mine received funding to do research on [the research project and where it was carried out]. All the money came from the company. So, first of all, there was an embargo in publishing their results, but, also, there was some manipulation about the results. So it depends always on the funding source."* (Assistant professor of agriculture, focus group 29, p. 10).

The problem with industrial funders who want to delay or influence research publications due to commercial interests, was also brought up in one of the other groups,

> "*And they want really to push you in a specific direction. I have examples from, right now, I have, one of my people there, he's having a project with a Danish [type of company]. […] So there's a discussion now on how to, the interpretations of measurements they are taking in field, and they don't believe the measurements because they say it could be due to this or that and so on. So these are also a part of that and when they are starting to release a scientific journal article on that, I'm sure there will be a lot of constraints on what's allowed to say or not say."* (Professor in wind energy, focus group 7, p. 9).

Many of these problems have to do with the fundamental differences in interests between researchers and industry. Researchers are mostly interested in publications and other academic outputs, whereas industry primarily has a commercial interest in science. However, interviewees also pointed out that collaborating with industry has many advantages, as for example better opportunities to scale up experiments and to make real life testing. To avoid problems of unjustifiable interference, interviewees suggested clarifying mutual expectations between industry and researchers before a funding contract is signed. Here, guidelines could be helpful.

In general, funders have to be careful with being too goal oriented in their approach to science, as this this could jeopardise RI,

> "*It's a problem that you have to reach a goal and this includes everybody. Maybe the SME that has invested – because I think they also, this is cofounded, they have to invest some money to the project – they will push to rather to produce something to get their money rather than stop the project or take the way out or whatever*." (Associated researcher in civil engineering, focus group 29, p. 10).

Being very goal oriented puts the independence of research at risk,

> *"[…] we see a tendency at the moment that they specify the calls to an absurd extreme sometimes. That you need to use something about green energy and then you get this sort*

of detailed call about what they are really looking for. So maybe they should look, they should look more at independence and more at trust of researcher […]." (RIO, focus group 7, p. 19).

Finally, it was pointed out that researchers also have a responsibility not to exaggerate the outcome expectations when submitting their research bids, *"people exaggerate a lot to get the funding."* (Professor in wind energy, focus group 7, p. 10). With the increased focus on the societal benefits of science, this was seen as an increasing tendency.

4.3.10 Publication and communication

Discussions on 'Publication and communication' concerned how RFOs can impose requirements and guidelines on publication and dissemination aspects of the research they fund. This could be setting publications requirements, clarifying expectations on authorships for project outputs, and setting requirements for open science. The topic was discussed in depth in the Croatian group, but also led to lengthy discussions in the Danish and Greek groups during the sorting exercises.

4.3.10.1 Key features of the topic 'Publication and communication'

Display 4.3.10: The mixed natural science groups' view on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication			Commercial journals have copyright over research once published	
Publication requirements	Reporting on failed research and negative results PhD publication requirements		Journals unwilling to publish negative results	All negative results must be published

Expectations on authorship	Authorship distribution typically according to contribution Unfair assigning of authorship considered a big RI issue	Nature or Science papers' contribution of each author	Authorship practices are embedded in local scientific culture. Guidelines will have difficulties solving the problems	Funders having guidelines on authorship contribution like journals Need to get rid of gift authorship culture
Open science (open access, open data, transparency)	Funders can exercise their power and change open-access systems Disciplinary differences in traditions and different perceptions of how mainstream open science is Data sharing really important for some research topics Data collectors owning the data	Open data procedures in astrophysics Portals for data sharing arXiv portal	Lacking proper data sharing infrastructure Huge expenses and sanctions from journals and publishers on open access Funding sanctions for not living up to open-access requirements Low-quality open-access and predatory journals	Ensure data publicly in databases if possible Funders refuse to pay for Golden Open Access Research communities establish their own journals

4.3.10.2 Key observations: 'Publication and communication'

If we first look at the subtopic 'Publication requirements', the problems and advantages connected to publishing negative results were amongst the issues discussed. It was pointed out that it is important to publish negative results, and in general to make room for failure,

> *"[…] when we are talking about research integrity, we mainly focus on success and excellence, but on the other hand, a macroscopic measure of research integrity might be the reported failures. I mean, if after so many years of having conducted research in a specific way within*

> *EU, there are no reported failures, this certainly means something, either that many of basic research projects are not very ambitious, so there is no risk, and this, certainly, compromises progress in knowledge, or, somehow, failure in is hidden or masked. […] we should leave some space for failure, not punishing the research groups that actually have performed the research according to all guidelines and best practices but still they failed. There is no progress if there is no possibility of failure. And definitely there is no research integrity, because failure is always there. If you are actually doing research."* (Assistant professor in engineering, focus group 29, p. 25).

One of the challenges for publishing negative results is that very few journals actually publish these results.

It was further discussed how much, and how early in the process, PhD students should publish during their PhD projects. The interviewees in the Greek focus group all agreed that it is a positive thing to publish papers as part of your PhD. To get your writings peer reviewed and to gain experience with publishing was seen as helpful for the candidates' further carriers. However, in order not to put too much pressure on the PhD candidates, it was also underlined that we have to be careful with the requirements for the number of papers that need to be published to obtain a PhD degree, *"Maybe we must go to the middle way, it should be not too many, but not zero."* (Project interviewer, focus group 29, p. 22).

The issue 'Publication and communication' sparked a long discussion in the Croatian group on problems related to authorship. Authorship issues were considered by this group as a major RI problem. In the natural and technical sciences, authorships are typically distributed according to contribution, "*What we usually do is the first author is the person who writes the paper, second author is the one who has contributed the most to the paper, and then, the rest of them as the contribution goes. The last author is always the advisor or the one who pays the money to the team."* (Professor in applied mathematics, focus group 29, p. 20).

The interviewees encountered many problems related to unfair distributions of authorships. This can both be in the form of gift authorships, where people who have not really contributed to a paper nevertheless get their name on it. Less frequently, it can also be the other way around, where authors are not getting their name on the paper, even though they substantially contributed to the work.

According to the interviewees, authorship practices are determined by different national and local cultures, or ways of 'doing science'. For example, even though they have not contributed directly to the work, you are expected in Croatia to put your professor and the data owner on the paper, "*If you want some data you need to put the owner of the data on the paper first. That's mandatory. It's like unwritten rule. But only in Croatia. When I worked with data from abroad it's free.*" (Assistant professor of physics, focus group 24, p. 4).

Because the distribution of authorships is so deeply embedded in the local scientific culture, it will also be hard to change it via, for example, SOPs and guidelines. Nevertheless, it was considered good practice to outline the contribution of each author in the paper. This could be turned into a general requirement from funders to funded research projects that authors of papers from such projects specify the contribution of every single author.

If we turn to open science, including open-access publication and open data, it was pointed out that funders here really can make an impact, like when the EU made it mandatory to have a DMP in Horizon 2020 projects. One of the things that could be taken up by the funders is open-access fees,

> *"[…] the ones paying what we are doing they have a huge say, and therefore it would also be really nice if funding agencies wanted to invest more time in ensuring that we are not double or triple paying for our publications, because they have an enormous power. So if they are saying 'sorry but we are simply not going to pay for Gold Open Access', then the system will change, because they are the ones with the money."* (RIO, focus group 7, p. 3).

Another, related problem, is that publishers get copyright over the research once it is published. As a researcher, you can therefore not publish it on open platforms without their permission. On the other hand, if researchers do not live up to funders' requirements for open-access publishing, the RPO can be punished financially. Focus on open-access publishing has also led to the increase in highly problematic, high fees but also low-quality 'predatory' journals. To avoid these journals and the high fees of the better commercial journals, one interviewee in the Danish group suggested appealing to scientific communities to start their own open-access journals. In this way the quality of the journal would be ensured, while at the same time the prices for publishing could be kept to

a minimum. In connection with this discussion, arXiv[5] was mentioned as a good example of a community driven portal for scientific papers.

There are similar problems attached to open data. Here, data collectors typically own the data: it is therefore up to them to make the data openly accessible. COVID-19 and climate change research has shown us how dependent we are on available data and that data is shared openly. Here funders could make sure that data from publicly funded projects are made publicly available. The discussions around open data made it clear that there currently are disciplinary differences in natural science when it comes to open data. For some this was mainstream, for others it was something relatively new. It was further pointed out that there can be practical problems connected to making your data openly available,

> *"I work with the huge amount of data and, in images. So I do, I work on software to analyse images and for me it's quite normal to share like open source code with some other people and also to use open source code from others. But the moment when you have lots of data that you acquired yourself it's not so easy I would say to share it. First, you don't have place to put it. There is no something like a huge, well organised public database where you could load your data. Second, it takes lots of time to sort it. And you have lots of trash data that, you know, that experiment didn't go well."* (Physicist, researcher, industry, focus group 24, p. 11).

Here, astrophysics might help with a best-practice example. As one interviewee explained, in astrophysics you use, "*big telescopes [unclear] telescopes all data you acquire you can use for yourself, for your research only for one year and then it gets public.*" (Physicist, researcher, industry, focus group 24, p. 7). The portal Ocean colour[6] was also mentioned as a good example of open data sharing.

[5] https://arxiv.org/

[6] https://www.oceancolour.org/portal/

4.3.11 Intellectual property issues

The topic 'Intellectual property issues' was discussed during the sorting exercise in the four groups. The topic addresses which policies RFOs possibly could adopt for tackling on IPR issues in the research they fund.

4.3.11.1 Key features of the topic 'Intellectual property issues'

Display 4.3.11: The mixed natural science groups' view on 'Intellectual property issues'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Intellectual property issues	Funders should not get too involved in dealing with IPR issues, RPOs can handle this Researchers generally uninformed on IPR		Small research entities struggling in dealing with IPR in big projects	

4.3.11.2 Key observations: 'Intellectual property issues'

The lengthiest discussion on this topic took place in the Croatian group. According to an interviewee in this group, researchers often lack knowledge about this issue,

> "*I would say that this is the, the topic most of the researchers at least in my field are not very well educated or informed about. They know how to publish papers, they know about general ethics issues, about authorships but when it comes to the intellectual property rights then it's like you know, not something general well known about*." (Assistant professor of chemistry, focus group 24, p. 20).

However, across the groups, interviewees did not think that funders should get too involved in this issue. In the Danish group, it was expressed that this is something the university itself can, and should, handle, *"I would say we can handle that."* (Researcher of indoor environment, focus group 7, p. 16), and in the Croatian group one of the interviewees said that he had experienced a funder that went too far and thereby ended up preventing a technology transfer,

> "*they would even go little bit too far drafting the contract, the IP contract between the partners that you had to stick to. And that was in a way ridiculous even though they probably know the people don't have experience but then at the end this contract that was already prewritten by the funding agencies, at the end were actually, they were obstacles to have some transfers of technologies*." (Physicist, researcher, industry, focus group 24, p. 20).

A challenge in big collaborative projects can be that individual researchers, small research units, and private companies do not always have the necessary legal knowledge and capacity to make the right decisions regarding IPR,

> "*Maybe I can add something. So I had experience with this intellectual property in European funds in [name of institution] with the big consortium where I was a partner with my private, with my company […] I was really not in a good position to, I cannot say negotiate, but even to go in consortium agreement with, with some fight or some additional, or some bigger role that maybe I should have had if I have some, if I would have some legal advice that is usually expensive or so to have more rights with the intellectual property, with the part of the project that I did in the end*." (Physicist, researcher, industry, focus group 24, p. 4).

The interviewees in this group did not think that guidelines or SOPs could solve this issue.

4.3.12 Heat map of perceived importance – natural science and RFOs

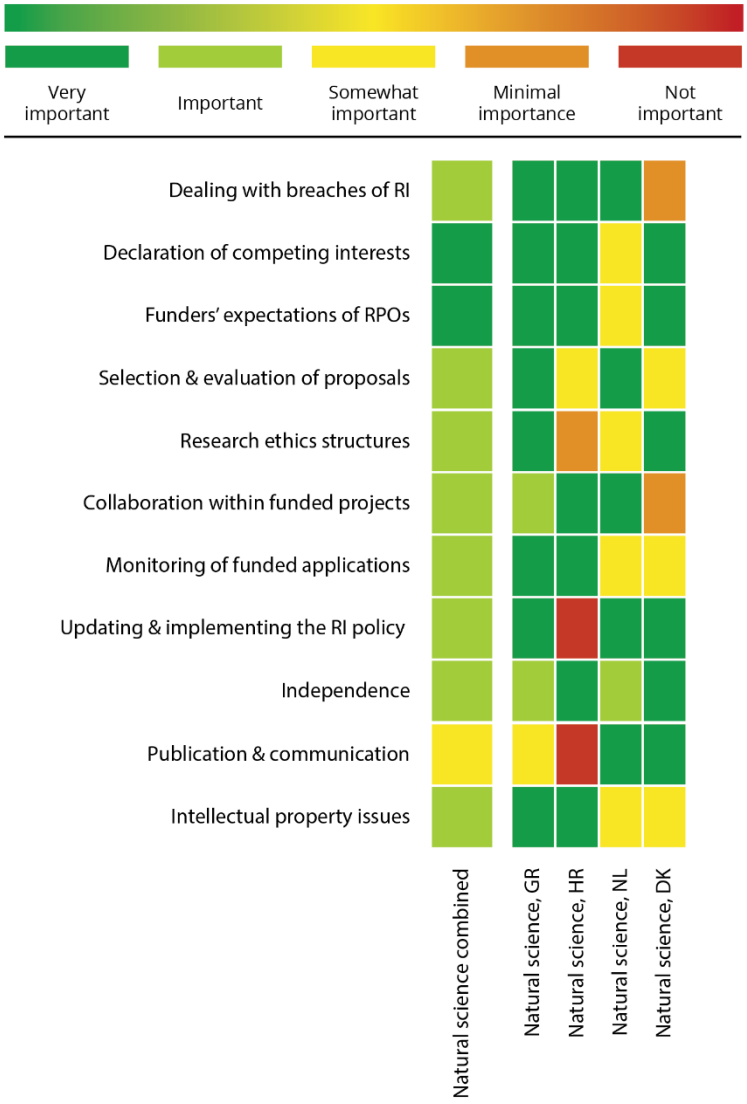


Figure 4.3.12: Heat map displaying sorting exercise results of 11 RI topics in the natural science RFO focus groups.

This heat map shows the results of the sorting exercise conducted during the focus group interviews for the stakeholder and researcher groups from the natural science. It reflects the importance assigned to specific topics in relation to research integrity. Specifically, the map provides an overview of the areas where participants perceived that RFOs could support the development of a strong research integrity culture with SOPs and guidelines. While the topics that demand the most attention from RFOs are clear, those marked as important deserve some elaborating. For some topics such as 'Dealing with breaches of RI' and 'Research ethics structures', the general feeling was that this must remain the responsibility of RPOs. Having tools for the 'Selection and evaluation of proposals' was seen as a positive contribution, as it would make procedures more transparent and fairer. Finally, 'Independence' was deemed important as a topic, but the range of actions for RFOs on this, as well as its influence on research integrity, were questioned during the sorting discussions.

4.3.13 Concluding remarks regarding natural science and RFOs

This chapter examines the understandings, prioritisation and recommendations of the four mixed (researchers and stakeholders) focus groups within the natural sciences in relationship to the 11 selected RI topics. The groups were conducted in four countries (Croatia, Denmark, Greece, and the Netherlands) with participants from these countries as well as other countries. In all, 24 interviewees participated in the focus groups and they represent core disciplines within natural science (Chemistry, Physics, Geology, Nanoscience, Mathematics etc.) as well as technical science (e.g. Wind energy, Chemical engineering). Together with researchers, stakeholders representing funders, industry, RIOs, ethical committees, RI committees, and unions also took part in the discussions.

Discussions in the focus groups, together with the heat map, show that the participants thought that the RI topics are all relevant for RFOs to address. All topics were thus placed in the 'very important' category in the sorting exercise in at least two groups, and no topic was placed in the 'none or minimal importance' category in more than one group. Four topics were placed in the 'very important' category in three groups. These topics are 'Declaration of competing interests', 'Funders' expectations of RPOs', 'Updating and implementing the RI policy', and 'Dealing with breaches of RI'.

Although the overall picture is that all discussed topics are important for the RFOs to address, the discussions also revealed differences in the perception of the importance of the single topics between the groups. As is the case within the humanities and social sciences (see sections 4.1 and 4.2), these differences can be explained with disciplinary, organisational, and especially national differences. For example, the topic 'Dealing with breaches of RI' was considered a 'very important' topic in three groups, but not in the Danish group, where it was placed in the category, 'none or minimal importance'. As the discussion of this topic shows (4.3.1), this was not because the interviewees in the Danish group believed that this topic was not important in itself. Instead, they pointed out that a legal system for handling this was already in place in Denmark and that RFOs therefore did not need to focus on this.

4.4 Medical science

The focus group study aims to explore how the main disciplinary fields of research perceive and relate to a number of research integrity issues relevant for both RPOs and RFOs, to understand the potential disciplinary variation in experienced challenges and their needs for institutional guidelines and SOPs to promote research integrity. In this section, we explore the promotion of research integrity in RFOs from the disciplinary perspectives of medical science.

Most studies on research behaviour and RI have been performed within the behavioural and (bio) medical science (Anderson et al. 2007; Hofmann and Holm 2019; John et al. 2012; Steneck 2006). As to the latter, a particular focus point of analysis has been the so-called "reproducibility crisis", understood as the difficulties of independent researchers to reproduce study findings (Resnik and Shamoo 2017). Such studies are (as within the other main areas of research) often linked to breaches of RI, and only a small number of studies explore the broader question of how RI is constituted and perceived from a more positive angle (Shaw and Satalkar 2018).

In the following, we examine how different stakeholders within and around medical science, such as researchers, REC and RIO members, funders, and researchers in management positions understand and prioritise RI topics such as independence from commercial interests, selection and evaluation of proposals, and research ethics structures. The aim is to increase our understanding of how RFOs may foster and advance RI practices and policies in alignment with the particular needs and interests of the medical sciences.

