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SUPER MoRRI – Scientific understanding and provision of an enhanced and robust monitoring system for RRI

D2.5 3rd RRI Monitoring Report

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List of Acronyms and Abbreviations

Table 1: Acronyms and abbreviations

Acronyms/Abbreviations	Definition
CCN	Country Correspondent Network
AIRR	anticipation, inclusiveness, reflection and responsiveness (AIRR)
CV	Curriculum Vitae
DORA	Declaration on Research Assessment
EU	European Union
EC	European Commission
FAIR	Findability, Accessibility, Interoperability, Reusability
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GERD	Gross domestic expenditure on Research and Development
GTDB	Green Tech Database
RFO	Research Funding Organisation
RPO	Research Performing Organisation
HEI	Higher Education Institution
SwafS	Science with and for Society
RRI	Responsible Research and Innovation
OS	Open Science
GE	Gender Equality
PE	Public Engagement
PICs	Practical Implementation Codes
TM	Third Mission
REI	Research Ethics and Integrity
R&D	Research & Development
R&I	Research & Innovation
RESU	Researchers Survey
STEM	Science, Technology, Engineering, Mathematics



Executive Summary

The “Scientific understanding and provision of an enhanced and robust monitoring system for RRI” (SUPER MoRRI) project contributes to monitoring Responsible Research and Innovation (RRI). Over the duration of the project, three monitoring reports were to be delivered. The report at hand (Deliverable D2.5) is the third in this series.

In the 1st Monitoring Report D2.2 (MR1), a total of 26 indicators for monitoring RRI were presented. These were drawn from secondary data sources including Eurostat, She Figures, Web of Science, Unpaywall, and Eurobarometer. The majority of these indicators were among those produced by the MoRRI project – the predecessor to SUPER MoRRI. These indicators relate particularly to the key RRI areas of Gender Equality and Open Access in the context of research and innovation. These metrics are reported at the national level for the EU27 plus Norway and the United Kingdom. A small selection of metrics concerning broader national research and innovation system characteristics were also included.

In the 2nd RRI Monitoring Report D2.3 (MR2), many of the secondary data indicators presented in MR1 were updated. The report introduced initial indicators emerging from the SUPER MoRRI empirical research programme. The research funding organisation (RFO) study involved the participation of more than 50 RFOs in Europe and beyond. The research performing organisation (RPO) study involved data collection for a sample of 122 European universities. Descriptive data and planned indicators were also presented for responsible innovation, emerging from the SUPER MoRRI study of gendered eco-innovations.

In this 3rd Monitoring Report D2.5 (MR3), the secondary data indicators presented in MR1 and MR2 are updated where such updates are available. New and updated indicators are presented based on further analysis and coding of the RFO, RPO, and gendered eco-innovations studies. The chapter on RFOs presents categorical indicators for monitoring RFOs’ strategic funding priorities, funding instrument design, and grant assessment processes. The chapter on RPOs provides categorical indicators regarding European universities’ policies, strategies, and practical implementation of RRI key areas. Finally, in the period between MR2 and MR3 a large-scale researcher survey (RESU) was undertaken. This report provides tables and visualisations of descriptive results from RESU. These include indicators about practices and perceptions of open and responsible research and innovation among European researchers. These indicators provide a focused entry point into researchers’ motivations and the barriers they report encountering. Insights into researchers’ perceptions of the benefits of RRI are also included. MR3 concludes with a summary of the SUPER MoRRI empirical programme and discussion of how the data will be made available via the online PROMISE portal (www.promise4era.eu).



1. INTRODUCTION

1.1. Scope and Objectives of the Deliverable

The “Scientific understanding and provision of an enhanced and robust monitoring system for RRI” (SUPER MoRRI) project contributes to monitoring Responsible Research and Innovation (RRI). Over the project duration, three monitoring reports were to be delivered. The report at hand (Deliverable D2.5) is the third in this series.

Three strategic documents collectively provide the background for SUPER MoRRI monitoring activities. The principles underpinning the SUPER MoRRI monitoring framework for RRI are outlined in the project’s Strategic Development Plan. The project approach to large-scale data collection activities is provided in the Implementation Plan. The Case Study Co-creation Methodology Report presents targeted empirical research efforts designed to provide new understandings of pathways to RRI benefits.

The SUPER MoRRI monitoring framework utilises existing resources and data and creates new information from primary data collected as part of the project. It combines qualitative and quantitative approaches and covers different levels of the research and innovation system, including individuals, organisations, regions, and countries. Through inclusion of stakeholders in co-creation processes, it aspires to ensure that any proposed indicators emerging from the project are relevant, credibly contextualized, and responsibly conveyed. The SUPER MoRRI monitoring framework strives for transparency and FAIR data sharing and employs openly accessible research protocols for each component of the primary data collection.

Figure 1 presents a revised version of the main components of the SUPER MoRRI Implementation Plan. Due to the COVID-19 pandemic, the timing of these components was adjusted.

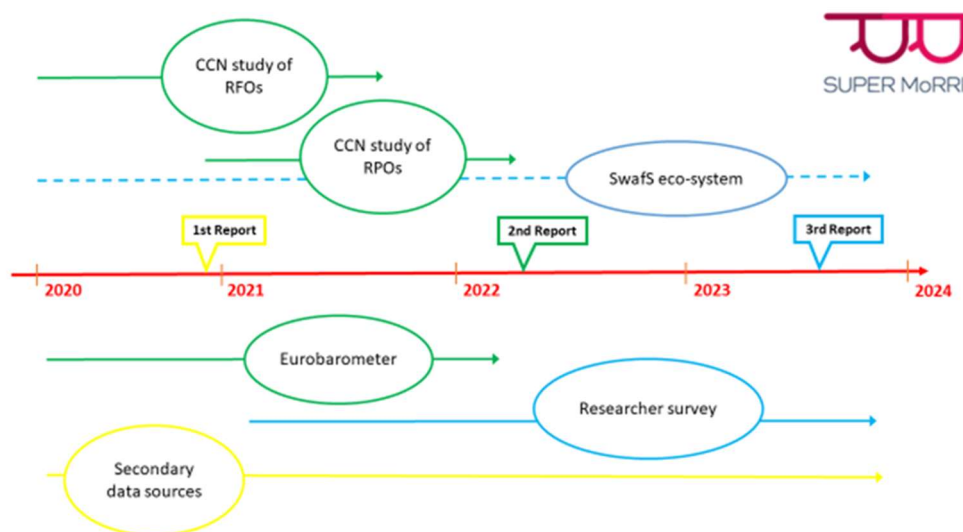


Figure 1: Revised timing of main data collection vehicles

The color-coding of Figure 1 illustrates the sequential inclusion of data from the empirical components of the Implementation Plan in the successive monitoring reports.



The 1st RRI Monitoring Report (MR1) reported secondary data at the country level. MR1 covers the EU27 along with Norway and the UK.

The 2nd RRI Monitoring Report (MR2) expands on MR1 by additionally including information, data, and indicators generated by two completed large-scale studies, one of research funding organisations (RFOs) and the other of research performing organisations (RPOs). Preliminary results are also included from a study of gendered eco innovations. MR2 updates the metrics and indicators included in MR1. The Report also includes results from a new Eurobarometer on public perceptions of research and innovation, which was carried out under the auspices of the European Commission in spring 2021.

Finally, this 3rd RRI Monitoring Report (MR3) continues to add data points to secondary indicators wherever available. It expands on the research funding organisation (CCN-RFO) and research performing organisation (CCN-RPO) studies by providing indicators of RRI in organisations. In addition, new indicators from the SUPER MoRRI study of gendered eco-innovations are included. Finally, the report presents the results from a large-scale survey of European researchers' practices and perceptions regarding RRI (RESU).

1.2. Relation to Other Tasks and Deliverables

The 3rd RRI Monitoring Report (MR3) is the third direct output relating to Tasks 2.5 (data collection) and 2.6 (basic analyses, data presentation, and transmission) in Work Package (WP2), as specified in the SUPER MoRRI Grant Agreement. The contents of MR3 are informed by Task 1.2 (critical assessment of existing MoRRI indicators), Task 1.8 (definition of continuing MoRRI indicator set) in WP1, and Task 5.2 (quantitative case studies on RRI patterns). The data presented in this report will be transferred to the SUPER MoRRI dashboard and online portal "PROMISE" developed in WP3, thus linking to Task 3.4 (technological platform development and deployment). Finally, MR3 also relates to the Annotated Methodological Report (D2.4) in which methodological and feasibility considerations pertaining to the SUPER MoRRI empirical research programme are presented in detail.

1.3. Deliverable Structure

This 3rd Monitoring Report is structured as follows: The Executive Summary briefly presents the purpose and content of this report. Chapter 1 introduces the scope and objectives of the deliverable, its relation to other tasks within the project, and its structure. It also briefly presents the data sources and methodologies.

Chapters 2-5 present data from the SUPER MoRRI empirical research programme. Chapter 2 presents the results of the SUPER MoRRI Researcher Survey. The overall aim of this empirical study is to examine European researchers' open and responsible research practices and their perceptions of, and attitudes towards, responsibility in research and innovation. Chapter 3 presents updated data from the CCN-RPO study and Chapter 4 covers updated data from the CCN-RFO study. Chapter 5 presents metrics on responsible innovation emerging from the Gendered Eco-Innovations Study.

Chapter 6 presents indicators based on secondary data sources. Chapter 7 then concludes this report, while Chapter 8 finishes by recapping the MR1-MR3 series.



2. Practices and perceptions of RRI among European researchers

This chapter outlines the methodology and main results of the SUPER MoRRI Researcher Survey (RESU) that was conducted between November 2022 and January 2023. The overall aim of this empirical study was to examine European researchers' responsible research practices and their perceptions of, and attitudes towards, open and responsible research and innovation.

In the following, we briefly introduce the methodological approach (for details see D2.4). After a description of the sample's characteristics, we present a synthesis of the RESU results that focuses predominantly on i) activities, ii) motivations, iii) benefits, and iv) barriers that respondents report experiencing when engaging in activities related to the following four RRI key areas: Public Engagement, Open Science, Gender Equality, and Ethics. The chapter concludes with a brief outlook and possible avenues for future work.

2.1. Methodological considerations and approach

The data collection from the survey was linked to the CCN-RPO Study in the SUPER MoRRI monitoring framework design. The sample of survey participants was based on the identification of (active) researchers from the RPOs included in the CCN-RPO study (for more details on the sample selection methodology, see D2.4). The CCN-RPO and RESU studies were based on a stratified sample of 122 higher education institutions, mainly universities, in 29 European countries. In this design, alignment between the meso-level institutional policy context and the micro-level of individual research practices and perceptions allows for combined multi-level analysis (for a more detailed description of the overall methodology see D2.4).

RESU was designed as a personalized online survey using the EFS survey tool. The questionnaire was developed in an iterative process by a team of various consortium partners in order to allow interlinkages with the RPO study (WP2), with case studies (WP5), and with the former survey conducted in the previous MoRRI project (D8.1; D9.1, Annex 1, Annex 2) (see Annex 1 for the Survey Questionnaire).

In total, 127.395 researchers (gross sample) were invited to participate in the survey. Among these, 105.224 researchers received the e-mail invitation (adjusted gross sample). A total of 5,420 researchers *participated* in the survey, amounting to an overall participation rate of 5.2% (adjusted gross sample) and a completion rate of 3.2% with 3,382 researchers *completing* the survey. Taking the net sample of 5,420 participants as a starting point, further data cleaning and validation processes were implemented in order to obtain reliable and high-quality survey data. The removal of 1,240 participants who did not sufficiently meet the required quality criteria resulted in a cleaned net sample of 4,180 participants. Their results are presented in the following sections.

2.2. Sample characteristics

In total, 4,180 researchers participated in the survey. The gender distribution was 54.5% male, 41.0% female, 0.5% non-binary, while 3.6% preferred not to state their gender. Another 0.4% identify with a gender that was not listed. The open answer option allowed us to capture two further gender (identity) variants, i.e. *agender* and *pluto*. It should be noted that the gender identification question raised a number of critical responses from survey participants. These appeared to stem primarily from the inclusion of the word "current" in the formulation of the question. For example, one respondent



was critical that [an over-emphasis on] gender is not relevant to science and expressed their frustration with "these types of new classifications to cope and explain comparatively missing capacity or performance. Science by definition should be based on excellence, nothing else".

Researchers from 45 different countries of residence participated in the survey. The following countries are most widely represented among participants: Denmark (10.4%), Sweden (9.7%), Italy (9.4%), Norway (7.3%), and Germany (6.8%) (for a full list see Annex II).

Among the 277 different RPOs, Scandinavian and Western European RPOs are most widely represented. The top five most represented RPOs are Uppsala University (4.9%), University of Oslo (4.5%), Sapienza University of Rome (4.3%), University of Helsinki (4.1%), Ghent University (4.2%), and Aarhus University (3.8%) (for a full list of RPOs see Annex II)

We observe great diversity with respect to their institutional background and field of research, as shown in Figure 2.

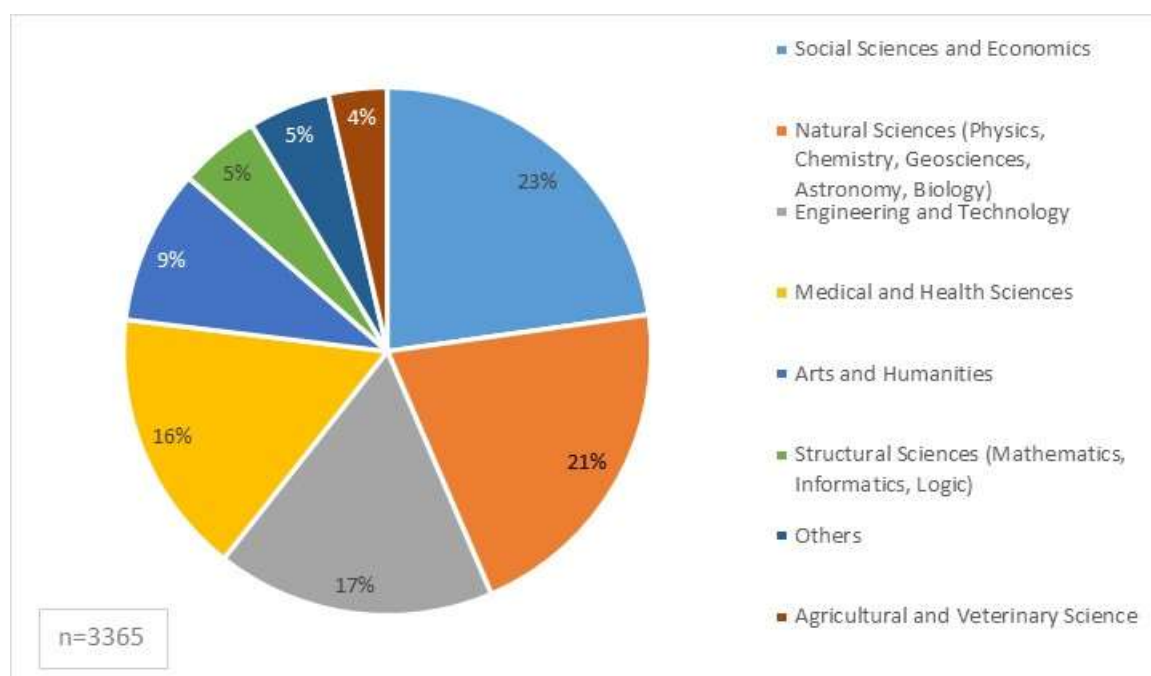


Figure 2: Research disciplines of survey respondents

Researchers working in the fields of Social Sciences and Economics form the majority of respondents (23%), followed by Natural Scientists (21%). Beyond the main areas listed in Figure 2, respondents entered further 167 options. While some of the disciplines present only terminological variations of the overarching categories, others are either multidisciplinary, not subsumable under the conventional fields, or very specific. Examples are Artificial Intelligence, Biostatistics, Psycholinguistics, Landscape Ecology or Industrial Design.