Four focus groups within medical science were carried out in four different European countries (Belgium, Denmark, Italy, and Spain) and they discussed and prioritised 11 different main RI topics. 20 different stakeholders representing core disciplines within medical science discussed and reported on their understandings of the different topics, key challenges related to them, and ideas and good examples of how to advance RI practices and procedures within each distinct topic. All four interviews were performed online due to the COVID-19 situation. The selected number of topics for the in-depth discussions (see display 4.4) in each group were integrated in the sorting exercise to fit the online format (see the methodology section for elaboration, section 2). The results of these discussions are addressed by topic in the following sections and summarised in separate displays were possible. We also provide a heat map at the end of this chapter (section 4.4.12) that visualises the assessed importance of each RI topic for the medical sciences.

Display 4.4. Overview of participants in the medical science focus group interviews

Focus group number	Disciplines represented*	Topics for in-depth discussion	Stakeholders represented***	Country	Face-to-face/online interview	Number of participants
8	Molecular pharmacology Biomedicine Clinical medicine	Research ethics structures** Selection and evaluation of proposals**	Private funding org. representative Management position at university Researcher Member of research ethics committee Administrative funding adviser (RPO)	DK	Online	4
9	Science communication Evolutionary Biology Developmental genetics Bioinformatics	Independence from commercial influences** Conflict of interest**	Researcher RI working group member PhD programme coordinator Scientific coordinator	ES	Online	4
19	Physiology Clinical medicine	Education and training in RI Dealing with breaches of RI	Researcher RIO	BE	Online	5

	Nursing education		Management position at university Public funding org. representative			
26	Anatomy Psychiatry Health statistics Gastroenterology Biology Physiology	Publication and communication** Monitoring of funded applications**	Researcher Ethical review board member RI review board member	IT	Online	7

* Participants may represent more than one discipline
** Due to the online format, the topics for in-depth discussion were discussed as part of the sorting exercise
*** Participants may represent more than one type of stakeholder

4.4.1 Dealing with breaches of RI

The topic 'Dealing with breaches of RI' concerns, which policies and procedures funding organisations may have in place in order to address research integrity breaches. For example, the medical science groups discussed which procedures funding organisations should follow, when breaches are detected, and how breaches could be sanctioned. The topic was discussed at length in the Belgian group, but the Danish and Spanish groups also granted the topic much attention in their sorting exercise discussions.

4.4.1.1 Key features of the topic 'Dealing with breaches of RI'

Display 4.4.1: The mixed medical science groups' view on 'Dealing with breaches of RI'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Dealing with breaches of RI	Focus on overall procedures and guidelines, whereas specific handling of cases is less important for this project RPOs should have detailed protocols for this and procedures on national and EU level as well In some countries, detailed procedures exist		Guidelines are no guarantee against misconduct	
RI bodies in the organisation				
Procedures for breaches by funded researchers	Funders be careful not to have separate procedures, if procedures are already in place in RPOs – division of work			Describe in grant agreement how breaches will be handled
By review committee members				
By reviewers				
By staff members				
Protection of whistleblowers and the accused				
Sanctions/other actions		Journal sanctions on dual	Mobility problem	Funders pay attention to misconduct cases

		publica-tions		Clear agreements on violations in the grant agreement
Communicating with the public				

4.4.1.2 Key observations: 'Dealing with breaches of RI'

The discussion on 'Dealing with breaches of RI' revealed huge differences between different countries and institutions. In the Belgian group, the feeling was that this was not the most important issue to concentrate on amongst the discussed topics. Here, it was suggested to concentrate on overall guidelines, but to leave the investigation and sanctions to the RPOs and the already existing systems, for example the Flemish system. On the other hand, participants in the Spanish group would like to see much more focus on this topic than what is currently the case. The difference reflects the current situation, where the region of Flanders has procedures in place, and the Catalonian region has not.

In the Spanish group, it was thus pointed out that it is important for the RPOs to have detailed procedures on how they will deal with breaches,

> "*But we decided or we discussed that it was very important that each institution has a protocol for dealing with this, a detailed protocol for dealing with this problem. So, how many people must be in the committee, from which, I mean, how we define the people that must be in the committee, all these steps in the process of dealing with this research integrity problem must be defined in this protocol for each institution... So I think it is very important to have some policies and some recommendations and some rules for it*." (Researcher in evolutionary biology, focus group 9, p. 16).

The participants in the Spanish group also called for regional, national and EU level procedures, "[…] *we need, apart from the institutional protocols and procedures, which, as we said before, it would be good if funders and agencies can force institutions to have these in order to get the money etc. But apart from that I think we need extra, like national level or maybe European level."* (Administrative employee in science communication, focus group 9, p. 17).

One of the challenges, when dealing with breaches, is that guidelines are no guarantee against misconduct,

> "*I have been confronted with things that I thought were not very OK, but I think that for all those issues there were very strict guidelines, I think that the guidelines, they were available or they are widely known. I think it's well known what we have to do and not do as researchers, but it really doesn't always help for people to comply with those guidelines, I think*." (Professor of surgery, focus group 19, p. 3).

If we look at 'Procedures for breaches by funded researchers', a funding representative in the Danish group warned against building up a detached system in RFOs,

> "*I think it will make little sense to make separate rules for funders, at least as long as you're funding research that takes place in public institutions that have sets of rules for this already. It would probably just add to the confusion rather than making things easier for those who had to adhere to all those rules. So if you as a funder think that there is an issue, you should take it up with those who are in charge of the rules already in place, rather than making your own rules on top of those very complicated rules*." (Private funding org. representative, focus group 8, p. 20).

The grant agreement could make the procedures and responsibilities around breaches of RI clear.

When it comes to sanctions, a participant in the Belgium group suggested looking at the entire research landscape. The interviewee was also a journal editor and pointed out that journals could (and already do) play a role in sanctioning, "[…] *this is indeed, I think, written in most journals instructions to the author, that if there is detection of fraud, dual publication, plagiarism to an extensive degree, that not only the manuscript will be rejected, but the faculty or the organization where the author is originating from will be informed."* (Professor of surgery, focus group 19, p. 11).

When it comes to sanctioning, mobility was conceived as a major challenge. Because there is no transnational system in place through which RPOs and RFOs can warn each other about researchers who have been involved in misconduct, researchers can in many cases just move on to another university if they have been accused of or convicted of misconduct,

> "*I think there should be more sanctions and it should be more coordinated, because otherwise, you know, they could lose their job here but then they go to some other country and they get a job and continue doing the same thing. So it's not, there's no, because everyone does their own thing and everyone looks only at their own people, their own staff and I don't know. I think there should be a more kind of global or national or supranational or whatever*

organisms or rules or something. It's like, for example what happens if someone that is in your institution committed misconduct when they were in a different institution, how, you know, what's the communication between the two institution, what, you know all these things, I think are not really solved. I don't know what funding agencies can do about it." (Administrative employee in science communication, focus group 9, p. 17).

4.4.2 Declaration of competing interests

'Declaration of competing interests' concerns which kinds of competing interests the participants find to exist within the medical research field, and which policies funders can have on handling conflicting interests in their funded research. All four focus groups discussed this topic as part of their sorting exercise.

4.4.2.1 Key features of the topic 'Declaration of competing interests'

Display 4.4.2: The mixed medical group's view on 'Declaration of competing interests'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Declaration of competing interests	Very important for funders to have policies for this *"We all have conflicts of interests"* (Associate professor in bioinformatics, focus group 9, p. 7)	Danish Ministry of Higher Education and Research's rules on conflict of interest		
Among review committee members				
Among reviewers	Close connection with independence		Small research communities	Look for reviewers outside of Europe
Among staff members				

4.4.2.2 Key observations: 'Declaration of competing interests'

Across the groups, interviewees agreed that it is very important for funders to have rules on conflicts of interest. This is due to the fact that all researchers have conflicts of interests, "*But we all of us have conflicts of interests, I may have institutional conflicts of interests with my own institution, right, in the sense that I may speak fondly and very positively about the research of a colleague of mine, just because it's a colleague of mine, you know.*" (Associate professor of bioinformatics, focus group 9, p. 6). Therefore, funding agencies have to have policies as to what counts as a conflict of interest, "[…] *funding agencies have to be enforcing a very extensive declaration of conflicts of interests, institutional, commercial of any kind."* (Associate professor of bioinformatics, focus group 9, p. 6). A funder in the Danish group expressed a similar view, "*So on conflicts of interest, I think it is extremely important for funders to have rules and to state these rules very clearly as an individual funder what you consider to be a conflict of interest and what not."* (Private funding org. representative, focus group 8, p. 13). Here, the guidelines from the Ministry of Higher Education and Research in Denmark were highlighted as an example of good guidelines.

The topic of 'Conflicts of interest' was also conceived to be close to the topic of 'Independence' – that reviewers were independent and as objective as possible in their evaluations, "[…] *from my perspective I understood it otherwise and I understand it in combination with this one. So, independence means for us whether an assessor, an evaluator is independent."* (Public funding org. representative, focus group 19, p. 17). Another challenge discussed was that conflicts of interest can be difficult to avoid due to small research communities where everybody knows everybody. In connection with this discussion in the Italian group, it was suggested that funders look outside Europe for reviewers of proposals.

4.4.3 Funders' expectations of RPOs

'Funders' expectations of RPOs' addresses expectations and requirements that RFOs may have to RPOs to enable their researchers to apply for and receive funding. The participants discussed expectations, on for instance, RI training sessions and institutional procedures in RPOs for handling misconduct. The topic was discussed in all focus groups in the sorting exercise, and the Belgian group furthermore had an in-depth discussion on the subtopic of 'Education and training for RI'.

4.4.3.1 Key features of the topic 'Funders' expectations of RPOs'

Display 4.4.3: The mixed medical science groups' view on 'Funders' expectations of RPOs'

Topic/sub-topics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Funders' expectations of RPOs	Funders' requirements of RI plans should aim at RPOs rather than single projects *"Then you just create another tick box"* (RIO, focus group 19, p. 16)			Controlling randomly selected research projects from time to time
Codes of conduct				
Assessment of researchers				
Education and training for RI	Division of work between RFOs and RPOs: RPOs' doctoral schools in charge of the RI training. RFOs raise awareness and make guidelines.	FWO's guidelines on promotion/supervision		RI training in institution a requirement to apply for funding Make it part of senior researchers contract with funders to take part in RI training Ideas for RI training content: supervision, issues from researchers' daily practices
Processes for investigating allegations of research misconduct	Differences between countries Funders can trigger institutional changes in procedures for handling of misconduct			Institutional procedures for dealing with misconduct a requirement to apply for funding

4.4.3.2 Key observations: 'Funders' expectations of RPOs'

In the discussion on 'Funders' expectations of RPOs', interviewees made it clear that requirements regarding RI plans and policies should be aimed at the RPOs rather than single research projects. Participants would like to see funders put pressure on RPOs to have high standards for RI, as this dialogue from the Spanish group shows,

> *P1: " […] in order to avoid you know extra burden and make it more difficult, perhaps I would-n't, I don't think it's very important to have a research integrity plan specifically for each project, you know, like 'how I am going to do with plagiarism in this project, how am I', but it requires that the institution has these things on place.*
>
> *P2: "No, I fully agree that the requirements should be at the institutional level" (Scientific coordinator,* focus group 9, p. 11*).*
>
> *P1: "Yeah, I also agree that this is very important. And I agree fully with [P2] that we need, apart from the institutional protocols and procedures, which, as we said before, it would be good if funders and agencies can force institutions to have these in order to get the money etc."* (Administrative employee in science communication, focus group 9, p. 11).

However, one of the interviewees also saw dangers in this kind of approach. In the Belgian group, an interviewee warned against turning the question of RI into tick boxing exercises. Instead, a change of mentality is needed, *"[…] then you just create another tick box because we already have to apply to a lot of things and you don't really create a change in mentality, which is more important, I think, than having all, then you can prove, you have a document in place because I don't think you change mentality with only documents."* (RIO, focus group 19, p. 16).

As a supplement to the requirements to the RPOs, it was suggested in the Danish group to also control the projects from time to time to check if they actually live up to the RPOs' RI standards. However, the interviewee who suggested this was also aware of the possible risks of putting an extra layer of bureaucracy on the research process,

> "*I think if, I know we're not supposed to put on new layers of control or reporting, but all I would say is that from my experience from the ethics committee, it is good practice to do it sometimes. Not least, you have done a lot, and some of these new consortia, they span, you know, several different countries, so many different groups, and, you know, maybe some of the researchers, they do have a good plan initially, they want to monitor things, but then you*

> *know things can go off in different directions. So I actually think it's a very good idea to just do some sort of a of a control, you know, of selected projects every once in a while."* (Professor in clinical medicine, research ethics committee member, focus group 8, p. 11).

If we look at the discussion on 'Education and training in RI', a representative from a funder in the Belgian group emphasised that there should be a division of work between RPOs and RFOs, where the RPOs are in charge of the training. RPOs know better what the researchers need. On the other hand, RFOs should raise awareness, create guidelines etc., *"So, this we do not see as a task for [name of the funder] apart from all kinds of raising awareness, also have guidelines that I already mentioned, profiles, frameworks, regulations etc., but for the moment we do not have the impression that for the training as such our intervention is necessary."* (Public funding org. representative, focus group 19, 7).

In the Spanish group, it was suggested that funders should make it a requirement for funding that RPOs have RI training and education in place in their institutions. According to the interviewees, this would have a big impact on RI. In the Belgian group, it was pointed out that senior researchers also need to have RI training and that this requirement could become part of the contract with funders. Here, it was further pointed out that it is important to focus on supervision and mentoring in the RI training, *"[…] what it is to be a supervisor and how you have to act and I think that's one of the important things for senior researchers, like how can I be a good supervisor […]"* (Professor in clinical medicine, focus group 19, p. 8). It was also suggested to module the training and education programmes so that they match the actual research process.

Another subtopic that was discussed in the groups was 'procedures for handling misconduct cases'. Here, it was pointed out that there are huge differences between countries and institutions in how they handle cases of misconduct. In some countries, a legal system is in place for handling such cases, whereas other countries lack national legal systems for this, as well as local institutional systems. Here, funders could play a role as a 'trigger' for getting procedures in place,

> "*So that could be a trigger to ask organisations, and not only organisations but also governmental parts, in order for example in Nordic countries you're more advanced, you have centralised [unclear] that is clearly defined, I think, what is handled by a central committee of misconduct and what is handled at the institutional level or university level, here we are far beyond, we are just starting to have a consultative regional committee, but it will be just consultative*." (Researcher in developmental genetics, focus group 9, p. 4).

RFOs could, for example, make it mandatory for RPOs to have a good system in place if they want to apply for funding.

4.4.4 Selection and evaluation of proposals

'Selection and evaluation of proposals' deals with criteria for research integrity issues that could or should be integrated when RFOs select and evaluate research proposals. This could be project-specific research-integrity plans and issues of plagiarism. All groups discussed the topic at length as part of their sorting exercise. The Belgian group also discussed it in their opening session and as part of discussions on other topics.

4.4.4.1 Key features of the topic 'Selection and evaluation of proposals'

Display 4.4.4: The mixed medical groups' view on 'Selection and evaluation of proposals'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Selection and evaluation of proposals	RFOs try to implement qualitative proposal assessments that looks at more than publications Funders be aware of national rules and codes of conduct	New review framework in the Netherlands		Make reflections on publications and output a part of the application
RI plan	RPOs should have RI policies in place, but RI plans for each project not necessary	DORA and WCRI declarations		Make special places in application platform for addressing relevant RI issues in the specific research project
Methodological requirements				Funders ask for data management plans for individual research projects
Plagiarism	Plagiarism of research project proposals sometimes experienced in panels		Parallel funding: double	

	Extreme cases of multiple applications for double funding can lead to a misconduct case		payment for the same piece of work	
Diversity issues				Reflections on gender composition of research team would be good, but be careful with quotas

4.4.4.2 Key observations 'Selection and evaluation of proposals'

In the discussion on 'Selection and evaluation of proposals', it was pointed out by a representative from a private funder that it is important that funders are aware of already existing national or institutional rules, before they start making their own, *"[…] for a private funding organisation that does its research support into public research institutions of different kinds, it's very important to adhere to the national set of rules, code of conduct, whatever is rules that researchers at such institutions must adhere to in the first place."* (Private funding org. representative, focus group 8, p. 3).

The general discussion also touched upon the publication pressure and funders' role in this regard. One of the interviewees pointed to the Netherlands as an example of a new good practice, "[…] *in the Netherlands this is the case, as you know, with the new review framework that is by NWO Academy has been presented at the end of 2019 to go to a more qualitative assessment, maybe also to avoid this stress on quantity, which indeed provokes sometimes bad practices.*" (Public funding org. representative, focus group 19, p. 6). In the Danish group, the funder representative called for more reflections on outputs in the applications and an increased acknowledgement of different types of outputs, "[…] *there are other just as valuable kinds of outputs that may be more relevant to the kind of project that you're suggesting compared to publishing everything in PNAS or wherever the impact factors are the highest."* (Private funding org. representative, focus group 8, p. 7).

On the subtopic of 'RI plan', interviewees in the Spanish group said that RPOs should have RI policies in place, but that it was not necessary to have RI plans for each single research project, "*I don't think it's very important to have a research integrity plan specifically for each project, you know, like 'how I am going to do with plagiarism in this project, how am I', but it requires that the institution*

has these things on place." (Administrative employee in science communication, focus group 9, p. 11).

In the Danish group, interviewees expressed a need for separating RI questions from the project description in applications. Funders could dedicate space in the application to the things that they wanted applicants to reflect on, or account for (for example, which permissions and approvals they already have or would apply for). It was also pointed out that grant holders should be made aware that funders expect them to follow local rules and procedures, "[…] *what does make sense is to make all applicants and not least grant holders aware that we expect them to follow rules at their local institution."* (Private funding org. representative, focus group 8, p. 19).

In the Spanish group, the DORA[7] and WCRI[8] declarations were discussed as documents that could inspire the evaluation of the RI elements of a project,

> "*The Hong Kong Principles asks for the evaluation of researchers to take into account integrity issues. So for example here it says 'assess responsible research practices, value complete reporting' […] or make all data available, 'reward the practice of open science, acknowledge a broad range of research activities, and recognise essential other tasks like peer review and mentoring'.*" (Administrative employee in science communication, focus group 9, p. 19)

Regarding 'Methodological requirements', it was suggested that funders could ask for a data management plan for granted projects.

Besides cases of plagiarism, which funders from time to time run into, funding committees also have to look out for researchers who try to obtain parallel or double funding,

> "*[…] Apart from that there is also the very specific issue of what we call parallel funding, so people trying to get paid twice, so to speak, for the same – or essentially the same – piece of work. We try to avoid that because we are working with public means and they should*

[7] https://sfdora.org/read/

[8] https://wcrif.org/guidance/hong-kong-principles

be spent in a fair and efficient way. Now, when those kinds of issues arise, again we rely on the peer reviews, the experts from the field, to actually point out whether this is parallel funding, and I can assure you this is not easy." (Public funding org. representative, focus group 19, p. 5).

Finally, it was suggested that more reflections on the gender composition of research teams would be good, but that it should not be in the form of a too instrumental use of quotas, "*I am all in favour of quotas, because I think that we have a big problem and you have to force it somehow, but I understand that in some cases, for example if there's a very male dominated field and you put a 50 percent quota for females makes it really really very hard"* (Administrative employee in science communication, focus group 9, p. 11)

4.4.5 Research ethics structures

In the discussion on 'Research ethics structures', the various stakeholders discussed existing institutional ethical guidelines and structures as well as the ethics requirements that RFOs do or could set up with regard to applying for and receiving funding. This includes requirements for attaining ethics committee approvals and for how ethical issues might be reported in funding applications. All groups discussed the topic as part of the exercise, and for three of the groups the issue was also brought forward as part of the open question session in the beginning of the interview.

4.4.5.1 Key features of the topic 'Research ethics structures'

Display 4.4.5: The mixed medical science groups' view on 'Research ethics structures'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Research ethics structures	Research ethics structures should be in place through RPOs. Funders expect that rules are applied and necessary approvals obtained		Negative findings do not get published. Seen as a task for ethics committees to	RFOs could have policies in place that ensure that all ethical approvals are obtained. If these are not obtained, the project will probably need to be adjusted and a plan b initiated.

	The topic is considered very important but also already very well addressed		ensure publication.	
Research ethics requirements				
Ethics reporting requirements				Online funding applications could provide an opportunity for ethical specifications related specifically to the topic of interest, e.g. clinical experiments Ethical considerations should have its own dedicated space for elaboration in the funding application

4.4.5.2 Key observations: 'Research ethics structures'

In general in the focus groups, there seemed to be a consensus that ethical structures are very important for medical research, but that as a topic, it is already well addressed at both RPOs and RFOs and ethical structures and guidelines are well established at large. Still, one associate professor of physiology pointed out that ethical commissions are not enough to cover the research integrity aspects of research ethics and that the implementation of common SOPs could be an idea to promote these aspects,

> *"… If you look to the example that you give us regarding to the COVID-19 and the research done by* hydroxychloroquine*, indeed the ethical committee is not enough to assure that integrity of the research should be done. And indeed we do need something different in order to start with the project, in order to design the study, in order to be sure that all the procedures are well done. And maybe that these SOP should be an useful tool in order to give strategy, a common strategy to perform research integrity activities*" (Associate professor of physiology, group 26, pp 2-3).

One funder pointed out that it is very important that RPOs have clear institutional ethical structures in place, and that the funding organisation rely on these structures. Hence, many applications will need to have ethical approvals from RPOs before projects are ready to be initiated. Furthermore, the funder also pointed out that funding applications need to contain a mandatory 'ethics list' (Public funding org. representative, group 19, p. 14). Another private funding body representative agreed to the importance of well-functioning RPO ethical structures, and the person in question was not in favour of adding *"separate rules*" that *"may be even in conflict with the rules that actually govern whether people do or do not get approval from ethics committees"* (private funding org. representative, group 8, p. 21). This funder looked positively upon implementing policies that require expected ethical approvals to be in place and if approvals cannot be obtained, a plan-b should be prepared.

4.4.6 Collaboration within funded projects

'Collaboration within funded projects' was discussed in all groups in the sorting exercise, but most profoundly in the Danish and Spanish groups. The topic concerns expectations and guidelines that funding organisations can set regarding research integrity issues that may arise in research collaborations amongst RPOs or research that is co-financed by multiple funders.

4.4.6.1 Key features of the topic 'Collaboration within funded projects'

Display 4.4.6: The mixed medical science groups' view on 'Collaboration within funded projects'

Topic/sub-topics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Collaboration within funded projects				
Expectations on collaborative research		The European Clinical Trial Partnership	Consortium partners differing in strictness of requirements	Alignment on requirements, e.g. the highest standards asked for amongst the collaborators

			Country differences on standards for informed consent	
Research that is co-financed by multiple funders	Complexity added when different funders ask for different things			Common grant schemes e.g. within EU Researchers should live up to highest standards asked of them (in case they encounter different standards) and make funders aware of conflicting requirements

4.4.6.2 Key observations: 'Collaboration within funded projects'

One of the problems that the interviewees expressed they experience in collaborative projects is that standards and procedures differ from country to country and sometimes also from institution to institution within the single countries,

> "*But I would say that it's a, when you have a collaboration where funding comes from different places that adds an extra level of complexity, because someone ask for something and some others ask for some other things. And maybe some partners in the consortium have more restrictive or more strict requirements and others not so much. So I believe that it is a problem or a difficulty or a challenge.*" (Administrative employee in science communication, focus group 9, p. 14).

The interviewees had, for example, experienced this with requirements regarding consent forms, "*So there are countries where the standards are, how can I say it, a little bit different. Collection of informed consent to be included in trials such as countries where treatment is free if you're in the trial, but it's very expensive if you're not.*" (Professor of clinical medicine, research ethics committee member, focus group 8, p. 12).

In the discussion on the topic, it was suggested to make it a policy for funders to demand that the highest standards always should be followed, *"The easy answer is to say that researchers should live up to the highest standard asked of them, because then all other funders' standards would be covered."* (Private funding org. representative, focus group 8, p. 12). The same interviewee (private

funding org. representative) further suggested making it a responsibility for researchers to make their funders aware of differing requirements and/or possible conflicts between funding sources.

Participants further suggested that funders could look into making common grant schemes in which they specify which rules should be followed. This would make it easier for applicants,

> "*I think recently there has been a few cases also in Denmark where for example several foundations in Europe have gone together on a common grant scheme. In that case, I think it will make it easier, if this is a common grant scheme, I think the foundations, it would be very nice if they had also considered which rules should be adhered to so it would be easier for the applicant*." (Administrative funding advisor in RPO, focus group 8, p. 12).

Common standards on the European level were requested, but it was also pointed out in the Spanish group that there already were some common standards and guidelines which could be used in collaborative projects, e.g. guidelines from the EDCTP, The European Clinical Trial Partnership.

4.4.7 Monitoring of funded applications

'Monitoring of funded applications' addresses different monitoring policies and processes that funding organisations can implement towards their grant holders. The topic was mainly discussed in the sorting exercise. The Danish, Spanish and Belgian groups had lengthy discussions on several monitoring aspects, including monitoring of the execution of research grants and compliance with research integrity requirements.

4.4.7.1 Key features of the topic 'Monitoring of funded applications'

Display 4.4.7: The mixed medical science groups' view on 'Monitoring of funded applications'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Monitoring of funded applications	Experiencing increased reporting to the funders		Bureaucracy and paperwork	

Financial monitoring				
Monitoring of execution of research grant	Flexibility in the research process is important, and funders monitoring grant execution restricts the creativity Monitoring of publishing of all results is a task for ethics committees, not the funders			
Monitoring of compliance with RI requirements	*"We don't have our own panels, because that would be a duplication"* (Public funding org. representative, focus group 19, p. 11)			

4.4.7.2 Key observations: 'Monitoring of funded applications'

'Monitoring of funded applications' was seen across groups as an important issue to address. But while the interviewees in general acknowledged that monitoring is important, they also pointed out that more monitoring easily ends up in more bureaucracy,

> *"And I think that if you, and it's very easy to prolong the list that you are going to control, and it's very difficult get things of that list once they have been on that list at any given point in time."* (Private funding org. representative, focus group 8, p. 9).

> *"Also 'cause it's really difficult to do this without adding much more paper-work and and kind of administrative [work], you know, also for the researchers […]"* (Administrative employee in science communication, focus group 9, p. 9).

It is about reaching the right balance between monitoring what needs to be monitored, but not monitoring more than that.

When it comes to 'Monitoring of execution of research grants', interviewees expressed quite diverse opinions. Some felt that funders should stay out of this part of the research process; others felt that funders could monitor this a bit more, illustrated in these two quotes from the Belgian group,

> "*I think it's worth it sometimes in some cases that some projects that have been approved are perhaps monitored a bit more intensively, whether or not they are actually executed etc."* (Nurse researcher and educator, focus group 19, p. 20).
>
> *"[…] I don't think it's a good idea to monitor everything researchers are doing and I also don't think it's feasible or possible even."* (RIO, focus group 19, p. 20).

It was pointed out that it is crucial to find a good balance between trust and control (focus group 8). Making too strict rules for the execution of the grant was also seen as something that could jeopardise creativity. Some flexibility is needed, "*But you talk about basic research and things are much more open, and you start to research something and then it becomes difficult or you find some [unclear] result, and you end up doing something totally different which maybe also as important, and there are so many examples of this."* (Associate professor of bioinformatics, focus group 9, p. 10). However, as it is also mentioned in the analysis of the topic 'Publication and communication' (see section 4.4.10), it was important for the interviewees that all results, negative as well as positive, are published. However, according to one of the interviewees (focus group 8), the funders should not monitor this. It should instead be monitored by an ethics committee (see also section 4.4.5).

In the discussion on 'Monitoring of compliance with RI requirements', a funder in the Belgian group pointed out that they did not have their own panels for this, and that this was up to the RPOs to monitor, "*We don't have our own panels, because that would be a duplication*" (Public funding org. representative, focus group 19, p. 11). However, in cases of misconduct funders should receive messages from the RPOs, so that they can react. Another funder (in the Danish group) agreed that the monitoring of RI is a task for the RPOs and not the funders,

> *"[…] of course it should be stated in their [the funders'] requirements that it should be under the umbrella of research integrity, but then that research integrity is more handled at the, for example at the university where they already have committees etc. in place to handle this. […] I think there is a big difference between monitoring and up front asking people to be compliant with rules. So I think it's important to state that you find this important as a funder, but I don't think it's important for the funding agency, whatever the source of money is, to control this, to monitor this. That would be at the university level*." (Professor of molecular pharmacology, management position at university, focus group 8, pp. 10-11).

4.4.8 Updating and implementing the RI policy

'Updating and implementing the RI policy' was discussed in all the groups as part of the sorting exercise. The topic addresses procedures that RFOs could have in place for updating and implementing their policies on research integrity.

4.4.8.1 Key features of the topic 'Updating and implementing the RI policy'

Display 4.4.8: The mixed medical science groups' view on 'Updating and implementing the RI policy'

Topic/subtopics	Main topic perceptions	Example of good practices	Chal-lenges	Recommendations and ideas for guidelines and SOPs
Updating and implementing the RI policy	Big funders must be aware of new things happening and update their policies accordingly Regular updating is important to ensure relevance of policies and avoid aspect that are no longer necessary			Check regularly if policies are still appropriate

4.4.8.2 Key observations: 'Updating and implementing the RI policy'

Apart from implementing the policies already in place, interviewees across the groups said that it is very important to make sure that your policies are updated regularly. The big funding organisations have to keep themselves updated on relevant changes and developments and update their policies accordingly,

> *"I think that when you're a funding organisation of a certain size, we have a lot, we have a huge amount of very small foundations in Denmark that, who are actually quite active within biomedical research, and you can't expect them to deal with all this governance, if they are only two or three people running a foundation. But when it comes to organisations of a certain size, I think that there's a great awareness, particular to the industrial foundations that we have so many of in Denmark, that you should, you should be aware of state codes of conducts and whatever rules you have, and stay in touch with whichever part of central administration that can update you on issues […] then decide on whether your local rules should*

be updated. So at least an occasional visit to your own sets of rules and see whether they should be updated or not." (Private funding org. representative, focus group 8, p. 18).

When you go through the policies it is also important to get rid of policies that are no longer important, in order to make sure the documents are kept as short as possible, "[…] *once something comes in, it never comes out and there is a risk that these guidelines would just grow and grow and grow."* (Professor of molecular pharmacology, management position at university, focus group 8, p. 19). If that happens, there is a risk that the policies would turn into documents nobody would actually read.

One of the interviewees (focus group 26) also said that it was important that these documents did not change all the time, or too frequently, so that researchers and others who would like to do things in the right way could keep up with the changes.

4.4.9 Independence

'Independence' refers to policies that funding organisations might implement in order to hinder unjustifiable interference in the funded research, be it interference from funders themselves, political, or commercial influences. The participants also discussed what they perceived as unjustifiable interference in the medical sciences. The topic was addressed by all four groups in the sorting exercise, and especially the Danish and Spanish groups had lengthy discussions on this topic.

4.4.9.1 Key features of the topic 'Independence'

Display 4.4.9: The mixed medical science groups' view on 'Independence'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Independence	Connection between independence and conflict of interests			
What counts as an unjustifiable interference?	Interference with publishing and more			

	Subtle forms of interference Funders directing research in a certain direction Companies changing policies during research project or killing PhD projects, when they lose interest			
Preventing unjustifiable interference by the funder	Transparency about funding important External funding makes up almost 100 percent of funding, and funders often have their agenda present in the calls			Funders should only interfere post-grant if something goes badly wrong
Preventing unjustifiable interference by political or other external influences	Independence is basically impossible because even universities' basic funding is a result of a political process			
Preventing unjustifiable interference by commercial influences	Especially important within medical research and collaboration with the pharmaceutical industry			

4.4.9.2 Key observations: 'Independence'

According to the interviewees, unjustifiable interference can be found in open, as well as more subtle ways,

> "*In the past where, you know, you have, you receive money from a company and then it is explicitly in the contract that you cannot publish anything or that they have to see everything before you publish it, and that is definitely, I think, an interference that should not be allowed. But then there are some other more subtle as governments in disguise that maybe all the money that this guy received, they didn't tell him that you can't say or you should say*

> *that, but it's influencing him kind of in a more subtle and difficult to grasp way*." (Administrative employee in science communication, focus group 9, p. 8).

Unjustifiable interference was also discussed as funders guiding research in a particular direction by the way they distribute their funding, i.e. the funding schemes they set up. For example, an interviewee expressed a worry that certain diseases are unjustifiably prioritised, "*A lot of researchers they are worried that the funders they will propose funding for projects that are associated with such as diseases, with cures that are expensive, and then sometimes forget the more marginalised diseases."* (Professor of clinical medicine, research ethics committee member, focus group 8, p. 16). Another set of challenges are attached to funding from industry. Due to other time perspectives and commercial prioritisations, industry can sometimes lose interest in a project and shut it down before it has been finalised. This can be especially harmful for PhD students who are working on such projects.

In the discussion on how unjustifiable interference from funders could be prevented, it was pointed out that it is important that researchers are very transparent about their funding sources, "[…] *when you have funding, it's always important to state where the funding comes from […] at least it's important that when a, when a researcher has a certain opinion that comes out of a research project that it's transparent if that could have been influenced by the funders."* (Professor of molecular pharmacology, management position at university, focus group 8, p. 14). Another way of ensuring independence for both researchers and funders would be to avoid interfering after the grant agreement has been signed, "*I guess that the independence that the foundations can have is that they can say that once they have granted the project, they will not basically, sort of interfere unless something really goes wrong."* (Professor of molecular pharmacology, management position at university, focus group 8, p. 17).

However, since external funding currently make up almost 100 percent of funding for research, research will always be influenced by funders,

> *"[…] for me the balance is important, and I think if we look at Denmark, I think what we can call truly, completely independent researchers is almost extinct, in the sense that the basic funding that I get to run my research is close to nil beyond my own salary. So that means that everything I do, and that goes for most of the faculty now, is externally funded, either from private foundations, from companies or from the government. And of course some of the calls are quite open and unrestricted but nevertheless there are people reviewing them. So there*

> *will be, in the end of the day, some restrictions and some areas, in particular new areas, can be very hard to fund initially. So I think to me the balance has gone too far towards the competitiveness [competitive funding], and that everything should be in competition. So I think it's fine that that element is there, but it's almost 100 percent now, and I think maybe that's not ideal from a university subscribing to the Humboldt model of independence."* (Professor of molecular pharmacology, management position at university, focus group 8, p. 16).

Even basic research funding given to universities also entails some risk of interference, because the priorities here are the result of political interests that in some cases are different from what researchers themselves would have prioritised.

Preventing unjustifiable interference from commercial influence is very important, according to the interviewees across the groups. Many interviewees mentioned potential problems related to research sponsored by or carried out by the pharmaceutical industry. Here are two examples,

> "*Yes, I agree that it's essential to maintain independence and to declare conflicts of interest. I think point D [preventing unjustifiable interference by commercial influence] is very important in medical research, especially in the research that is done and published by the pharmaceutical industry. It's a huge problem and I hope that this project can help to address that in the future."* (Professor of clinical medicine, focus group 19, p. 15).

> *"In biomedicine in particular, I think this independence of research is very important […] the pharmaceutical industry is a very good example and the pharma industry has such, is so strong and so powerful and can have, there are historically many, many examples where they have unduly influenced research"* (Administrative employee in science communication, focus group 9, p. 8).

Finally, it should also be mentioned that to some participants, 'Independence' was closely connected to 'conflicts of interest', as these two examples illustrate, "*Yes, I agree that it's essential to maintain independence and to declare conflicts of interest."* (Professor of clinical medicine, focus group 19, p. 15) and "*Yeah, okay. I am not completely sure, but what you described, I first, I, it sounds to me like the subject of conflict of interests. And of course conflict of interest is extremely, extremely important."* (Associate professor of bioinformatics, focus group 9, p. 6).

4.4.10 Publication and communication

'Publication and communication' refers to the requirements and guidelines that funders can set for publication and dissemination of funded projects. The topic, for instance, involves open science and authorship. The topic was discussed at length in all focus groups, mainly during the sorting exercise but also as part of the opening sessions in the Belgian and Spanish groups.