With respect to respondents' work experience (defined by number of years post-Master's level), more than one-third of respondents (38%) reported having more than 20 years of experience. Early career researchers with experience of up to five years comprised slightly less than one-fifth of respondents (17%). By scientific career stage, established researchers (R3) formed the largest group of respondents



(35%), followed by leading researchers (R4, 29%), recognised researchers (R2, 20%), and first stage researchers (R1, 16%).

2.3. What lies beneath the notion of RRI?

Before asking respondents about their views and practical engagement related to the four RRI key areas, we asked them about their association with the concept of RRI on an ideational level. More precisely, respondents were asked what comes to their mind when thinking about Responsible Research and Innovation. The word cloud below (Figure 3) shows the respondents' main associations with RRI, with their strength expressed by their relative size. A majority (76%) of respondents associate RRI with Ethics, followed by 68% that relate it to Transparency or Open Access / Science (64%), Sustainability (47%) and Excellence (44%).



Figure 3: Word Cloud with the most common associations with RRI

Besides the 14 associations depicted above, respondents entered a further 189 individual descriptions or terms, which they associate with RRI. The overarching themes range from environmental and climate protection to human rights, freedom of research, rigorous research, interdisciplinarity and transformation. While we find overlaps and similarities in the associations, we still observe a great diversity/heterogeneity in the associations, showing the breadth and scope of the (perceived) notion of RRI. Yet, this may also indicate its conceptual dispersion and lack of clear focus. There were also some minor critical voices characterizing RRI as "fashionable jargon" with no particular meaning.

In the following sections, for each of the RRI key areas considered (public engagement, open access, gender equality and ethics) we describe what the activities and underlying motivations were for a corresponding practice and what benefits are associated with it. We also look at the barriers to more highly developed RRI practice. While the activities in the respective RRI key areas naturally differ, some of the motivations, benefits, and barriers have overlaps and are recurring throughout the survey.



2.4. Researchers' Practice and Perception of Public Engagement

The survey provided the following definition to respondents prior to the questions on Public Engagement. *By public engagement we understand the engagement of non-academic actors in science, in order to facilitate interaction and dialogue, and involve those actors in decision-making (see appendix I.)*

2.4.1. Activities

Respondents were asked about their cooperation with a variety of non-academic actors in the last three years.

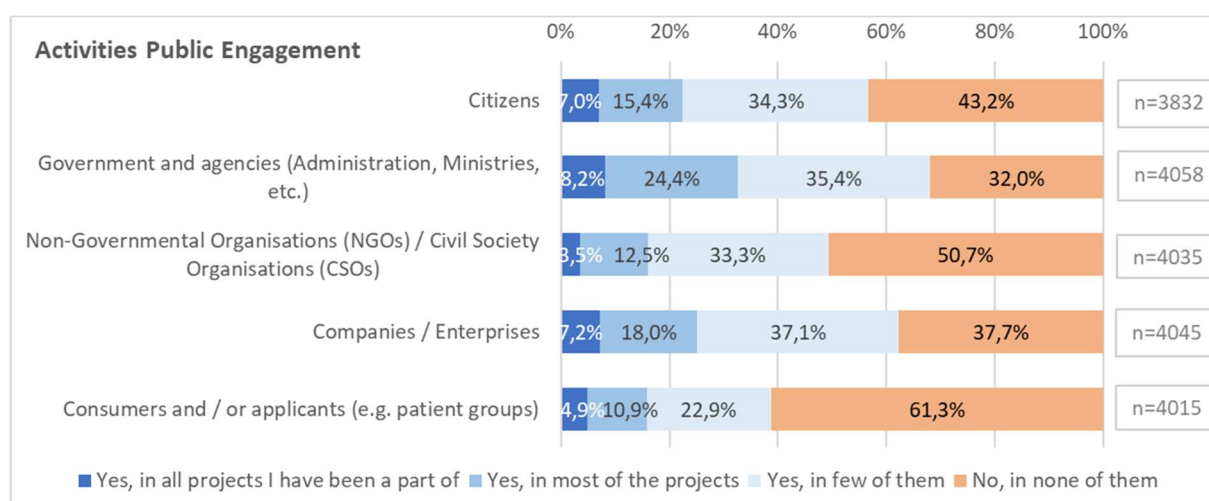


Figure 4: Activities regarding Public Engagement

Figure 4 shows that researchers who interact with non-academic actors in at least a few of their projects are a majority for three of the five actor types. Almost two-third of respondents have not cooperated with consumers or applicants, while half of the respondents have not interacted with non-governmental organisations in any of their projects. Researchers who always collaborate with non-academic actors in their projects have mostly done so with government and agencies (8%), companies and enterprises (7%) and citizens (7%). A stable base of one-third of researchers have interacted with each of the different types of non-academic actors in at least a few of their projects.



2.4.2. Motivation to engage with non-academic actors

Respondents were asked about their motivation to pursue Public Engagement activities. Figure 5 presents the main motivations to engage with non-academic actors. Almost half of the respondents (46%) strongly agree that research must engage with the public and that they wish to maximize the reach and impact of their research (44%).

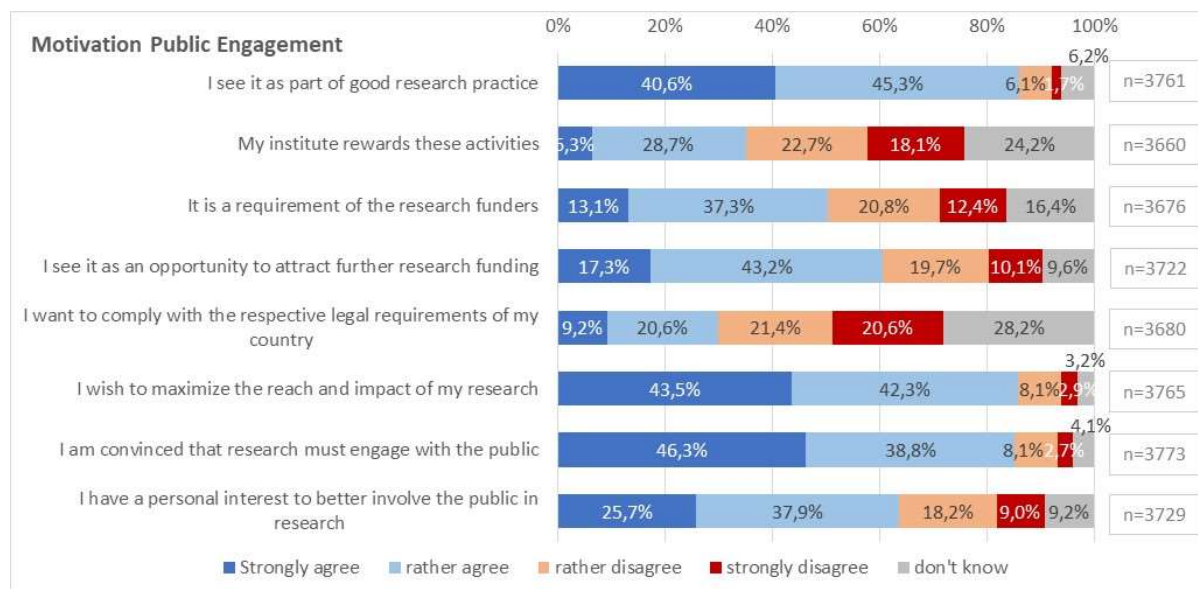


Figure 5: Motivations for Public Engagement

The overall tendency and attitude towards Public Engagement is positive across all motivations included. The leading motivating factors are mostly of an intrinsic and/or normative nature, with 85.1% either strongly or rather agreeing they are motivated by the personal conviction that research must engage with the public. Beyond the motivations offered, respondents mentioned numerous other benefits, including more consciousness and proximity to the real world, increasing research validity, ensuring access to funding, or 'multiperspectivity'.