4.4.10.1 Key features of the topic 'Publication and communication'

Display 4.4.10: The mixed medical science groups' view on 'Publication and communication'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Publication and communication	Publication of research is crucial		Pressure to publish can lead to misconduct and publication of unfinished research Bad science	
Publication requirements	Publication cultures are different across disciplines Important to publish all findings, positive and negative			RFOs ask researchers in their project descriptions/applications to outline their view on relevant outputs
Expectations on authorship	Guidelines on aggregated level unusable to the specific research disciplines Funders expect researchers to follow established practices		Avoiding gift authorships Authorship issues in research collaborations	Draft publication policies in advance

Open science (open access, open data, transparency)	Open data just as important as open access to publication Funders can drive open science agenda forward		Open science is resource costly for the researchers, e.g. 'open access' Where and how to make data public	Make it obligatory to share data Investments in open data procedures and infrastructure RFOs give funding to the open access requirements they set Journals' prices should be scrutinised Train young researchers in open data

4.4.10.2 Key observations: 'Publication and communication'

Across the groups, the topic 'Publication and communication' led to a rich discussion on all the subtopics. In general, it was pointed out that it is important to publish your results,

> "*But I think we have to change the mentality and also realise that the communication is part of your research. It's the last step, and it's as important, if not more, than everything else. Because if you do all of that and you don't make it available for everyone, it's like, it's not, you know, it doesn't really have an effect. So I think that's important*." (Administrative employee in science communication, focus group 9, p. 6).

On the other hand, it was pointed out that too high a pressure to publish can also lead to bad research practices and publication of unfinished research,

> *"I think the main problem is the fact that first of all there is a pressure to publish and this results in high level scandals where data have been fabricated, data have been manipulated, data have been invented, graphs have been manipulated."* (Professor in clinical medicine, focus group 19, p. 4).

> *"I think part of the problem with research integrity might be connected to the growing pressure on publish or perish, not least publish in high impact publications or perish, so that can lead to an un-, what was an unintended pressure on publishing results that are maybe not*

ready for publishing yet." (Professor of molecular pharmacology, management position at university, focus group 8, p. 6).

A participant (in focus group 19) emphasised that it is a general challenge in medical science that there is a lot of bad science produced, and that the peer review process is crucial and needs to be strengthened, "*I think in general there should be an effort trying to professionalize in a way the way that peer review is being done, so that you can really discriminate good science from bad science."* (Professor in clinical medicine, focus group 19, p. 5)

Looking at the subtopic 'Publication requirements', interviewees pointed out that publication cultures are different across disciplines and that funders should acknowledge differences between disciplines in their requirements for outputs. Not all results have to be published in the best journals: other types of outputs should also be considered. However, it was emphasised that it is important to publish both positive and negative results – and that funders keep an eye on this, "*I think it's crucial, especially, or not at least, you know, considering studies which involve patients, because this is mandatory and we all write it in our protocol, you know, positive, negative, inconclusive, we will publish, but what's the follow up?"* (Professor in clinical medicine, research ethics committee member, focus group 8, p. 7).

Regarding 'Expectations on authorship', it was pointed out by an interviewee in the Belgian group that existing guidelines on authorship are on an aggregated level that make them difficult to use for the individual disciplines. Guidelines have to be close to the specific discipline, because each discipline has its own rules and traditions*, "But it's not always easy to find the specific guidelines for every discipline, because for a lot of different things and different disciplines you have other rules, for example like authorship with the first author, last author and so on."* (RIO, focus group 19, p. 4). A funder in the Danish group said that they as a funder expected researchers to adhere to established practices within their field, but that they otherwise did not interfere.

One of the big challenges concerning authorship in the medical field is gift authorships. It is a challenge especially for young researchers to avoid them, "*And it remains a general problem that gift authorships are abundant and that it's very difficult as a junior researcher not to mention the chief of your department, even if he or she did not contribute intellectually to the work that you've done."* (Professor in clinical medicine, focus group 19, p. 4). Collaborating with researchers outside your own lab can also make it difficult to settle roles; who should be co-author, corresponding author

etc. (focus group 26). In order to avoid such problems, it was suggested (focus group 26) to make a publication policy in advance in collaborative projects.

Looking at 'open science', it was pointed out that funders can play a key role in driving this development, *"[…] if the funders make the requirements for open science, then the process is necessary and the process will be more likely to happen more quickly."* (Administrative funding advisor in RPO, focus group 8, p. 8). An interviewee from the Spanish group said that it was as important to focus on open data as well as open access. A challenge here is, however, where and how the data can be made publicly available. There are many problems related to logistics in this and so far no common infrastructure for data sharing.

Another challenge, connected to open access, is the cost of open-journal publications. An interviewee in the Italian group pointed out that it can be difficult to get funding for open access. Likewise, a participant in the Danish group said that funders often require open access, but that they are unwilling to fund the costs. Finally, an interviewee in the Spanish group reflected on the dilemma of spending money on open access that could have been used on research, "[…] *it's tough to decide to use some of the money that I need for doing science, to dedicate this money to finance a publication in an open science journal."* (Researcher in evolutionary biology, focus group 9, p. 5).

The discussions in the focus groups led to many concrete suggestions for improvements. First, it was suggested to make it obligatory to share your data openly, *"So, I think this is the number one problem, there are no guidelines on that, and I think one of the possible solutions there would be to make it an obligation to share your source data publicly and I think that's the only way to go forward so that anyone can re-analyse the data."* (Professor in clinical medicine, focus group 19, pp. 4-5). Secondly, young scientists must be trained in good open data practices. Thirdly, it was suggested that governments invest more in open data infrastructures, so that data can easily be stored and shared. Fourthly, RFOs must ensure funding for open access, "[…] *if they require open access they should also have funding for this and not just say that the funding we've already got should cover it."* (Professor of molecular pharmacology, management position at university, focus group 8, p. 6). Finally, it was suggested to look into the prices that journals set for open-access publishing,

> *"[…] there must be done something in the journals also. I cannot imagine why we must pay so many… so much money for publishing just one paper, I mean, it's really really a lot of money when in fact as reviewers of the papers, we don't have, we don't receive any money*

for reviewing a paper, so I don't know if it's so expensive to publish, why it must be so expensive to publish a paper in an open science journal." (Associate professor of bioinformatics, focus group 9, p. 6).

4.4.11 Intellectual property issues

'Intellectual property issues' was discussed as part of the sorting exercise across all four groups. The discussions on the topic concerned whether the issues of IPR exist within the medical research field, and how funding organisations can take a position on such issues.

4.4.11.1 Key features of the topic 'Intellectual property issues'

Display 4.4.11: The mixed medical science groups' view on 'Intellectual property issues'

Topic/subtopics	Main topic perceptions	Example of good practices	Challenges	Recommendations and ideas for guidelines and SOPs
Intellectual property issues	Funder: no IPR strings attached to the funding Complicated legal stuff IPR related to technology transfer and conflict of interests Differences within medical research disciplines		Taking out patents can be "a nightmare"	

4.4.11.2 Key observations: 'Intellectual property issues'

In the discussion across the groups it became clear that 'Intellectual property issues' is a difficult topic to handle, especially for researchers. One of the researchers gave an example from a project,

"*It's because the, well first of all it's because there's two universities involved, so that's one complication already. But then with the EU and the EU project it is that our Tech Trans*

> *Officer at [name of university] had difficulties in handling the whole process, because there are all these partners involved and whether it was, I guess it's somewhat unclear what was actually in the grant agreement, how to handle this. I'm not an expert in this, I cannot really tell you what difficulties are in details, but it's just that it seems like there is a least something in the grant agreement that becomes a complication*." (Professor of molecular pharmacology, management position at university, focus group 8, p. 14).

This participant took out a patent in relation to an EU funded project, and experienced the process as a nightmare, *"[…] I took a patent, and right now I wish I never did, because it's just a nightmare to handle with the EU and everybody else involved in this. So there should, so they're certainly not facilitating the project process I think."* (Professor of molecular pharmacology, management position at university, focus group 8, p. 14). A funder in the Danish group said that they never attached any intellectual property strings to their funding – and that it was very important that everybody could see if there are strings or not connected to the funding they receive.

The discussion also showed that there are differences between basic research and clinical research, as well as research carried out with industry, as this dialogue from the Italian group shows,

> P: *"And for sure if you are dealing with basic research should be not so very important the intellectual property issue, so we have to distinguish to my opinion between this two issues."*
>
> I: *"But very important for clinical right? Or something like that?"*
>
> P: *"Also for the research activity that are done with industries you know. In terms of translation of the results of your research. In that case it's very, very important because otherwise it's impossible to deal with industries, companies or…"* (Associate professor of physiology, focus group 26, p. 16).

In the Spanish group, the IPR discussion led to a discussion on technology transfer and to possible conflicts of interests, "*But the issue is that the moment that I, that you create intellectual property, if I create intellectual property for my own research, I create a conflict of interest. And from that point on whatever, I publish on that research, I have a conflict of interest because I'm making money out of it*." (Associate professor of bioinformatics, focus group 9, p. 14).

4.4.12 Heat map of perceived importance – medical science and RFOs

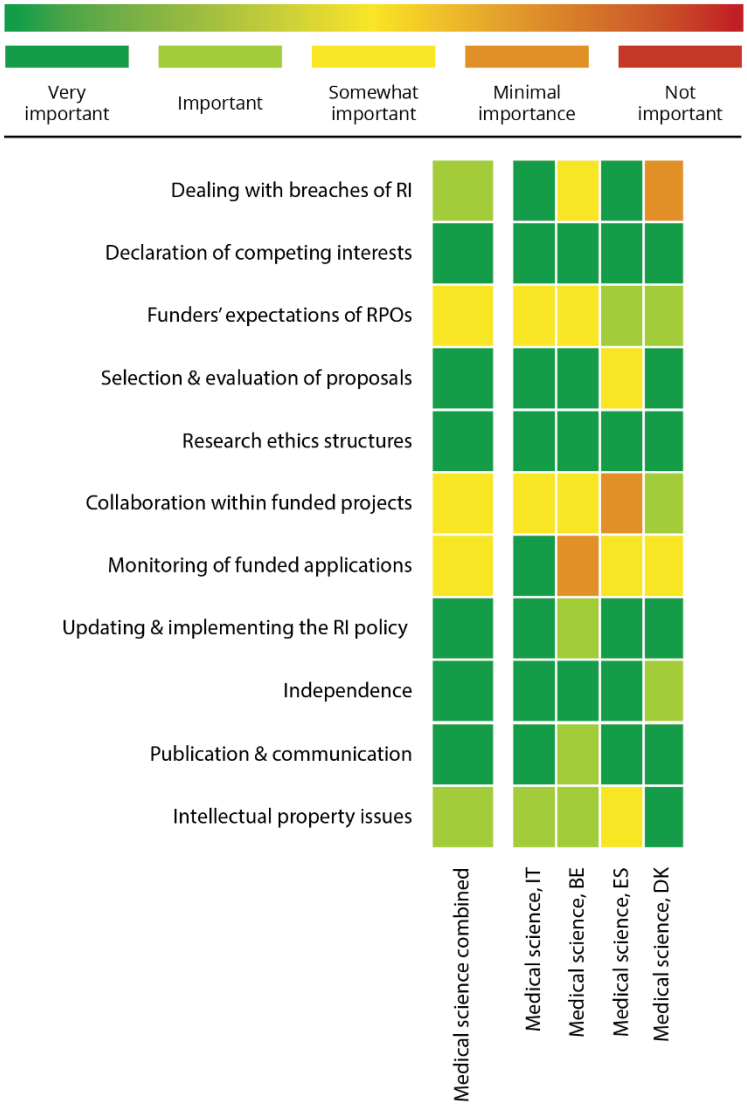


Figure 4.4.12: Heat map displaying sorting exercise results of 11 RI topics in the medical science RFO focus groups.

This heat map shows the results of the sorting exercise during the focus group interviews for the stakeholder and researcher groups from the medical sciences. It reflects the importance assigned to specific topics in relation to research integrity. Specifically, the map provides an overview of the areas where participants perceived that RFOs could support the development of a strong research integrity culture with SOPs and guidelines. From the eleven topics, six were deemed as areas where RFOs could contribute positively to RI efforts in research culture. As with the other disciplines, participants noted that there must be a balance on the responsibilities between RPOs and RFOs. Thus, for some topics such as 'Research ethics structures', 'Independence', 'Updating and implementing the RI policy', and 'Publication and communication', RFOs should not interfere with the internal affairs of RPOs, but should demand that there are mechanisms in place. While others, such as 'Declaration of competing interests' and 'Selection and evaluation of proposals', should involve the work of the RFOs themselves. Finally, the three topics marked as somewhat important ('Funders expectations of RPOs, 'Collaboration within funded projects', and 'Monitoring of funded applications') were seen as difficult to implement and follow effectively.

4.4.13 Concluding remarks regarding medical science and RFOs

This chapter examines the understandings, prioritisation and recommendations of the four mixed focus groups within the medical sciences in relationship to the 11 selected RI topics. The groups were conducted in four countries (Belgium, Denmark, Italy, and Spain) with participants from these countries as well as other countries. In all, 20 interviewees participated in the focus groups. The participants represent all major disciplines within medical science (clinical research, physiology, anatomy, biomedicine, molecular pharmacology, nursing, health statistics etc.), as well as key stakeholders such as RIOs, private and public funders, ethical committees, and RI committees.

The results of the discussions in the focus groups and the sorting exercise (displayed in the heat map) show that the topics 'Publication and communication', 'Research ethics structures', and 'Declaration of competing interests' are especially important for RFOs in relation to medical science. These three topics were placed in the 'very important' category in all four groups. But also 'Independence', 'Updating and implementing the RI policy', and 'Selection and evaluation of proposals' were assessed as important issues for funders to focus on. The results for 'Intellectual property issues', 'Dealing with breaches of RI', and 'Funders' expectations of RPOs' were more indistinct,

while 'Monitoring of funded applications' and 'Collaboration within funded projects' were assessed as the least important topics for funders to deal with in relation to medical science.

The low scores for 'Monitoring of funded applications' had to do with an experience of increased reporting to the funders and a fear of extra paperwork and bureaucracy. Moreover, the interviewees also pointed out that a balance between trust and control has to be found. For example, room for flexibility in the research process was considered important. A too rigid monitoring of the execution of the grant could jeopardise creativity. The low score for 'Collaboration within funded projects' probably has to do with an already confusing landscape of different requirements from different funders. The interviewees experienced that standards and procedures differ from country to country and sometimes also from institution to institution within the single countries.

4.5 Cross-case analysis of RI topics in RFOs – perceptions and perceived importance of topics across main areas of research

The preceding within-case analyses provide thorough insights into how the different main areas of research perceive the selected 11 RI topics and prioritise them in terms of importance of having and implementing SOPs and guidelines in RFOs in order to support and cultivate a strong research integrity culture. The heat-map and cross-case analysis below shed some light on emerging patterns and contextual variation across the four main areas of research in relation to the perceived need for RI policies and procedures in RFOs.

Figure 4.5: Heat map displaying sorting exercise results of 11 RI topics across the 16 RFO focus groups.

As highlighted throughout the within-case analyses above, each field of research has specific perceptions of the topics and needs for RI SOPs and guidelines. Hence, a main cross-cutting finding is that RFOs must pay particular attention to disciplinary characteristics and varieties in RI needs when

considering, designing and implementing RI procedures and policies. This pattern is also displayed in the heat map above, which shows a quite varied picture of how the focus groups have sorted the topics within as well as across disciplines.

Nonetheless, the heat map allows for an identification of several topics that were sorted more often under very important, such as 'Dealing with breaches of RI', 'Research ethics structures' and 'Publication and communication'. The heat map also identifies topics that were more often sorted as less important, 'Intellectual property issues' and 'Collaboration within funded projects', but these topics were still ranked as important in several groups.

Aside from disciplinary differences, other contextual factors such as national and organisational differences are found to influence the focus groups' quite varied perceptions and importance assessment of the different topics. For instance, the focus group participants come from different national contexts with variations in funding cultures and variations in legal and institutional structures for handling allegations and breaches of research integrity. Similarly, the organisational contexts differ across researcher and stakeholder institutional affiliations, with very varied attention given to the different topics in terms of established RI practices and procedures. Current RI landscapes are also determining for the recommended efforts for RFOs to pursue. Thus, if well-functioning institutional and national practices are in place – e.g. related to managing potential RI breaches – RFOs should refrain from establishing parallel procedures. In this regard, consensus existed amongst participants that unnecessary bureaucratic requirements should be avoided. Researchers, in particular, expressed the concern that added SOPs and guidelines from the RFOs will result in an increased administrative burden.

5. Conclusion, crosscutting themes and recommendations

In SOPs4RI, it is a core idea that RPOs and RFOs must make their own Research Integrity Promotion Plans (RIPPs) to ensure that their research activities live up to the fundamental principles of the European Code of Conduct for Research Integrity: reliability, honesty, respect, and accountability (ALLEA, 2017). In the RIPPs, the RPO or RFO must describe the organisation's RI policies and reflect as to how the policies will be implemented, monitored, and updated. To help RPOs and RFOs in this work, SOPs4RI is working on selecting and defining the topics that should be addressed in the RIPPs. SOPs4RI will further build a toolbox with SOPs and guidelines for the selected topics that RPOs and RFOs can use, or be inspired by, in their own work with the RIPPs.

Nine RI topics were selected for the first version of the toolbox for the RPOs and eleven topics for the RFOs (see section 3 and 4 above). This selection was based on two extensive scoping reviews (D3.2, link in references), interviews with research integrity experts (D3.3, link in references), and a Delphi survey (D3.4, link in references). The focus group study has confirmed the importance of the selected topics for the toolbox. Although not all the topics are equally important for all disciplines, each of them was considered important by at least two main areas of research (medical science, natural science, social science and/or the humanities). In fact, as the combined heat maps in section 3.5 and 4.5 show, seven out of nine RPO-topics, and nine out of eleven RFO-topics were considered 'very important' or 'important' by at least three of the four main areas. 'Declaration of competing interests' and 'Collaborative research among RPOs' were the two topics that got the lowest scores within the RPO groups, while it was 'Intellectual property rights' and 'Collaboration within funded projects' in the RFO groups. However, as mentioned, in both cases two of the four main areas still considered these topics important.

The RI topics and sub-topics that emerged in the focus group interviews are contained within the nine and eleven predefined and broad RI topics but they, as well as the interviews in general, add to a detailed understanding of the depth and width of the different topics. At the same time, the results of the focus group study show that several contextual factors and topics are of significance for researcher and stakeholder perceptions and vital to take into consideration when tailoring institutional RI polices and guidelines.

First of all, the focus group study clearly shows that RPOs and RFOs have to consider disciplinary differences when they prepare their RIPPs. For most of the topics discussed in the focus group interviews, the findings show that researchers requested policies that take disciplinary differences into account. This is also the case with SOPs and guidelines, where researchers from different areas of research expressed a need for discipline-specific support and guidance in their work. For example, this became evident in discussions on the topic of 'Data practices and management'. Here, many good examples of SOPs and guidelines already exist within medical science (e.g. for how to handle data in clinical trials). However, SOPs and guidelines from the medical sciences cannot simply be transferred to other main areas of research. Across the natural sciences, medical sciences, humanities and social sciences, researchers work with very different types of data. They therefore also need different SOPs and guidelines to help them in their work. Therefore, to be useful for different RPOs and RFOs – with different disciplinary priorities – SOPs4RI's toolbox must contain SOPs and guidelines for all main areas of research.

Besides offering insights into the specific needs of disciplines, the focus group study has likewise cast light on the understanding amongst researchers of the RPOs' and RFOs' roles in ensuring a high RI standard amongst researchers in Europe and beyond. Interviewees across the focus groups emphasised that the responsibility of the RPOs is to ensure a high standard of RI. For example, RPOs must ensure that researchers work in a sound research environment with fair procedures for appointments and promotions. They also have to establish ethics and RI structures, to ensure appropriate RI training of researchers at all levels, and prepare relevant SOPs and guidelines for the different disciplines.

The results from the mixed focus groups also point towards many areas in which RFOs can make a difference. First, they can look at their own evaluation and funding procedures and practices and formulate policies for topics, such as, for example, 'Selection and evaluation of proposals', 'Declaration of competing interests', and 'Monitoring of funded projects'. Moreover, RFOs can also put pressure on RPOs in order to get them to focus more on RI, i.e. to have clear policies, governance structures, and guidelines in place. One of the challenges here is to find the right balance between making an impact through RI policies and practices in the RFOs and at the same time avoid duplicating structures. If RPOs already have good policies and procedures in place, there is no need for RFOs to create their own policies and procedures for these topics. However, in the cases where good RI policies and procedures are not in place, RFOs can make a huge impact on RI issues by putting their own RI standards into effect.

Avoiding duplication and parallel systems constitutes another issue discussed by the participants during the interviews, i.e. avoiding unnecessary bureaucracy. Across disciplines, RPOs, and countries, researchers felt they have to deal with too much bureaucracy when it comes to RI. In the RPOs and RFOs, it is therefore important to think carefully about application requirements, review requirements, and other types of paperwork connected to RI. Interviewees expressed a willingness to work thoroughly with RI issues, but they feared that new policies and standards would be placed on top of already existing requirements, so that valuable time is taken away from research and redirected into paperwork.

Consequently, RPOs as well as RFOs need to critically scrutinise all their documents, forms, and requirements in order to see if they can be slimmed down and made more relevant to researchers. They should ask: Are all the requirements necessary? Are they important for all disciplines in all types of RPOs across all countries? Can researchers actually answer the questions they are asked? RPOs and RFOs must make sure that all their RI requirements and tools are meaningful and practical for the researchers who are going to use them. If not, such policies, procedures, and practices will lose legitimacy, as shown in this report.

A related issue that emerged in the focus group interviews, relate to the costs associated with RI requirements. Formulating policies, establishing RI structures, monitoring RI issues, paying more attention to RI issues in applications, and so on are all activities that potentially can ensure a high RI standard in the research carried out, but they are also activities that come with a cost (money, time, focus etc.). It is therefore important to carry out cost-benefit analyses to find out where to get most value for money. This will also be an element in SOPs4RI's future work in relation to the pilot testing of the toolbox.

Finally, it is also important to consider national differences. Some countries have national laws that regulate some of the topics discussed in the focus groups. This is, for example, the case with the topic 'Dealing with breaches of RI'. Here, different national legislation and non-legislation has to be taken into account when formulating policies, governance practices, and guidelines for this topic.

To conclude, the focus group study has validated the importance of the selected RI topics for the RPOs and RFOs. The study also clearly shows the need for a disciplinary approach in working with the RIPPs. When formulating policies, establishing governance structures, or preparing SOPs and guidelines, disciplinary differences have to be taken into account. The focus group study further shows that both RPOs and RFOs can play a positive role in ensuring high RI standards. However, the

message from the focus groups is also that RFOs especially have to be careful not to expend energy on establishing procedures and practices in areas where good procedures and practices already exist. To uphold legitimacy around RI procedures and practices, it is also essential to avoid unnecessary bureaucracy. Researchers should do the paperwork that is necessary to uphold a high RI standard, but not more than that. Requirements must also be meaningful and practical. Lastly, the focus groups also pointed towards important national differences that SOPs4RI have to consider in future work.

6. References

ALLEA (2017). The European Code of Conduct for Research Integrity. Revised Edition. https://allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

Anderson, M. S. et al. (2007): "Normative dissonance in science: Results from a national survey of U.S. scientists", Journal of Empirical Research on Human Research Ethics 2(4): pp. 3-14

Bouter, L. M. et al. (2016): "Ranking major and minor research misbehaviors: results from a survey among participants of four World Conferences on Research Integrity", Research Integrity and Peer Review (2016): pp. 1-17.

Davies, S. R. (2019): "An Ethics of the System: Talking to Scientists About Research Integrity", Science and Engineering Ethics (2019) 25: pp. 1235-1253. https://doi.org/10.1007/s11948-018-0064-y

D3.2 (SOPs4RI Deliverable): "D3.2: Scoping reviews including multi-level model of research cultures and research conduct", authors: Gaskell, G., Ščepanović, R., Buljan, I., Utrobičić, A., Marušić, A., Reyes Elizondo, A. E., Kaltenbrunner, W., Labib, K. and Tijdink, J., link: https://www.sops4ri.eu/wp-content/uploads/D3.2_Scoping-reviews-including-multi-level-model-of-research-cultures-and-research-conduct.pdf (2019)

D3.3 (SOPs4RI Deliverable): "D3.3: Report on the results of the explorative interviews", authors: Ščepanović, R., Tomić, V., Buljan, I. and Marušić, A., link: https://www.sops4ri.eu/wp-content/uploads/D3.3_Report-on-the-results-of-the-explorative-interviews.pdf (2019)

D3.4 (SOPs4RI Deliverable): "D3.4: Report on the rounds on the Delphi procedure", authors: Labib, K., Mokkink, L., Bouter, L., Widdershoven, G., Evans, N. and Tijdink, J., link: https://www.sops4ri.eu/wp-content/uploads/D3.4_Reports-on-the-rounds-on-the-Delphi-procedure.pdf (2019)

D4.2 (SOPs4RI Deliverable): "D4.2: First version of the SOPs and guidelines", authors: Tijdink, J., Dierickx, K. and Widdershoven, G., link: https://www.sops4ri.eu/wp-content/uploads/D4.2_First-version-of-the-SOPs-and-guidelines.pdf (2020)

D5.1 (SOPs4RI Deliverable): "D5.1: Protocol for the focus group interviews", authors: Sørensen, M. P., Ravn, T. and Bendtsen, A.-K., link: https://www.sops4ri.eu/wp-content/uploads/D5.1_Protocol-for-the-focus-group-interviews.pdf (2020)

Fanelli, D. (2009). "How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data", PLoS ONE 4(5): p.e5738

Halkier, B. (2016). Fokusgrupper (3rd ed.). Frederiksberg: Samfundslitteratur

Hofmann, B. and Holm, S. (2019): "Research integrity: environment, experience or ethos?", Research Ethics 15(3-4): pp. 1-13. DOI: 10.1177/1747016119880844

Haven, T. L. et al. (2019): "Researchers' perceptions of research misbehaviours: a mixed methods study among academic researchers in Amsterdam", Research Integrity and Peer Review (2019): pp. 4-25. https://doi.org/10.1186/s41073-019-0081-7

John, L. et. al. (2012): "Measuring the Prevalence of Questionable Research Practices With Incentives for Truth Telling". Psychological Science 23(5): pp. 524-532.

Morgan, D. L. (1997): Focus Groups as Qualitative Research (2nd ed.). Thousand Oaks, CA, US: Sage Publications, Inc.

Patton, M. Q. (1990). Qualitative evaluation and research methods (2nd ed.). Thousand Oaks, CA, US: Sage Publications, Inc.

Penders, B. et al. (2009): "A question of style: method, integrity and the meaning of proper science", Endeavour 33(3): pp. 93-98. DOI: 10.1016/j.endeavour.2009.07.001

Resnik D. B. and Shamoo, A. E. (2017): "Reproducibility and Research Integrity", Accountability in Research 24(2): pp. 116-123. DOI: 10.1080/08989621.2016.1257387

Saldaña, J. (2013). The Coding Manual for Qualitative Researchers (2nd ed.). London: SAGE Publications Ltd

Shaw, D. and Satalkar, P. (2018): "Researchers' interpretations of research integrity: A qualitative study", Accountability in Research 25(2); pp. 79-93. https://doi.org/10.1080/08989621.2017.1413940

Steneck, N. H. (2006): "Fostering integrity in research: Definitions, current knowledge, and future directions", Science and Engineering Ethics (2019) 12(1): pp. 53-74.

7. Appendices

7.1 Appendix I. Roadmap

SOPs4RI - Roadmap for WP5

Planning and designing

Deadline	Task	Responsible/involved
15/8-19	Matching of expectations with WP4 on what we get from WP4 - and what we are expected deliver to WP4	MPS
15/8-19	Agenda for kick-off meeting in WP5	MPS/TR
29/8-19	Kick-off meeting for WP in Aarhus	MPS/all
29/8-19	Task distribution between partners	MPS/all
29/8-19	Sampling strategy	TR/all
20/9-19 (send out for comments before 10/9)	Invitation letter	TR/comments from all
20/9-19	Excel template for recruitment	TR
20/10 (process begins at kick-off meeting)	Create exercise for focus group interviews	MPS, TR/all
1/11 (draft for comments 15/10)	Interview guide	MPS, TR, CWTS/all
1/11-19 (draft for comments 15/10)	Consent form	TR/all
1/11-19	Finalise design of focus group interviews (Milestone 13 in SOPs4RI)	MPS/all

8/11-19 (draft for comments 3/11-19)	Submit Ethical Approval application to Aarhus University's Research Ethics Committee (to be discussed by them on their meeting 5 December)	MPS, TR/all
18/11-19, from 13:00 to 15:00 CET	Skype meeting on recruitment process and test interviews	All partners
11/12-19	Test of interview guide/four test interviews	AU, CWTS, NTUA, MEFST
16/12-19, from 13:00 to 15:00 CET	Skype meeting on experience with test interviews (Any problems in the interview guide? Exercise? Other things?) + status on recruitment process	All partners
20/12-19	Adjustment of interview guide and exercise	MPS, TR, CWTS
15/1-20	Recruitment of interviewees finalised	All partners
15/1-20	Guidelines for practicalities in connection with the interviews (recording, material, catering etc.)	TR
31/12-19	Deliverable 5.1 ready for review: Protocol for the focus group interviews. This protocol must give a detailed description of the design, methods and aims of the focus group interviews.	MPS/TR and CWTS + comments from all.
31/1-20	All focus group interviews are planned (including recruitment of interviewees, booking of rooms, catering, check of recording equipment etc.) (Milestone 14 in SOPs4RI).	All partners
31/1-20	Deliverable 5.1 uploaded to the EC	AU

Interviewing

Deadline	Task	Responsible/involved
1/2-20	Interview period begins	All
15/2-20	Template for transcription of interviews send out	TR

31/3-20	32 focus group interviews conducted	All
23/4-20	Transcription of 32 focus group interviews finalised (can begin immediately after each interview has been conducted) (Milestone 15 in SOPs4RI).	AU, CWTS, MEFST, NTUA

Analysing and reporting

Deadline	Task	Responsible/involved
15/4-20	Coding strategy finalised	AU, CWTS
24/4-20	Coding of interviews in NVivo begins	AU, CWTS
31/5-20	Coding of all interviews completed	AU, CWTS
1/6-20	Analysis strategy finalised and analysis of interviews begins: • responses to version 1.0 of the SOPs and guidelines • discipline specific needs regarding SOPs and guidelines	AU, CWTS
30/6-20	Analysis completed	AU, CWTS
1/7-20	Writing period for report on the results of the focus group interviews begins. The report is going to describe the results of the focus group interviews, focusing on the differences between the four main disciplinary areas. It should be written in accordance with the expectations described in the protocol for WP4.	AU, CWTS, all partners comment and/or contribute
31/7-20	Deliverable 5.2 ready for review.	AU, all partners
31/8-20	Deliverable 5.2. uploaded to the EC	AU

7.2 Appendix II. Invitation letter to potential participants

Invitation to participate in a focus group discussion on promoting a strong research integrity culture

Dear Sir/Madam [replaced by name],

We invite you to take part in a focus group discussion organized by the European project SOPs4RI (Standard Operating Procedures for Research Integrity: https://www.sops4ri.eu/) **on the xx of March 2020 at the …. University.**

SOPs4RI is funded by the European Commission as part of the SwafS (Science with and for Society) program within Horizon 2020. SOPs4RI aims to promote excellent research and a strong research integrity culture across European Research Performing Organisations (RPOs) and Research Funding Organisations (RFOs).

As part of the project, we plan to conduct 32 focus group interviews across Europe with researchers from the humanities, social science, natural science, and medical science together with main stakeholders from, e.g. research integrity offices, academies of science, journals, RFOs, governmental bodies, industry, and researcher unions.

In your capacity as a researcher [or stakeholder] within the field of x [replaced by field specific information], we would like to invite you to participate in one of these focus group interviews.

We are interested to learn more about how RPOs (e.g. universities) and RFOs can help researchers within your discipline to conduct research in the best and most responsible way. In the focus group, we thus wish to learn from the participants' needs for research integrity procedures and guidelines. Your valuable perspectives and knowledge will help us to identify best practices and develop a novel and practice-oriented set of useable research integrity guidelines that RPOs and RFOs can use to create institutionally tailored research integrity promotion plans.

The focus group interview will involve 5-6 researchers from related research disciplines [or 3 researchers and 3 stakeholders] together with two SOPs4RI members. Your personal information will

be kept strictly confidential throughout this process, and all written and processed interview material will be anonymised. Please see our privacy policy for more information (https://osf.io/ycakg/).

The interview will take place at x on x and will last for two hours. We would be very grateful if you could indicate whether you would like to participate in the focus group discussion.

If you have any questions concerning the project and/or the details of the focus group study, please contact [the person recruiting + email + telephone]

Kind regards,

7.3 Appendix III. Letter of information to participants

Background for the Focus Group Study

SOPs4RI (Standard Operating Procedures for Research Integrity) is a four-year (2019-2022), multi-partner project funded by the European Commission. SOPs4RI aims to stimulate transformational processes across European Research Performing Organisations and Research Funding Organisations (RPOs & RFOs). Specifically, SOPs4RI will establish an inventory of relevant Standard Operating Procedures (SOPs) and Guidelines that RPOs & RFOs can draw on when developing governance arrangements promoting strong research integrity cultures.

In the new research framework program in the EU – Horizon Europe – that kicks off in January 2021, the European Commission wishes to strengthen its commitment to Research Integrity by requiring that organisations that receive EU funding, not only formally declare compliance with the European Code of Conduct for Research Integrity (ALLEA), but also do this in practice by implementing so-called Research Integrity Promotion Plans (RIPPs). A RIPP is a plan for how the organization will ensure, foster and promote responsible research practices, avoid detrimental practices, and handle misconduct.

The SOPs4RI project has been asked by the commission to deliver a document describing which topics that should be covered in the RIPPs. The research group behind the SOPs4RI project consists of 13 organisations in 10 different European countries. We are working towards creating an online, freely available toolbox with Standard Operating Procedures (SOPs) and Guidelines that Research Producing Organisations (RPO, e.g. universities) and Research Funding Organisations (RFO) can use in their work with the RIPPs.

The Focus and Approach in the Focus Group Discussion

In order to make the toolbox useful for different organisations, it is important that it is sensitive towards national, organisational and disciplinary differences. In different work packages, we look into different aspects of this. The purpose of the focus group study is to help us gain a better understanding of different disciplines'/main research areas' needs for research integrity support from RPOs and RFOs in the form of SOPs and/or guidelines.

In previous work in SOPs4RI, we have identified a number of topics that influence research integrity, and that are important for universities and other research producing or funding organisations to

address. Such topics could for instance be education and training in RI; research ethics regulatory procedures; publication and communication issues and dealing with breaches of RI, among other topics.

In the focus group interview, we will present the focus group participants with some of the topics in order to learn more about their understanding of them – and the participants' needs for SOPs or guidelines for these topics within different areas of research. In all, we are going to discuss two or three different topics in-depth. We also have an exercise where participants will be asked to sort a longer list of topics into three different groups, depending on their relevance and importance for the field of research. The interview will last for 2 hours including a short break.

In a focus group interview, there are fewer questions than in a standard interview, and the conversion in a focus group takes place among participants rather than between the interviewer and the interview person as in a standard interview. We wish to learn from the participants' experiences and perceptions, and it is therefore important that the participants talk together and discuss the issues presented by the moderators of the focus group. The moderators' role is therefore primarily to be mediators for a conversation between the participants.

All issues discussed in the focus group interview are confidential. The interview will be audio recorded and the subsequent interview transcriptions will be anonymized and handled in alignment with the European Union's General Data Protection Regulation as outlined in the project's privacy policy and in the consent form that participants will receive prior to the interviews.

7.4 Appendix IV. Consent form

Informed Consent for Participation in SOPs4RI Focus Group Interview Study

Description of the Project

SOPs4RI aims to promote excellent research that aligns with the principles and norms of the European Code of Conduct for Research Integrity, and to counter research misconduct. Through the development and empirical validation of standard operating procedures (SOPs) and guidelines, the project intends to cultivate research integrity and reduce detrimental practices across European research performing organisations (RPOs) and research funding organisations (RFOs). SOPs4RI is funded by the European Commission as part of the SwafS (Science with and for Society) program within Horizon 2020.