2.4.3. Benefits

Respondents were asked about the main benefits they perceive in relation to their Public Engagement activities (Figure 6). Among the three leading benefits reported by respondents are the emergence of new research topics (46%), a higher social relevance of scientific outputs (45%) and an increased societal impact of the research (42%). On average one third of respondents have not (yet) observed any of those benefits but are expecting them to arise in the future. The benefit least expected to occur is a changed approach to risk in one's research as a result of engaging with the public (33%).

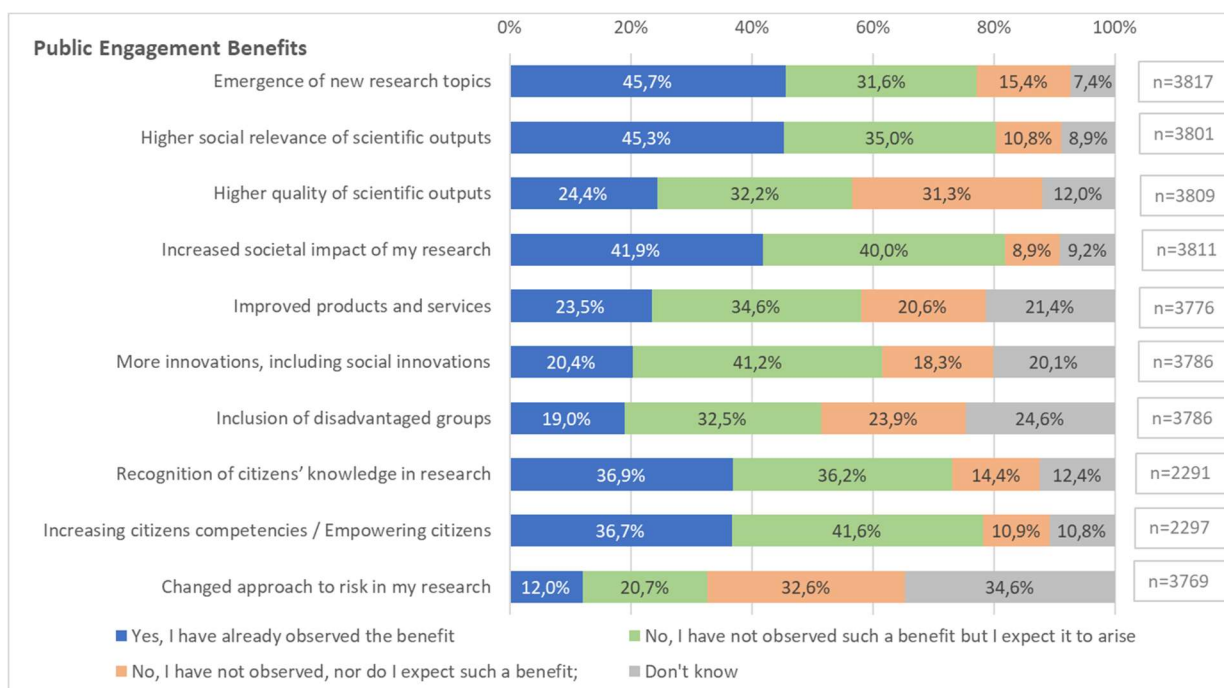


Figure 6: Benefits of Public Engagement

Other benefits raised by the respondents included more public support, increased funding, or clearer communication of research results to public audiences.



2.4.4. Barriers

Respondents were asked about the main barriers they perceive in relation to their Public Engagement activities. Figure 7 summarizes the main factors that prevent researchers from engaging and exchanging with the wider public.

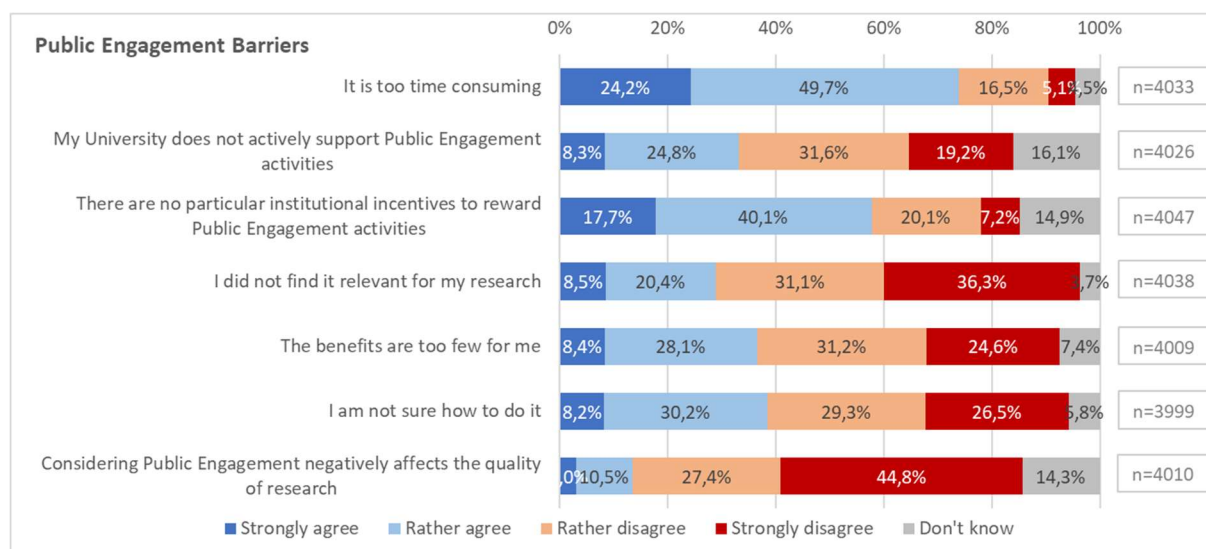


Figure 7: Main barriers to Public Engagement

A quarter of respondents (24.2%) strongly agree that the time-consuming nature of public engagement related activities is a major barrier, with a further half (49.7%) rather agreeing. A total of 57.8% strongly or rather agreed that the absence of particular institutional incentives to reward such activities is a barrier. A majority of respondents (72.2%) disagreed that Public Engagement activities negatively affects the quality of research.

In addition, respondents pointed to the difficulty of recruiting non-academic actors, or the incompatibility of public actions with their job description or research focus, as additional barriers.



2.5. Researchers' Practice and Perception of Open Science

The survey provided the following definition to respondents prior to the questions on Open Science. *The term Open Science bundles activities that aim to make all components of the scientific process openly accessible and usable. These include an unrestricted access to scientific publications (Open Access) and research data (Open Data).*

2.5.1. Activities

Respondents were asked whether they have enacted a range of different Open Science activities in their research during the past three years (Figure 8).

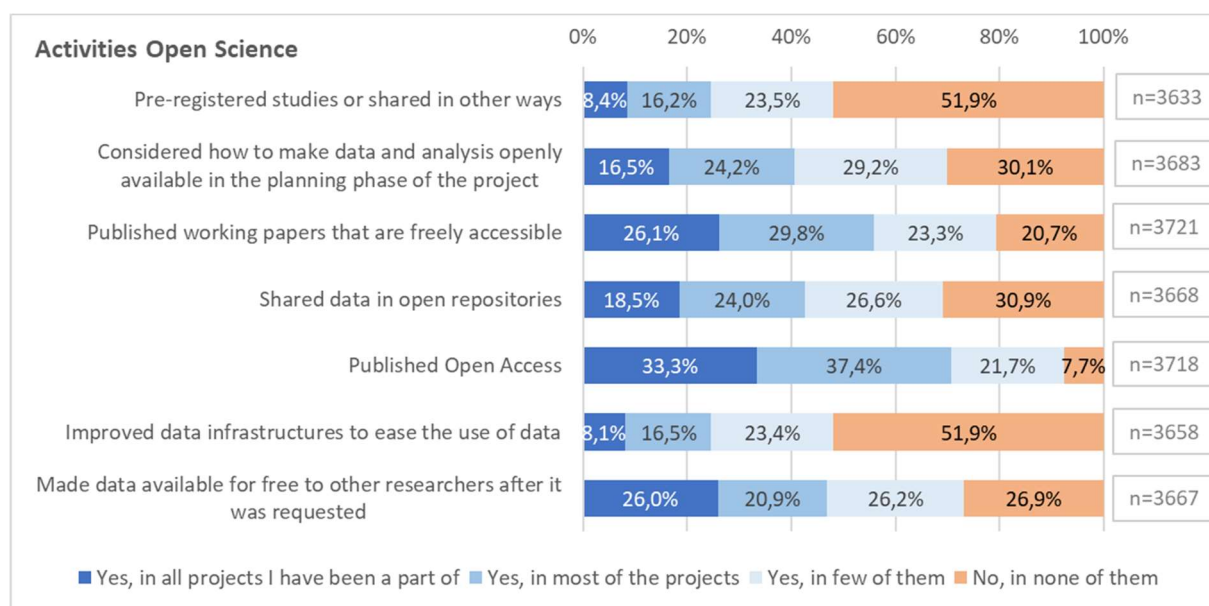


Figure 8: Activities regarding Open Science

One third of respondents (33%) state having published open access in all projects they have been part of. Similarly, a quarter of respondents (26%) reported publishing working papers that are freely accessible in all projects. A majority of respondents (73.1%) have made data available in at least a few of their projects. A large proportion of respondents have not been engaged in some Open Science activities on any of the projects they have been involved in, such as improving data infrastructures to ease the use of data or pre-registering studies (both 52%).



2.5.2. Motivation to engage in Open Science

In the area of Open Science, the top motivating factors for European researchers are primarily of normative or personal nature, as Figure 9 shows.

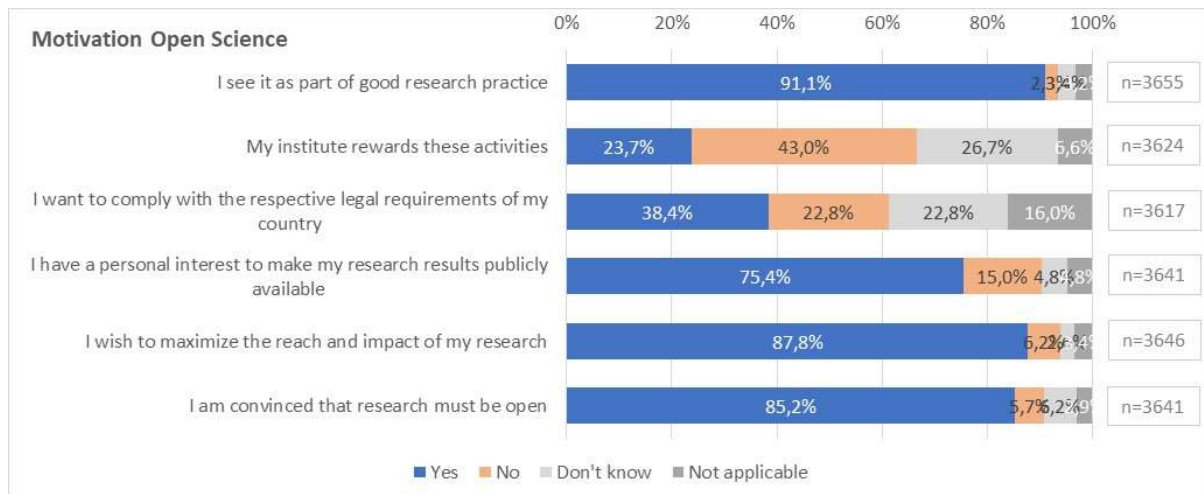


Figure 9: Motivation to engage in Open Science related activities

A large majority of respondents state that they are driven to publicly share their research because they consider it as part of good research practice (91%), seek to maximize their research impact (88%), or believe that (good) research must be open (85%). In contrast, almost half of the respondents (43%) report that their institution does not reward Open Science activities, highlighting the importance of institutional support in driving Open Science.

Other motivating factors mentioned include building trust with stakeholders through transparency, engaging in expert exchange, or adding value and quality to the research. There was also mention that funding agencies play an important role in incentivizing Open Science.



2.5.3. Benefits

Respondents were asked about the main benefits they perceive in relation to their Open Science activities.

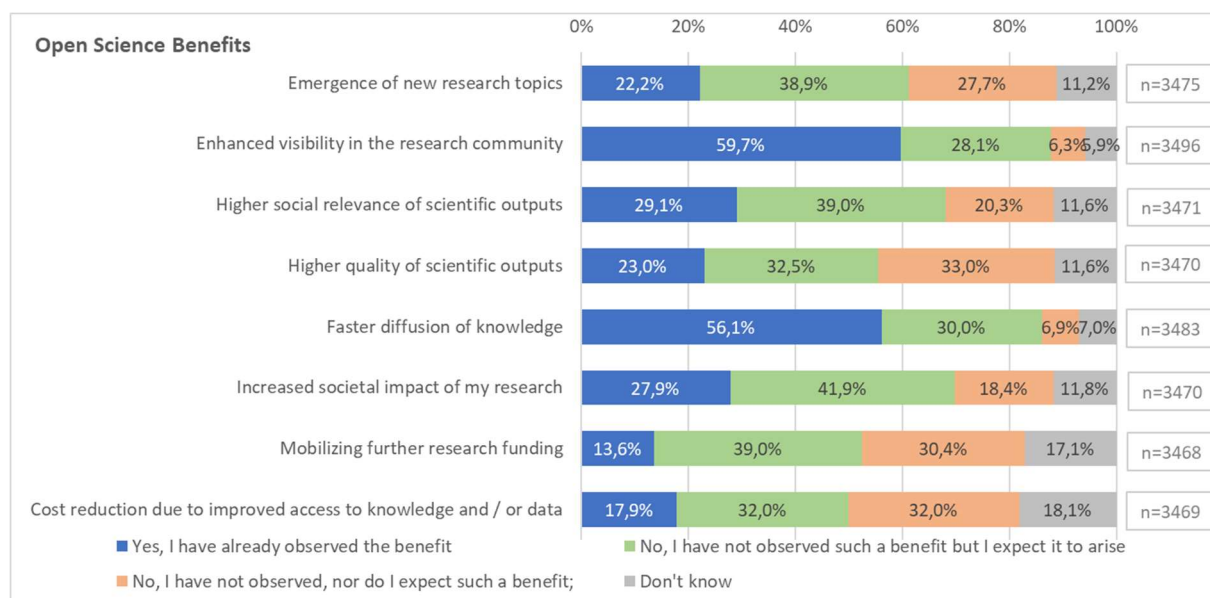


Figure 10: Benefits of Open Science

As shown in Figure 10, among the two leading observed intangible benefits of Open Science are an enhanced visibility in the research community (60%) and a faster diffusion of knowledge (56%). The overall tendency across the different benefits is positive, with large numbers of respondents expressing either having observed a benefit or expecting it to arise. However, for several benefits we also find groups of approximately one-third of respondents that have neither observed nor expect a particular benefit to occur.