Aim of the focus group interviews

In the focus group interviews, we wish to learn from the participants' various experiences with the kinds of research integrity procedures and guidelines that are seen as beneficial for researchers and stakeholders from different fields and organisations. This valuable knowledge will help us identify best practices and develop a novel and practice-oriented set of useable research integrity procedures that RPOs and RFOs can use to create institutionally tailored research integrity promotion plans. The 32 European focus group interviews in this study will include researchers from the humanities, social science, natural science, and medical science together with main stakeholders from, e.g., research integrity offices, academies of science, journals, RFOs, governmental bodies, industry, and researcher unions.

The study poses a small risk of discovering sensitive information, for instance concerning research misconduct cases or problems with how specific institutions deal with research

integrity issues. In the focus group introduction and debriefing, we will emphasise that participants are not to repeat what is said in the focus group interview to others. By signing this informed consent form, participants agree to maintain the confidentiality of the information discussed by all participants and researchers during the focus group session. Participants will have the opportunity to view, and if relevant, comment on their own transcription.

Use of data and dissemination of research findings to participants

The focus group interviews will be audio recorded and the subsequent interview transcripts will be made fully anonymous. Informed consent forms will be stored separately from the audio files and interview transcripts. All data material will be stored encrypted and safely at SharePoint, a web-based collaborative and GDPR compliant platform, for 5 years after the last publication from the study. SharePoint will be administered by the project coordinator, Aarhus University.

Each participant in the focus group interview may at any time demand removal of his/her interview data by a simple request to the coordinator of the study, Mads P. Sørensen (mps@ps.au.dk), or to Aarhus University's Data Protection Officer (DPO@au.dk). Data, which have already been published, cannot be removed.

The findings from the focus group interviews will be analysed, published and made publically available. The project report detailing the findings of the study will be send to all participants when the report has been finally approved by the European Commission. No personal identifiable information will be mentioned or disclosed at any point. To promote open science and avoid research waste, anonymised data from the focus group interviews will also be made available on the project's OSF (Open Science Framework) site: https://osf.io/49fbk/. Here all names and other identifiers (information on country, university etc.) will be removed to ensure full anonymity.

Data breach

In case of a data breach, affected participants will be contacted and data will be temporarily removed from the compromised storage. All internal transfer of sensitive data will be done though secure pathways. Specifically, the secure Sharepoint workspace established for the SOPs4RI project will be used for data transfer.

Supervision

Aarhus University's Data Protection Officer (DPO@au.dk) can be contacted for questions regarding Data Protection in the SOPs4RI project. Research coordinator Mads P. Sørensen (mps@ps.au.dk) also welcomes any questions about this study.

Consent

Participation is voluntary and participants are free to withdraw from the study at any time and without giving any reason for withdrawing by contacting Mads P. Sørensen (mps@ps.au.dk) or Aarhus University's Data Protection Officer (DPO@au.dk).

By signing the consent form, you indicate that you are in agreement with all of the statements below:

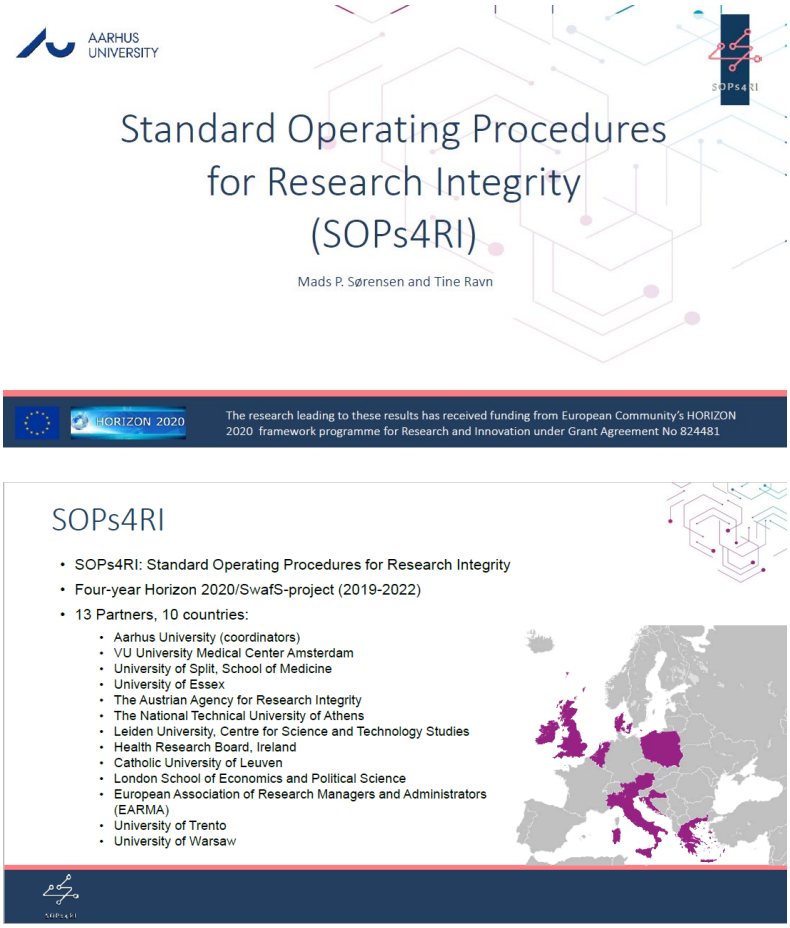
- I have read the information provided about the study. I have had the opportunity to ask questions and my questions have been sufficiently answered. I have had enough time to decide whether I would like to participate.
- I am aware that participation in the study is voluntary. I also know that I can decide at any moment to not participate or to withdraw from the study. I do not have to provide any reasons for not participating or terminating enrolment in the study.
- I give consent to the audio recordings of the focus group interview.
- I give consent to the collection and use of my interview data in line with established data protection guidelines and regulations (GDPR).
- I give consent to having my interview data safely stored for five years on SharePoint after the last publication from the study.
- I give consent to having my anonymised transcribed interview data made publicly available on OSF. I understand that this means that the anonymised data can be used for research purposes other than the ones described above. I am also aware that this means that my anonymised information may be used in countries outside of Europe and that the regulations for data processing and storage in those countries may not comply with those of the European Union.
- I agree to maintain the confidentiality of the information discussed by all participants and researchers during the focus group interview.
- I want to participate in this study.

Participant's signature: Contact's signature:

Name in Block letters:

Day/month/year

7.5 Appendix V. Introductory power point slides to the interview



From principles to practice

Research Integrity Promotion Plan (RIPP)

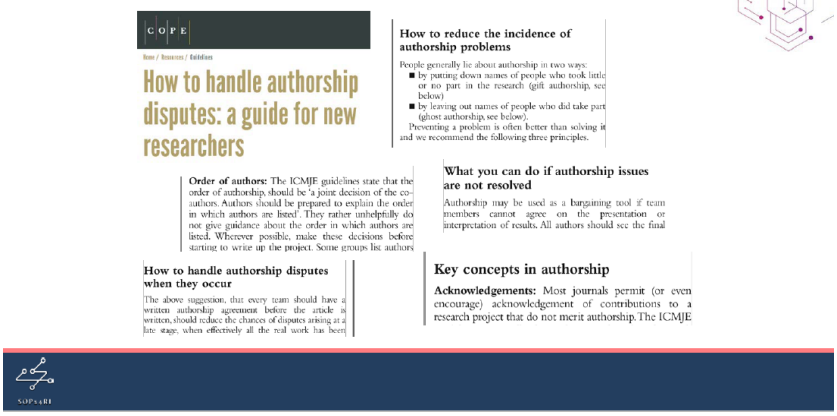
- All research performing organisations (RPOs) and research funding organisations (RFOs) should have a RIPP
- The RIPP should outline the steps that the RPO or RFO will take to promote research integrity in the context of its mission and disciplinary focus
- It should address a number of RI topics and subtopics – and outline policies for how these topics will be handled.

Responsible Conduct of Research

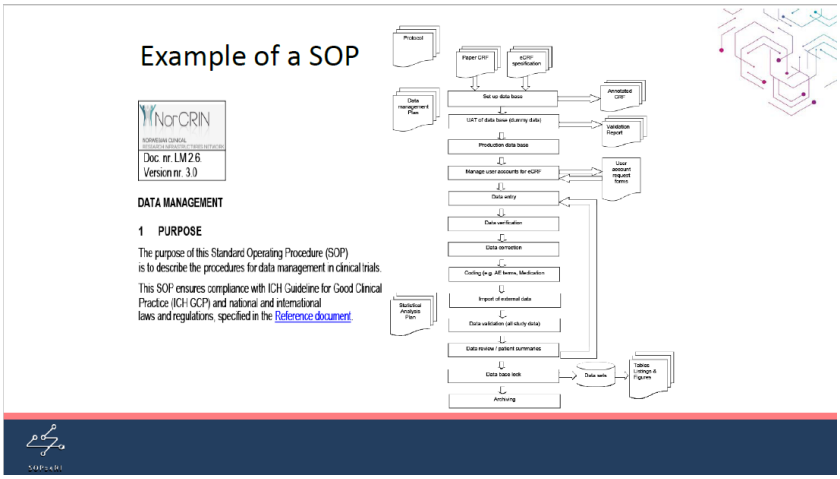
In SOPs4RI, we work on …

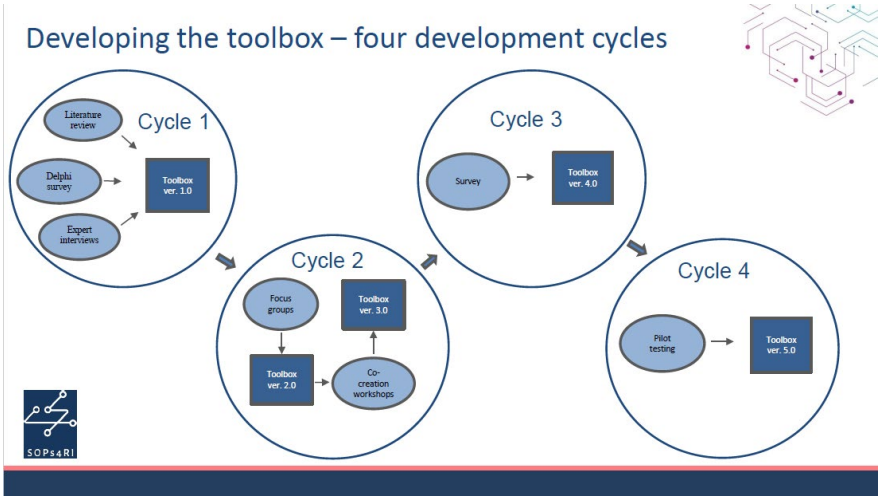
- **Defining the topics and subtopics** that should be addressed by research performing organisations (RPOs) and research funding organisations (RFOs) in the RIPPs.
- **Creating an online, free, and easy accessible toolbox**
  - Good examples of Standard Operating Procedures (SOPs) and Guidelines for all the topics and subtopics.
  - SOPs and guidelines that RPOs and RFOs can use as inspiration when formulating their own RI policies.

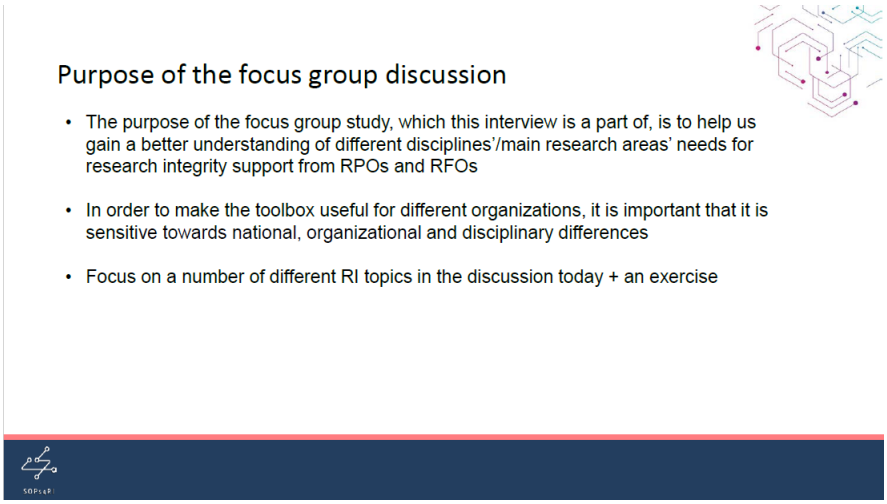
Example of a guideline



Example of a SOP







7.6 Appendix VI. Template for participant info sheet

Focus group no. X, Field of research, discipline, mixed/researcher groups

Date and time:

Interview address:

Interview participants:

1. Name, affiliation, position, contact details, other important information (e.g. leave early etc.)
2. X
3. …

7.7 Appendix VII. Moderator guide

The focus group study – the interview/moderator guide

Consent form (5 minutes)

"Before we start the interview, we need you to sign the consent forms we send you in advance." [Have extra copies ready for signing, in case the participants haven't brought a signed version of the copy that was send to them].

Introduction (10 minutes)

[Parts of the following text – 'Background' and 'What we are going to talk about today' – will be send to participants beforehand, when the interview appointment is confirmed. During the interview, the main points are summarized in a few slides].

Welcome

Thank you very much for taking the time to participate in this focus group study. We are very pleased that you accepted our invitation.

Background [May be done in the national language, if needed]

In the new research framework program in the EU – Horizon Europe – that kicks off in January 2021, the European Commission wishes to strengthen its commitment to Research Integrity by requiring that organisations, that receive EU funding, not only formally declare compliance with the European Code of Conduct for Research Integrity (ALLEA), but also do this in practice by implementing so-called Research Integrity Promotion Plans (RIPPs). [Have a copy of the Code of Conduct ready if anybody asks what that is]

A RIPP is a plan for how the organization will ensure, foster and promote responsible research practices, avoid detrimental practices, and handle misconduct.

Our project, which is called SOPs4RI (Standard Operating Procedures for Research Integrity), has been asked by the commission to deliver a document describing which topics that should be covered in the RIPPs. The research group behind SOPs4RI consists of 13 organisations in 10 different European countries. We are working towards creating an online, freely available toolbox with Standard Operating Procedures (SOPs) and Guidelines that Research Producing Organisations

(RPO, e.g. universities) and Research Funding Organisations (RFO) can use in their work with the RIPPs.

- [Show an example of a guideline] By guidelines, we mean statements 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 may include checklists.

- [Show an example of a SOP] Standard Operating Procedure (SOP) are on the other hand a detailed, written instruction, aimed to achieve uniform action step-by-step. SOPs prescribe specific actions; they liberate users from decision-taking by ensuring that the procedure is followed. They may come in the shape of a 'decision-tree'/flow-diagram, similar to what is referred to as an algorithm in clinical contexts.

In order to make the toolbox useful for different organisations, it is important that it is sensitive towards national, organisational and disciplinary differences. In different work packages, we look into different aspects of this. The purpose of the focus group study, which this interview is a part of, is to help us gain a better understanding of different disciplines'/main research areas' needs for research integrity support from RPOs and RFOs in the form of SOPs and/or guidelines. The focus group study consists of 32 interviews overall.

What we are going to talk about today

We have invited you today, because you are researchers [or stakeholders] within x main area of research.

In previous work in SOPs4RI, we have identified a number of topics that influence research integrity, and that are therefore important for universities and other research producing [or funding] organisations to address. Today, we will present you with some of the topics in order to learn more about your understanding of them – and your area of research's needs for SOPs or guidelines for these topics. In all, we are going to discuss two [or three] topics in-depth. We also have an exercise where you will be asked to sort a longer list of topics into three different groups, depending on their relevance and importance for your field of research. More about that later.

Practical issues

The interview will take 2 hours including a short break after an hour. [There is coffee, tea and water on the table. There is also some cake and some fruit, so please help yourself to some of that OR sandwiches/light lunch in the break].

In the interview today, we start with a couple of open questions. We then specifically look at two [or three] topics in-depth before we have a break. Hereafter, we turn to the exercise before rounding off.

In a focus group interview, there are fewer questions than in a normal interview. It is important that you talk together and discuss the issues. Our role is primarily to be moderators for a conversation between you.

We also have to emphasise that all issues discussed in the focus group interview are confidential. It is important that everybody can talk freely without fearing that what he or she says here might be brought up elsewhere.

After the interview

The interview will be audio recorded so that we can remember what has been said today. The subsequent interview transcriptions will be anonymized and handled in alignment with the European Union's General Data Protection Regulation as outlined in the consent form and the project's privacy policy.

Introduction of participants

All participants introduce themselves [starting with their names, so that the transcribers can separate their voices.]

Opening questions (10-15 minutes)

For the 16 researcher-only groups

1) "When you think about your own work/research, are there any areas related to RI where it would be beneficial to have more clear guidelines or SOPs?"
   Probes:

   "Have you experienced any problems when it comes to being able to conduct your research in a responsible way and would it have been useful for you to have SOPs or guidelines here?" "Do you sometimes experience that it is difficult to find out what the right way to act is, when you are working with RI issues, for example some of the issues you just mentioned?"

2) "Which topics would you like to see covered in a RIPP at your institution?"
   Probe:

"What is the most important topic for enhancing RI in your area of research?"

For the 16 mixed groups

1) "Funders could potentially play a role in setting RI standards that beneficiaries – both researchers and their host institutions – should live up to in order to receive funding. Which areas related to RI would you like to see funders focusing on?

   Probe:

   "What is the most important topic for enhancing RI in X main field of research – and is it a topic that funders should do something about?"

   "Which problems related to RI do you encounter in your work?"

   "Now we would like to delve into two [or three] RI topics that might be important for universities or other research producing organisations [or funders] to focus on: topic no. 1 is …, topic no. 2. Is … [and topic no. is …]

[Overall, 40 minutes are allocated to the two or three topics]

First topic (15 minutes):

Second topic (15 minutes):

Third topic (15 minutes):

Break (10 minutes)

[Moderator explains when the interview will start again]

The sorting exercise (25 minutes)

Introduction

In our project (SOPs4RI), we have via a Delphi survey [Explain, if needed, what a Delphi consensus consultation process is], expert interviews and scoping reviews identified a number of topics that effect research integrity and that universities and other research producing organizations [or RFOs, for mixed groups] might need to address. However, we don't know which of these issues are especially important for x main field of research. We would therefore like you as a group to talk about and to sort these topics into three categories:

- In group 1, you place the topics that are *very important* for RI within your field of research,
- In group 2, you place the topics that are *somewhat important* within your field of research,
- In group 3, you place the topics that are of *no or minimal importance* for research integrity within your field of research.

[We are especially interested in hearing their thought on how it should be – what we *ideally should focus on*– seen from their disciplinary perspective.]

[The cards with the topics are placed on the table together with three other cards with group numbers, all participants get 3 minutes for themselves to think about the question, and collectively they hereafter negotiate which cards to put into group 1, 2 and 3.]

[Remember to take a photo of the cards at the end of the exercise!]

Follow up questions, examples:

- For the topics that are placed in group 1, "Is there a need for SOPs or guidelines for these topics?"
- "Why have you placed X in group Y?"
- "Is X not important since you have placed it in group 3?"

Add to topics (5 minutes)

"Are there important topics for RI that we have missed? Are there other topics we need to include? Things that RPOs and RFOs have to pay attention to and implement SOPs and guidelines for?"

Rounding off/debriefing (5 minutes)

- Thank you for you participation.
- What will happen now: transcripts, analysis, report to the EC (we'll send the report to you) plus academic papers.
- End with a short evaluation of the interview "How have you experienced the focus group?

Extended feedback round during pilot focus groups (substitutes Rounding off/debriefing) (20-30 minutes)

- Thank you for you participation.
- What will happen now: transcripts, analysis, report to the EC (we'll send the report to you) plus academic papers.

"Since this is the first focus group we are conducting in this focus group study, it would be helpful for us if you could provide us with some feedback on the interviews. We will use this feedback to optimize the next focus groups."

Questions and concerns to be discussed

- How did you experience the introduction – were the slides clear?
    - Did you feel you got enough information - and relevant information?
- For each of the main questions in the topic guide (2-3 per focus group)
    - One of the main topics we addressed in the focus group was "…". Were the questions related to this topic clear? Was there any ambiguity/lack of clarity in how the questions were asked?
        - Is there something we could improve in the questions discussed?
- Regarding the sorting exercise
    - Was it clear what was expected of you during the exercise?
    - Were there any problems in conducting the exercise? Suggestions for improvements?
- On the general process of the focus groups
    - What could the facilitators do better to maximize the outcome of the focus group interview?
    - How did you perceive the informed consent process?
- Is there any other general feedback you would like to give us about the focus group?

7.8 Appendix VIII. Ranking exercise template

Template for ranking exercise in RPO focus groups

Education and training in RI	Responsible supervision and mentoring	Dealing with breaches of RI	Research ethics structures
a. Pre-doctorate b. Post-doctorate c. Training of RI personnel & teachers d. RI counselling and advice	a. PhD guidelines b. Supervision requirements & guidelines c. Building and leading an effective team	a. RI bodies in the organization b. Protection of whistleblowers c. Protection of those accused of misconduct d. Procedures for investigating allegations e. Sanctions f. Other actions (including mobility issues)	a. Set-up and tasks of ethics committees b. Ethics review procedures

Data practices and management	**Declaration of competing interest**	**Research environment**	**Publication and communication**

a. Guidance and support b. Secure data storage infrastructure c. FAIR principles	a. In peer review b. In the conduct of research c. In appointments and promotions d. In research evaluations e. In consultancy	a. Fair procedures for appointments, promotions and numeration b. Adequate education and skills training c. Culture building d. Managing competition & publication pressure e. Conflict management f. Diversity issues g. Supporting a responsible research process (transparency, quality assurance, requirements)	a. Publication statement b. Authorship c. Open science d. Use of reporting guidelines e. Peer review f. Predatory publishing g. Communicating with the public

Collaborative research among RPOs	a. Among RPOs inside/outside the EU b. With countries with different R&D infrastructures c. Between public and private RPOs		

Templates for ranking exercise in RFO focus groups

Dealing with breaches of RI	Declaration of competing interests	Funders' expectations of RPOs	Selection & evaluation of proposals
a. RI bodies in the organization b. Procedures for breaches by funded researchers c. By review committee members d. By reviewers e. By staff members f. Protection of whistleblowers and the accused g. Sanctions/other actions h. Communicating with the public	a. Among review committee members b. Among reviewers c. Among staff members	a. Codes of Conduct b. Assessment of researchers c. Education and training for RI d. Processes for investigating allegations of research misconduct	a. RI plan b. Methodological requirements c. Plagiarism d. Diversity issues

Research ethics structures	Collaboration within funded projects	Monitoring of funded applications	Updating and implementing the RI policy
a. Research ethics requirements b. Ethics reporting requirements	a. Expectations on collaborative research b. Research that is co-financed by multiple funders	a. Financial monitoring b. Monitoring of execution of research grant c. Monitoring of compliance with RI requirements	

Publication and communication	**Independence**	**Intellectual property issues**	

a. Publication requirements b. Expectations on authorship c. Open science (open access, open data, transparency)	a. What counts as an unjustifiable interference? b. Preventing unjustifiable interference by the funder c. Preventing unjustifiable interference by political or other external influence d. Preventing unjustifiable interference by commercial influences		

7.9 Appendix IX. Topic list with questions and probes

	Topics for Researcher groups	Start questions	Probes	Topics for mixed groups	Start questions	Probes
1.	**Education and training in RI**	Education and training in research integrity issues are often emphasized as important to promote a more responsible research culture. – Which type of issues do you think should be covered in RI training?	Different issues for different groups? – students, junior and senior researchers) What kind of procedures could your institution/organization implement to ensure a high level of RI training? Would it be a good idea to have SOPs or guidelines here?	**Education and training in RI**	Education and training in research integrity issues are often emphasized as important to promote a more responsible research culture. In this regard, funders can provide an incentive to researchers to obtain good education and training in RI. – Which type of issues do you think should be covered in RI training?	Different issues for different groups? – students, junior and senior researchers) Do you think funders should ask that researchers are trained in research integrity issues to receive funding? (if yes, type of RI issues?) What kind of procedures could your institution/organization implement to ensure a high level of RI training? Would it be a good idea to have SOPs or guidelines here?

2.	**Research ethics structures**	Research ethics structures seem to differentiate between research fields and across institutions and countries. Which type of issues do you think should be covered in ethical approvals within your main field of research? (Hum, Soc Sci, Med, Nat)	What kind of procedures could your institution/organization implement to ensure a sound and transparent ethical approval process? What is the perception of ethics regulatory procedures in your field? (hinderance/nuisance, basic condition of doing good research, necessary step to receive funding, etc.) Would it be a good idea to have SOPs or guidelines here?	**Research ethics structures**	Research ethics structures seem to differentiate between research fields and across institutions and countries. Which type of issues do you think should be covered in ethical approvals within your main field of research? (Hum, Soc Sci, Med, Nat)	What kind of procedures could your institution/organization implement to ensure a sound and transparent ethical approval process? Would it be a good idea to have SOPs or guidelines here?

3.	**Publication and Communication** (authorship, open science)	Is open science an important issue within your field of research? How do you practice open science? (e.g. OSF, protocols, citizen science projects, use of ResearchGate/ Mendeley etc.) How do you distribute authorships within your field of research?	What are main RI-related barriers of practicing open science in your field? What kind of procedures could your institution/organization implement to promote open science? What kind of procedures could your institution/organization implement to promote clear authorship guidelines? Would it be a good idea to have SOPs or guidelines here? (authorships/open science)	**Publication and Communication** (open science)	Is open science an important issue within X field of research? How is it typically practiced? (e.g. OSF, protocols, citizen science projects, use of ResearchGate/ Mendeley etc.) Should funders require that beneficiaries (researchers and research institutions) live up to certain standards when it comes to open science?	What kind of procedures could a RFO implement to promote clear standards for open science? Would it be a good idea to have SOPs or guidelines here? (authorships/open science)

4.	**Dealing with breaches of RI** (including RI investigations, procedures, sanctions, whistleblowers)	We know that institutions and organizations deal with breaches of RI in different ways and that it e.g. varies whether there are local Research integrity offices (RIOs) and if national research integrity committees are appointed within and across countries. Which type of issues would you like to see covered in RPOs' and RFOs' policies on (potential) breaches of RI? (e.g. allegation, investigation,	"Do you see a need for more RI counselling and advice? (institutional/organizational, nationally)" Would it be a good idea to have SOPs or guidelines here? What kind of procedures could your institution/organization implement to be better equipped to handle breaches of RI? (FFP, QRP)	**Dealing with breaches of RI** (including RI investigations, procedures, sanctions, whistleblowers)	We know that institutions and organizations deal with breaches of RI in different ways and that it e.g. varies whether there are local Research integrity offices (RIOs) and if national research integrity committees are appointed within and across countries. Which type of issues would you like to see covered in RPOs' and RFOs' policies on (potential) breaches of RI? (e.g. allegation, investigation,	"Do you see a need for more RI counselling and advice? (institutional/organizational, nationally)" Would it be a good idea to have SOPs or guidelines here? What kind of procedures could your institution/organization implement to be better equipped to handle breaches of RI? (FFP, QRP)

		appeal, sanction, dissemination, infrastructure etc.)			appeal, sanction, dissemination, infrastructure etc.)	
5.	**Data management (GDPR)**	All researchers in Europe have to comply with the European GDPR rules. Do you see any challenges in fulfilling these requirements?	Do you always know how to be GDPR compliant with the data generated from your research? What kind of procedures could your institution/organization implement to support responsible research practices when collaborating with other RPOs? Would it be a good idea to have SOPs or guidelines here?	**Selection and evaluation of proposals**	When research projects are funded, they need to be in compliance with existing research integrity requirements and, ideally, this should be transparent in research applications when RFOs select and evaluate proposals – In research applications, which RI elements do you view as important to include? Why?	Would it be a good idea to request a RI plan from the applicants? What elements should be covered in such a plan? What about diversity issues? How do we avoid that this becomes a pure box ticking exercise? There are of course also many other issues to consider when selecting and evaluating project proposals: How can funders e.g. ensure that the most relevant methods are used?

						How can plagiarism be discovered? Would it be a good idea to have SOPs or guidelines here? What kind of procedures could RFOs implement to ensure that funded research applications actually adhere to RI requirements ?
6.	**Independence from commercial influences(academy/ industry collaborations)**	Issues regarding appropriate interference and research independence can emerge in collaborations between academia and industry/SMEs	(Good/bad examples?) What kind of procedures could your institution/organisation implement to support scientific freedom in academic/industry collaborations? Would it be a good idea to have SOPs or guidelines here?	**Independence from commercial influences(academy/ industry collaborations)**	Issues regarding appropriate interference and research independence can emerge in collaborations between academia and industry/SMEs How do you experience academia/Industry collaborations in terms of	(Good/bad examples?) What kind of procedures could your institution/organization implement to support scientific freedom in academic/industry collaborations? Would it be a good idea to have SOPs or guidelines here?

		How do you experience academia/Industry collaborations in terms of ensuring that research remains independent from commercial influence? Can you think of other issues that might endanger academic independence, and for which some guidance might be helpful?			ensuring that research remains independent from commercial influence? Can you think of other issues that might endanger academic independence, and for which some guidance might be helpful?	
7.	**Research collaboration among RPOs**	We know from existing research that perceptions of how to practice responsible conduct of research can be quite diverse.	Have you experienced any problems when it comes to being able to conduct your research in a responsible way? What kind of procedures could your institution/organization	**Monitoring of funded applications**	When research projects are funded, they need to be in compliance with existing research integrity requirements.	RI requirements also include financial monitoring and monitoring of the research plan/grant agreement – how do we secure that funds are used in the way they were supposed to be used? And how do

		How do you experience collaborations with other research performing organizations?	implement to support responsible research practices when collaborating with other RPOs? Would it be a good idea to have SOPs or guidelines here?		How can funded applications best be monitored to secure compliance with RI requirements?	we ensure that researchers live up to the grant agreement (research plan)? What kind of monitoring procedures could RPOs and RFOs implement to ensure that funded research applications actually adhere to RI requirements? Would it be a good idea to have SOPs or guidelines here? How do we avoid too much bureaucracy here?

8.	**Transparency** (Supporting a responsible research process)	Transparency is considered an important norm in all fields of research; it has for example a prominent place in many Codes of Conduct for Research Integrity. We would like to hear your thought about how transparency can be ensured in your field of science?" (Example of possible problems with transparency: That it is difficult to follow a paper – its methods, analysis or other parts of it – because of a lack of transparency)	What kind of procedures could your university implement to ensure transparency within your field? Would it be a good idea to have SOPs or guidelines here?	**Conflict of interest**	From a previous study in this project, it seems that conflicts of interest might be a central issue both to RPOs and RFOs (e.g. in regard to review committee members/reviewers) Have you encountered conflicts of interest? (examples?) How do you manage them?	What kind of procedures could RPOs and/or RFOs implement to reduce conflicts of interest? Would it be a good idea to have SOPs or guidelines here?

9.	**Managing competition and publication pressure**	We know from existing research that competition and publication pressure in some cases may challenge responsible research practices – but we don't know how this plays out within different disciplines. In your fields of research, do you experience that competition and publication pressure can jeopardize responsible research practices? (In what way? Examples?)	Do you know what is expected of you in terms of publications? Do you think the incentive structures in your institution (e.g. policies on hiring, promotions, remuneration) influence publication pressure and competition? (in what way?) Could your institution use other measures to assess researchers, in order to alleviate competition and publication pressure? What kinds of additional procedures could your RPO implement to ensure that competition and publication pressure do not jeopardize RI?			

			Would it be a good idea to have SOPs or guidelines here? Publication (e.g. publication policy) and Competition (e.g. positions/career progression)			
10.	**Responsible supervision and mentoring**	Responsible supervision and mentoring are often emphasized as important to promote a more responsible research culture. Which type of issues do you think should be covered in RI supervision?	(Different for various positions/team collaborations?) What kind of procedures could your institution/organization implement to ensure a high level of RI mentoring / supervision? Would it be a good idea to have SOPs or guidelines here? (e.g. PhD/ Post doc guidelines, PI team leadership)			

7.10 Appendix X. List of practicalities

List of practicalities

Prior to the focus group interviews:

- Invitations + reminder(s) + confirmation mail with info on time, venue etc. (including separate PDF introduction to the interviews and informed consent form)
- Book a room in advance (agree on access issues etc. if the interview is going to take place at another university/organisation – remember to bring the contact details for the responsible administrative staff employee).
- Catering (food and beverages, e.g. make prior arrangements with the local canteen to have the food delivered, remember to bring contact details for the catering service). Make sure that they or you bring tableware, napkins etc.

Materials to bring to the focus group interviews:

- Paper and pens
- Extra consent forms
- Exercise material: posters and exercise cards (template for lamination provided), photo slip (template provided)
- Overview of interview participants (template provided)
- Interview guide + introductory slides
- Topic list (with questions)
- Small presents
- Digital equipment
    - Two dictaphones suitable for group discussions (Rea's recommendation: microphones: https://www.amazon.com/Olympus-Conference-Omni-directional-microphone-capabilities/dp/B009OOEP4U; Digital voice recorder Olympus (WS-853).
    - Camera or phone for the exercise photo
    - Computer and projector for the intro slides

Remember to take a photo of the exercise at the end of the focus group + remember to get signed informed consent forms from all participants!

7.11 Appendix XI. Topic division and distribution of focus groups

Aarhus

Discipline	**Place**	**Topic 1**	**Topic 2**	**Topic 3**	*Back-up topic*
HUM historical	DK	Data management	Transparency	Independence from commercial influences	
HUM stakeholder/researchers	ES	Research ethics structures	Selection and evaluation of proposals	-	*Independence from commercial influences*
SOC stakeholder/researcher	DK	Research ethics structures	Selection and evaluation of proposals	-	*Independence from commercial influences*
SOC qualitative	ES	Data management	Transparency	Research collaboration among RPOs	-
NAT lab/exp/app	ES	Data management	Independence from commercial influences	-	
NAT theoretical	DK	Dealing with breaches of RI	Transparency		*Data management*
NAT stakeholders/researchers	DK	Research ethics structures	Selection and evaluation of proposals	-	*Monitoring of funded applications*
MED stakeholders/researchers	DK	Research ethics structures	Selection and evaluation of proposals	-	*Education and training for RI*
MED stakeholders/researchers	ES	Independence from commercial influences	Conflict of interest	-	*Monitoring of funded applications*
MED clin/trans/pub health	DK	Data management	Transparency	Independence from commercial influences	*Publication and communication*

CWTS & VUmc

Discipline	**Place**	**Topic 1**	**Topic 2**	**Topic 3**	*Back-up topic*
HUM language	NL	Managing competition and publication pressure	Supervising & Mentoring	Education & Training in RI	-
HUM stakeholders/researchers	NL	Education and training in RI	Dealing with breaches of RI	-	*Publication and communication*
HUM stakeholders/researchers	DE	Publication and communication	Monitoring of funded applications	-	*Education and training in RI*
SOC stakeholders/researchers	NL	Education and training in RI	Dealing with breaches of RI	-	*Research ethics regulatory procedures*
SOC quantitative	NL	Managing competition and publication pressure	Supervising/Mentoring	-	*Education and training in RI*
SOC qualitative	DE	Education and training in RI	Publication and communication	-	*Managing competition and publication pressure*
NAT lab/exp/app	BE	Managing competition and publication pressure	Supervising/Mentoring	Research collaboration among RPOs	-
NAT stakeholders/researchers	NL	Education and training in RI	Dealing with breaches of RI	-	*Research ethics regulatory procedures*
MED stakeholders/researchers	BE	Education and training in RI	Dealing with breaches of RI	-	*Publication and*

					communication
MED clin/trans/pub health	NL	Managing competition and publication pressure	Supervising/Mentoring	Research collaboration among RPOs	-

MEFST & UoT

Discipline	**Place**	**Topic 1**	**Topic 2**	**Topic 3**	*Back-up topic*
HUM communication	HR	Research collaboration among RPOs	Publication and communication	-	*Supervision and mentoring*
SOC stakeholders/researchers	HR	Publication and communication	Monitoring of funded applications	-	*Dealing with breaches of RI*
NAT lab/exp/app	HR	Education and training in RI	Publication and communication	Research ethics structures	-
NAT stakeholders/researchers	IT	Publication and communication	Monitoring of funded applications	-	*Conflicts of interest*
MED basic research	HR	Education and training in RI	Publication and communication	-	*Reseach collaboration among RPOs*
MED stakeholders/researchers	IT	Publication and communication	Monitoring of funded applications	-	*Conflicts of interest*

NTUA & LSE

Discipline	**Place**	**Topic 1**	**Topic 2**	**Topic 3**	*Back-up topic*
HUM philosophical & aesthetic	UK	Research ethics structures	Dealing with breaches of RI	-	*Transparency*

HUM stakeholders/re-searchers	GR	Independence from commercial influences	Conflict of interest	-	*Selection and evaluation of proposals*
SOC quantitative	UK	Research ethics structures	Dealing with breaches of RI	Independence from commercial influences	-
SOC stakeholders/re-searchers	GR	Independence from commercial influences	Conflict of interest	-	*Selection and evaluation of proposals*
NAT stakeholders/re-searchers	GR	Independence from commercial influences	Conflict of interest	-	*Dealing with breaches of RI*
MED basic research	GR	Research ethics structures	Dealing with breaches of RI	Independence from commercial influences	-

7.12 Appendix XII. The rationale for the combination of topics in the interviews

The tables in this appendix show which topics are combined in the interviews and the reasons behind the single pairings/groupings. The overall rationale behind the pairing/grouping is that we wanted to combine 'most similar topics' in order to make them supplement and inform each other as much as possible. The intention is to gain as deep knowledge as possible about the topics in the focus groups (i.e. to open up for 'thick descriptions').