In addition, respondents mentioned compliance with funders or better chances of publication as further gains of engaging in Open Science. However, there was consensus that the benefits are rather limited, at least as expressed in the open text section of this topic of the survey. Respondents point to numerous disadvantages and demotivating factors such as, for example, additional costs for subscription and publishing or negative effects on the quality of research.



2.5.4. Barriers

Respondents were asked about the main barriers they perceive in relation to their Open Science activities.

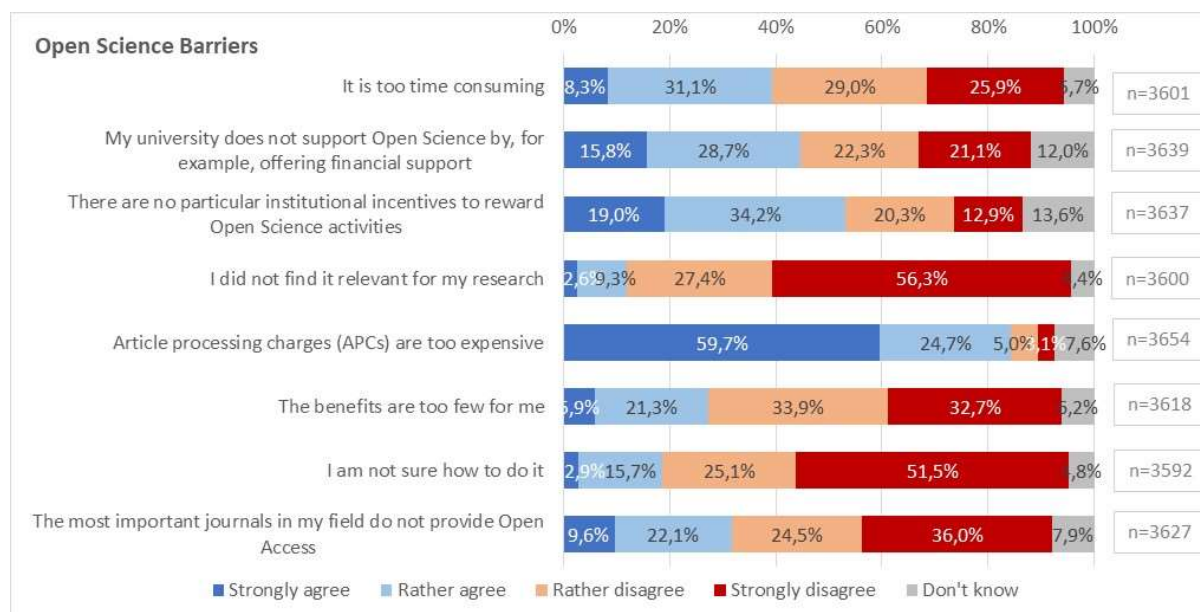


Figure 11: Barriers to Open Science

As Figure 11 shows, article processing charges (APCs) are considered the largest barrier to Open Science (84.4%). Many respondents either strongly or rather agree that the absence of institutional incentives to reward Open Science related activities (53.2%) as well as an absence of explicit support from the university (44.5%) are significant barriers to Open Science.

In the additional barriers (open text) section many respondents expressed that pay to publish models seriously affect the quality of published research. They expressed their frustration with high charges. Others pointed out that Open Science is simply not compatible with their research given data protection laws, data sensitivity, and ethical issues (such as working with vulnerable groups).



2.6. Researchers' Practice and perception of Gender Equality

The survey provided the following definition to respondents prior to the questions on Gender Equality. *Gender equality refers to the equal representation of women in research and innovation and the inclusion of gender aspects in research and innovation content.*

2.6.1. Activities

Respondents were asked whether Gender Equality was taken into account in their research during the past three years (Figure 12).

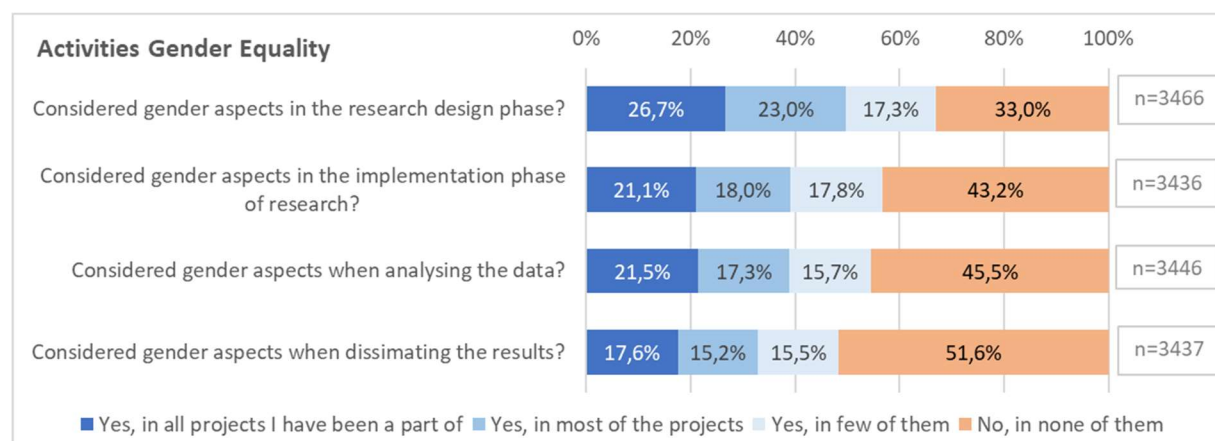


Figure 12: Activities regarding Gender Equality

On average one-fifth of respondents have taken gender aspects into account in all research phases in all projects they have been part of. However, across all activities listed, a majority of respondents reported not having considered gender aspects across each of the research phases. For each phase the largest group of respondents reported not having considered gender equality in any of their projects. For example, 46% have never considered gender aspects in the analysis of their data and more than half of the respondents (52%) have never considered gender aspects in their dissemination activities at the end of a project phase.



2.6.2. Motivation

Respondents were asked about their motivations to pursue Gender Equality activities.