RPO Topics to combine			**Reasons**
Data management	Transparency	Collaboration among RPOs	*Data management and transparency (e.g. preregistration) issues are closely related to each other. Collaboration among RPOs will have important implications on data management and transparency, so it is interesting to discuss these in the same focus groups.*
Managing competition and publication pressure	Supervision and mentoring		*The way that supervision and mentoring is done has a strong influence on research culture and the pressures that researchers feel.*
Education and training in RI	Publication and communication		*A big part of research integrity education is related to improving awareness about things like open science, authorship issues, predatory publishing, etc.*
Research ethics structures	Dealing with breaches of RI	Independence from commercial influences	*These are the topics which contain a lot of existing resources. It is interesting to find out about disciplinary differences here to see if existing resources are appropriate across fields.*

RFO Topics to combine			Reasons
Research ethics structures	Selection and evaluation of proposals		*These are both topics that need to be addressed early on (before the project has even received funding), and it is therefore make sense to cover them together.*
Independence from commercial influences	Conflict of interest		*Both of these topics have to do with conflicts of interest, but the first one is more focused on commercial influences. Therefore, it is appropriate to discuss them together.*
Publication and communication	Monitoring of funded applications		*Since monitoring, as well as publication and communication, are aspects of research that occur later down the line in the process (after the project has received funding and run for a little while), it makes sense to discuss these topics together.*
Education and training in RI	Dealing with breaches of RI		*By discussing breaches and education together, we can explore what happens (or should happen) when RI is not adhered to and what kinds of awareness/education/training is needed to prevent such things from happening or to deal with them.*

7.13 Appendix XIII. Topics for the sorting exercise

The following two topic lists are identical with the final lists of topics for the first version of the toolbox (cf. D.4.2.)

Topics for the ranking exercise – for the 16 researchers only/RPO groups.

Rank	Topic	Subtopics
1	Education and training in RI	a. pre-doctorate b. post-doctorate c. training of RI personnel & teachers d. RI counselling and advice
2	Responsible supervision and mentoring	a. PhD guidelines b. supervision requirements & guidelines c. building and leading an effective team
3	Dealing with breaches of RI	a. RI bodies in the organisation b. protection of whistle-blowers c. protection of those accused of misconduct d. procedures for investigating allegations e. sanctions f. other actions (including mobility issues)
4	Research ethics structures	a. set-up and tasks of ethics committees b. ethics review procedures
5	Data practices and management	a. guidance and support b. secure data storage infrastructure c. FAIR principles
6	Declaration of competing interests	a. in peer review b. in the conduct of research c. in appointments and promotions d. in research evaluations e. in consultancy
7	Research environment	a. fair procedures for appointments, promotions and numeration b. adequate education and skills training

		c. culture building d. managing competition & publication pressure e. conflict management f. diversity issues g. supporting a responsible research process (transparency, quality assurance, requirements)
8	Publication and communication	a. publication statement b. authorship c. open science d. use of reporting guidelines e. peer review f. predatory publishing g. communicating with the public
9	Collaborative research among RPOs	a. among RPOs inside/outside the EU b. with countries with different R&D infrastructures c. between public and private RPOs

For a description of the topics/subtopics, click here.

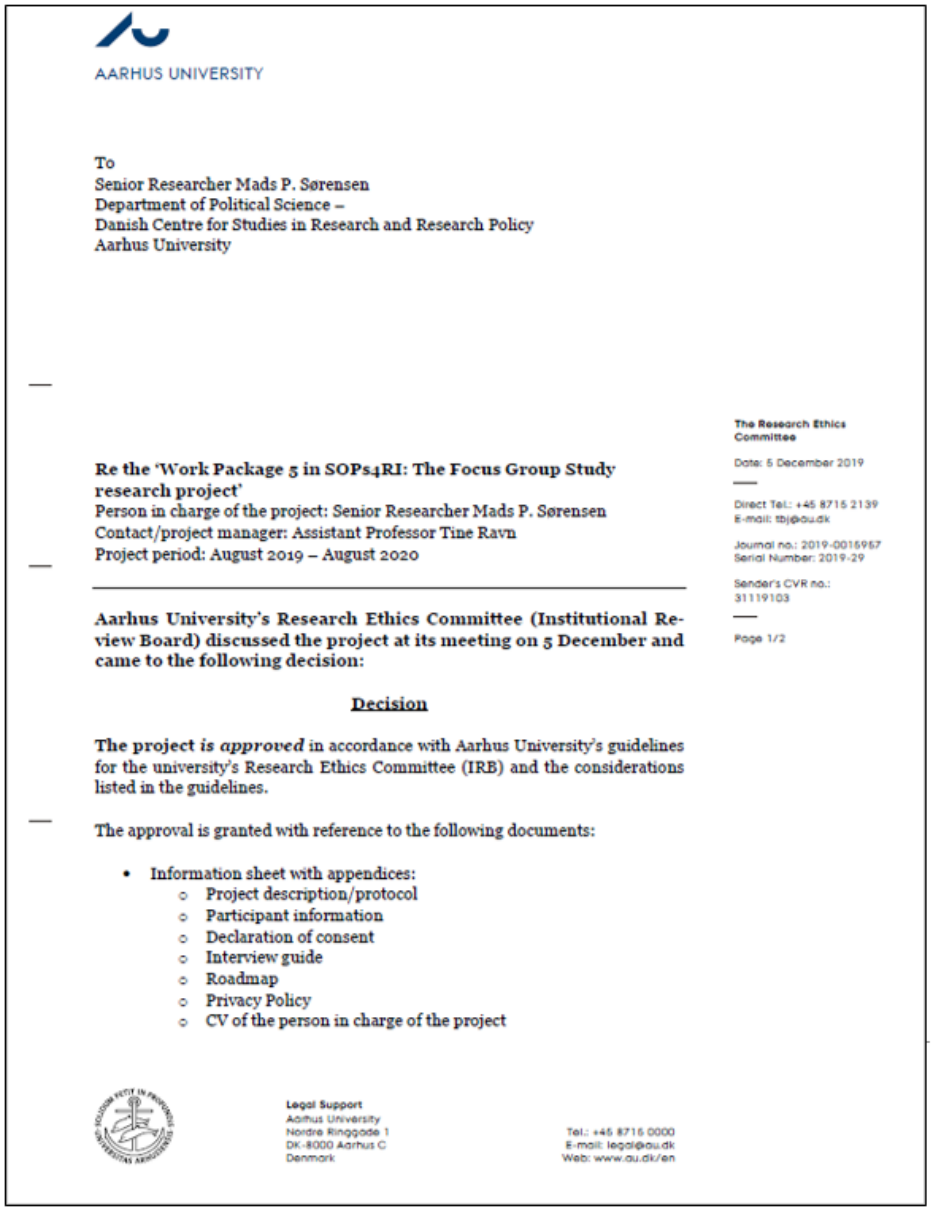
Topics for the ranking exercise – for the 16 mixed groups/RFO groups.

Rank	Topic	Subtopic
1	Dealing with breaches of RI	a. RI bodies in the organization b. procedures for breaches by funded researchers c. by review committee members d. by reviewers e. by staff members f. protection of whistle-blowers and the accused g. sanctions/other actions h. communicating with the public
2	Declaration of competing interests	a. among review committee members b. among reviewers c. among staff members
3	Funders' expectations of RPOs	a. Codes of Conduct b. assessment of researchers

		c. education and training for RI d. processes for investigating allegations of research misconduct
4	Selection & evaluation of proposals	a. RI plan b. methodological requirements c. plagiarism d. diversity issues
5	Research ethics structures	a. research ethics requirements b. ethics reporting requirements
6	Collaboration within funded projects	a. expectations on collaborative research b. research that is co-financed by multiple funders
7	Monitoring of funded applications	a. financial monitoring b. monitoring of execution of research grant c. monitoring of compliance with RI requirements
8	Updating and implementing the RI policy	*NONE*
9	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
10	Publication and communication	a. publication requirements b. expectations on authorship c. open science (open access, open data, transparency)
11	Intellectual property issues	*NONE*

For a description of the topics/subtopics, click here.

7.14 Appendix XIV. Documentation for ethical approval



AARHUS UNIVERSITY

To
Senior Researcher Mads P. Sørensen
Department of Political Science –
Danish Centre for Studies in Research and Research Policy
Aarhus University

The Research Ethics Committee

Date: 5 December 2019

Direct Tel.: +45 8715 2139
E-mail: tbj@au.dk

Journal no.: 2019-0015957
Serial Number: 2019-29

Sender's CVR no.:
31119103

Page 1/2

Re the 'Work Package 5 in SOPs4RI: The Focus Group Study research project'
Person in charge of the project: Senior Researcher Mads P. Sørensen
Contact/project manager: Assistant Professor Tine Ravn
Project period: August 2019 – August 2020

Aarhus University's Research Ethics Committee (Institutional Review Board) discussed the project at its meeting on 5 December and came to the following decision:

Decision

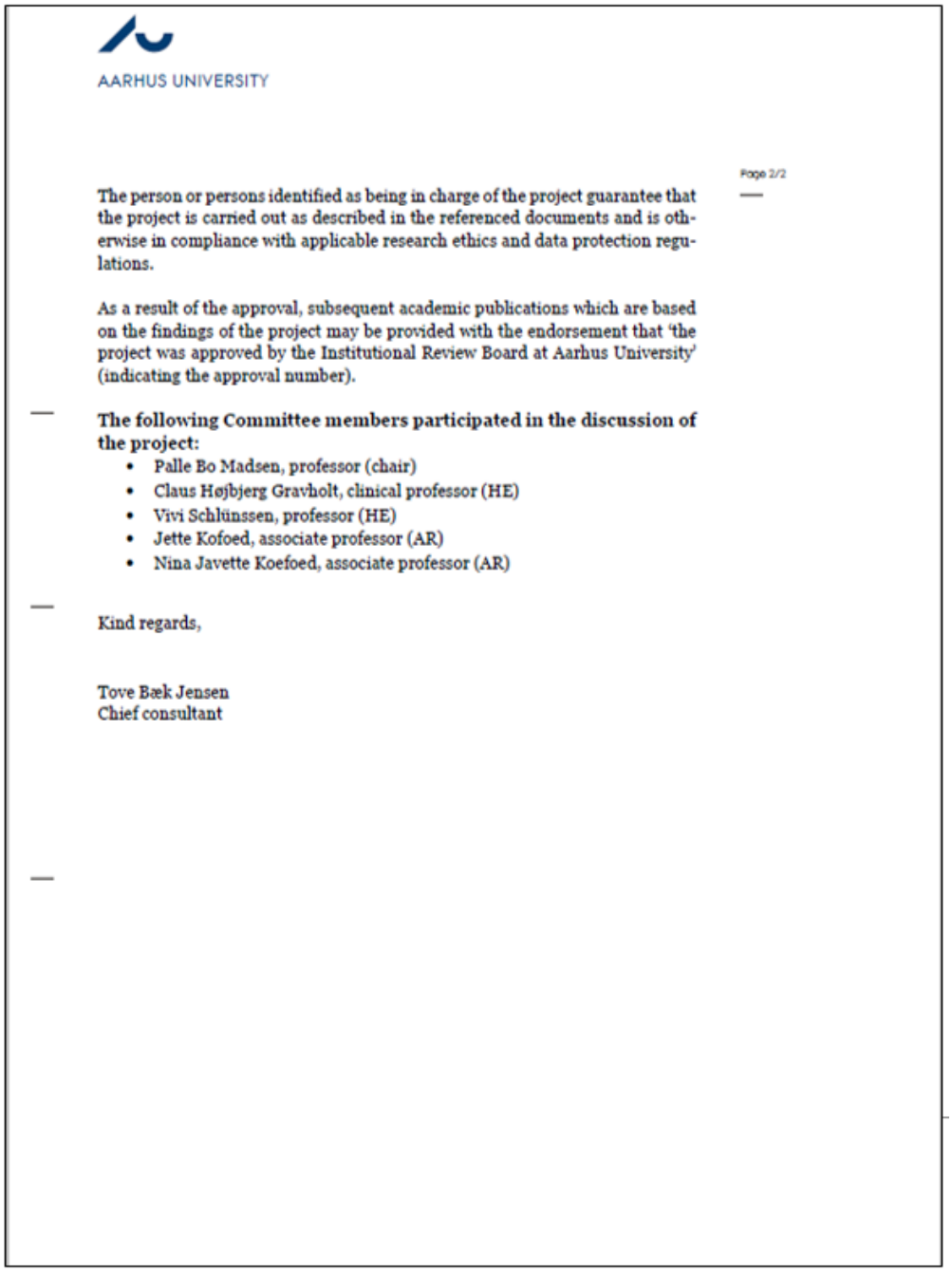
The project *is approved* in accordance with Aarhus University's guidelines for the university's Research Ethics Committee (IRB) and the considerations listed in the guidelines.

The approval is granted with reference to the following documents:

- Information sheet with appendices:
  - Project description/protocol
  - Participant information
  - Declaration of consent
  - Interview guide
  - Roadmap
  - Privacy Policy
  - CV of the person in charge of the project

Legal Support
Aarhus University
Nordre Ringgade 1
DK-8000 Aarhus C
Denmark

Tel.: +45 8715 0000
E-mail: legal@au.dk
Web: www.au.dk/en



AARHUS UNIVERSITY

The person or persons identified as being in charge of the project guarantee that the project is carried out as described in the referenced documents and is otherwise in compliance with applicable research ethics and data protection regulations.

As a result of the approval, subsequent academic publications which are based on the findings of the project may be provided with the endorsement that 'the project was approved by the Institutional Review Board at Aarhus University' (indicating the approval number).

The following Committee members participated in the discussion of the project:

- Palle Bo Madsen, professor (chair)
- Claus Højbjerg Gravholt, clinical professor (HE)
- Vivi Schlünssen, professor (HE)
- Jette Kofoed, associate professor (AR)
- Nina Javette Koefoed, associate professor (AR)

Kind regards,

Tove Bæk Jensen
Chief consultant

7.15Appendix XV. Privacy Policy

SOPs4RI – WP5: Focus groups

Privacy policy

This document describes the privacy policy that all research activities conducted in work package 5 are committed to follow.

Data collection, processing, storage and usage

Collection, storage and use of the data collected during the focus groups interviews will be in alignment with the European Union's General Data Protection Regulation and Danish Ministry of Higher Education and Science's recommendation in the Danish Code of Conduct for Research Integrity, section II. 2.1.i.

The ethical approval of the focus group study in Work Package 5 will be obtained from the Research Ethics Committee at Aarhus University.

Before the interview, all participants in the focus group interview will be presented with an information letter and an informed consent form, which includes information on the project's purpose, funding, recruiting processes, methodologies, expected risks/adverse effects, beneficiaries of research results, communication of research results and all matters concerning collected data as described in this document.

In order to be able to transcribe and analyse the interviews, the focus group interviews will be audio recorded. The subsequent interview transcriptions will be anonymised. Informed consent forms will be stored separately from the audio files and transcripts. All data material will be stored safely at SharePoint, a web-based collaborative and GDPR compliant platform, administered by the project coordinator, Aarhus University. All data will be stored encrypted at SharePoint for 5 years after the last publication from the study. The findings from the focus group interviews will be analysed, published and made publicly available. No personal identifiable information will be mentioned or disclosed at any point. Data preservation will comply with GDPR regulations, and it is the responsibility of the WP5 research coordinator, Mads P. Sørensen (mps@ps.au.dk) to ensure that sensitive data is secured and deleted in accordance with the GDPR regulations.

Each participant in the focus group interviews may at any time demand removal of his/her interview data by a simple request to the coordinator of the study, Mads P. Sørensen (mps@ps.au.dk), or to

Aarhus University's Data Protection Officer (DPO@au.dk). However, data, which have already been published, cannot be removed.

To promote open science and avoid research waste, anonymised data from the focus group interviews will also be made available on the project's OSF (Open Science Framework) site: https://osf.io/49fbk/. Here, all names and other identifiers (information on country, university etc.) will be removed to ensure full anonymity.

In case of a data breach, affected participants will be contacted and data will be temporarily removed from the compromised storage. All internal transfer of sensitive data will be done through secure pathways. Specifically, the secure SharePoint workspace established for the SOPs4RI project will be used for data transfer.

Questions about the Privacy Policy?

Aarhus University's Data Protection Officer (DPO@au.dk) can be contacted for questions regarding data protection, privacy issues and use of data in the SOPs4RI project. Research coordinator Mads P. Sørensen (mps@ps.au.dk) also welcomes any questions about this study.

AARHUS UNIVERSITY

VUmc

SVEUČILIŠTE U SPLITU
MEDICINSKI FAKULTET

University of Essex

ÖSTERREICHISCHE AGENTUR FÜR WISSENSCHAFTLICHE INTEGRITÄT

Universiteit Leiden

Health Research Board

KATHOLIEKE UNIVERSITEIT LEUVEN

LSE The London School of Economics and Political Science

EARMA

UNIVERSITAS VARSOVIENSIS

SOPs4RI

www.sops4ri.eu @sops4ri SOPs4RI Project @sops4ri

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824481.