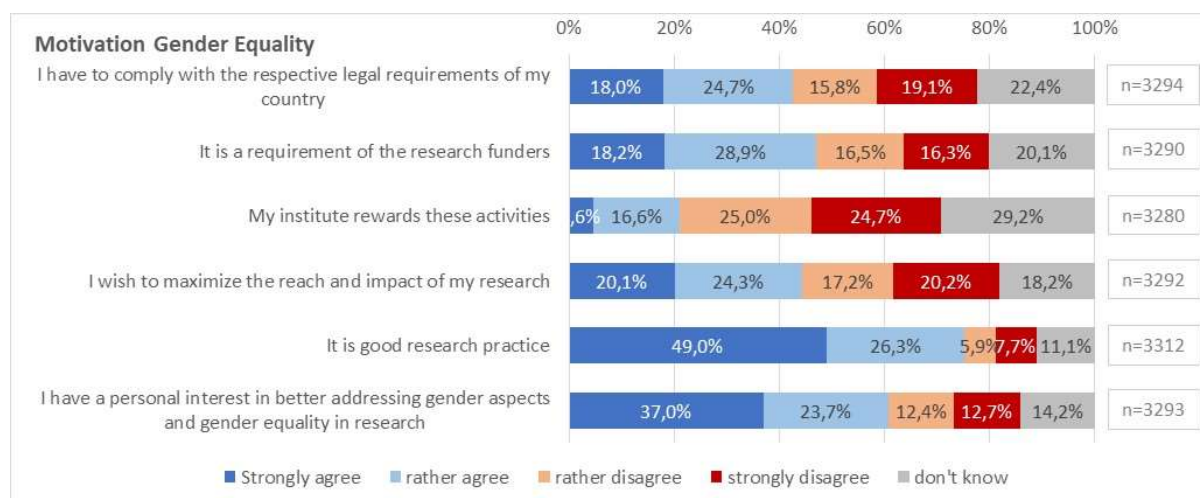


Figure 13: Motivations to engage in Gender Equality activities

As Figure 13 shows, three-quarters of the respondents (75.3%) are motivated to consider Gender Equality because they regard this as good research practice. A further 60.7% strongly or rather agreed they have a personal interest in better addressing gender aspects and gender equality in research. Activities to promote Gender Equality are also pursued in order to comply with the respective national legal requirements (42.7%) or with research funders' requirements (47.1%). In contrast to this picture, the motivating force of extrinsic factors, such as institutional rewards, is limited. While around one-fifth of respondents strongly or rather agree that they are motivated by institutional incentives, half of all respondents (49.7%) either rather or strongly disagreed.



2.6.3. Benefits

Figure 14 presents the numerous benefits of taking Gender Equality into account when doing research. Respondents were asked whether they have already observed them or still expect them to occur.

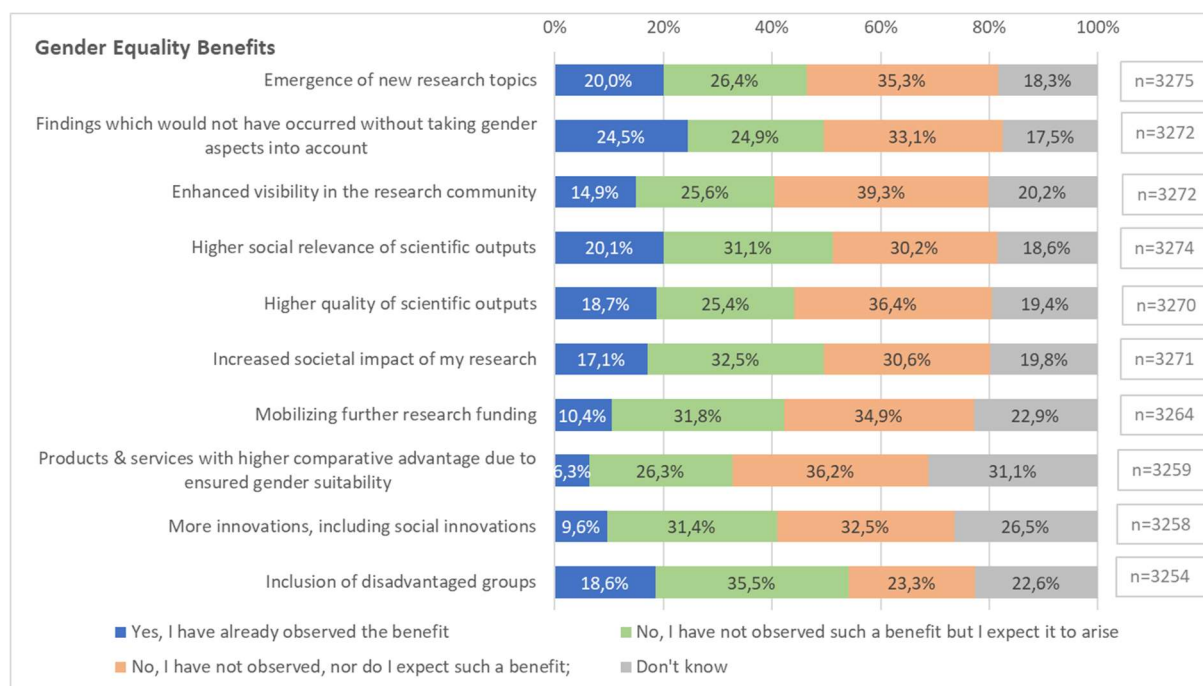


Figure 14: Benefits of Gender Equality

The leading benefit, observed by 24.5% of respondents, is the generation of findings which would not have occurred without taking gender aspects into account. A higher social relevance of scientific outputs (20.1%) and the emergence of new research topics (20%) are among the most frequently observed benefits. Approximately one-third of respondents express not observing or expecting any of these benefits. On average, one-quarter to one-third of respondents have not yet observed any of the benefit but expect them to arise in the future. This is understandable given the likely emergence and evolution of some of these benefits over a longer period of time.

Other benefits mentioned were better team dynamics or advancing women's academic careers.



2.6.4. Barriers

Figure 15 illustrates the main barriers to consider Gender Equality.

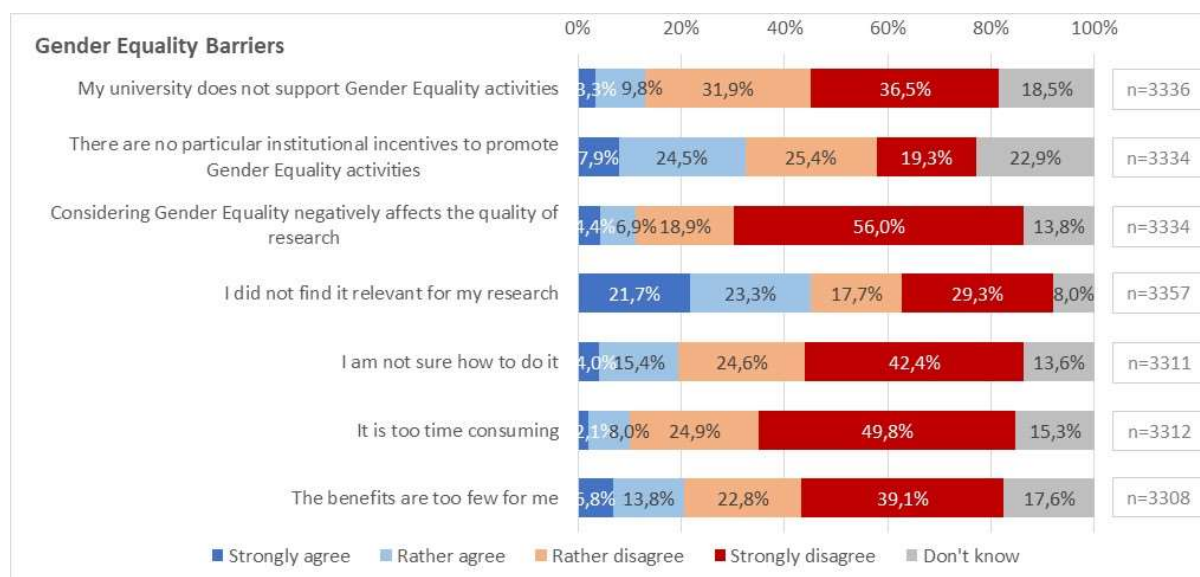


Figure 15: Barriers to the promotion of Gender Equality

One fifth of respondents strongly agreed that they do not engage in Gender Equality related activities because they do not find it relevant to their own research (21.7%). In total, one third and almost half of the respondents, respectively, consider the lack of any institutional incentives to promote gender equality (32.4%) and its irrelevance to their own research (45%) as main barriers to its implementation.

Similarly to the other RRI key areas, respondents also pointed to numerous other barriers that vary in their origin and nature, offering valuable insights into the contextual contingencies and the difficulty of taking Gender Equality in research forward. These included, for example, structural difficulties in establishing gender balance in male-dominated disciplines, or recruiting challenges given the asymmetry between (available) highly qualified male or female researchers across scientific fields. However, many comments clearly stated that gender is not relevant to their work at all.



2.7. Researchers' Practices and Perceptions of Ethics

The survey provided the following definition to respondents prior to the questions on Ethics. *By Ethics we understand the application of ethical principles or values to various issues and fields of research, including ethical aspects of the design and conduct of research, whether research results may be misused, and aspects of scientific misconduct.*

2.7.1. Activities

Respondents were asked whether they have considered Ethics in their research during the past three years (Figure 16).

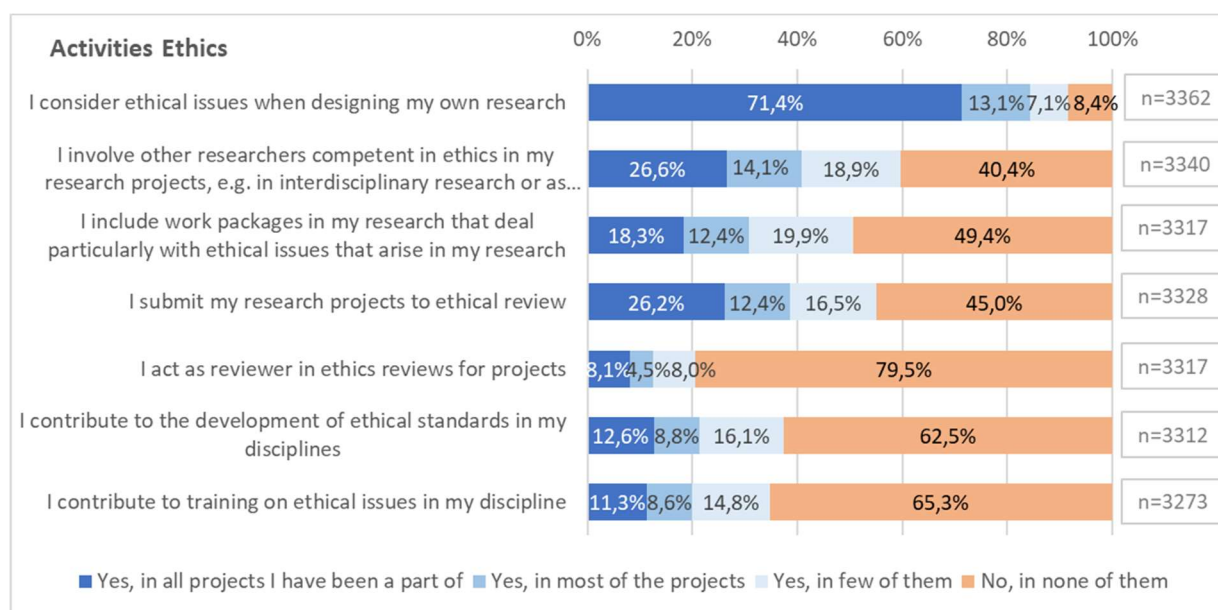


Figure 16: Activities regarding Ethics

A large majority of 71% of respondents report having considered ethical issues when designing their own research in all projects they have been part of. A total of 41% of respondents in total have involved other researchers competent in Ethics in their research projects or submitted their research projects to ethical reviews in either all or most of their projects. A large majority (79.5%) of respondents have never acted as an Ethics reviewer, while two-thirds of respondents have neither contributed to training on ethical issues nor to the development of ethical standards in their disciplines in any of their projects.



2.7.2. Motivation

Respondents were asked about the motivations to adopt ethical research practices.



Figure 17: Motivation to engage in Ethics activities

As presented in Figure 17, there is great consensus on the main driving forces to engage in Ethics. Large majorities of respondents are motivated to engage in Ethics because they strongly agree it is part of good research practice (87.2%) or because they are convinced that research must be ethical (87.6%). Most respondents (76.9%) report they want to comply with the respective national legal requirements or research funders' requirements (75.2%). Respondents most strongly disagreed being motivated by institutional rewards (16.2%).

In the additional answers provided by respondents we observe variation in the importance and necessity/utility of Ethics across disciplinary fields or research subject from top priority (e.g. in animal experimentation) to not relevant (e.g. basic physics). Some respondents explained their 'disinterest' in Ethics with the fact that it is not legally required in their respective scientific field and country context. Other driving motivations are, for example, reasons of personal responsibility or its contribution to originality, excellence, or a good academic culture.



2.7.3. Benefits

Figure 18 summarizes respondents' experience and observation of various benefits resulting from an ethical research conduct.

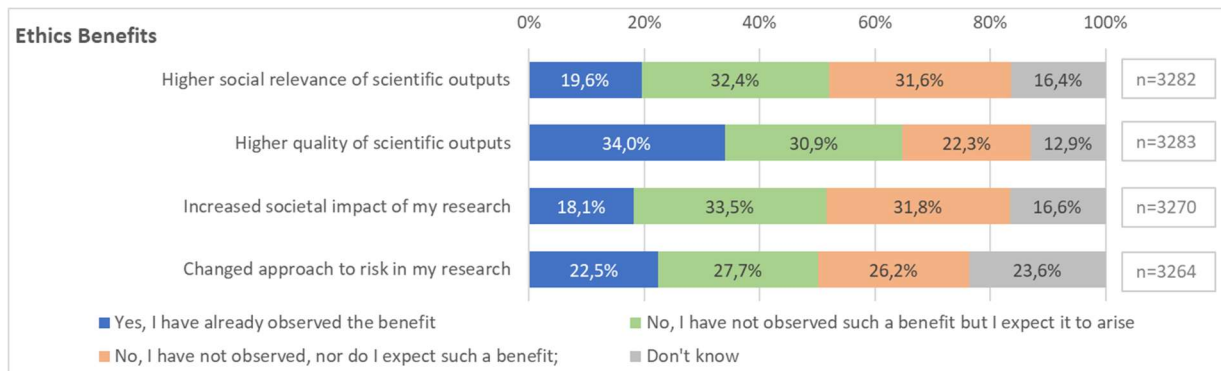


Figure 18: Benefits of Ethics

About one-third of respondents (34%) have observed a higher quality of scientific outputs as a result of ethical conduct. On average, one-fifth of respondents have already observed the other three benefits listed. However, the overall picture is divided, given that across all benefits, approximately one third still expects the benefit to arise, while a similar share of respondents express that they have not observed any benefits, nor expect any to occur.

When examining the nature of the benefits, it can be also seen that benefits occurring on a smaller, individual scale are more frequently observed, while benefits with a wider scope that lie beyond the individual sphere (of influence and control), such as, for example, increasing societal relevance or impact, are observed less frequently. However, this may be rooted in the time-lag between the realization of small-scale gains and large-scale impacts, as expressed in the higher shares of respondents still expecting the societal benefits to occur.

Additional benefits mentioned by respondents were better data replicability, the promotion of research integrity, a contribution to excellence, or "peace of mind". Others suggested that Ethics should not be regarded as a means to an end, but as a non-negotiable code of conduct and key pillar of good science.



2.7.4. Barriers

Figure 19 illustrates the main barriers to Ethics in research.

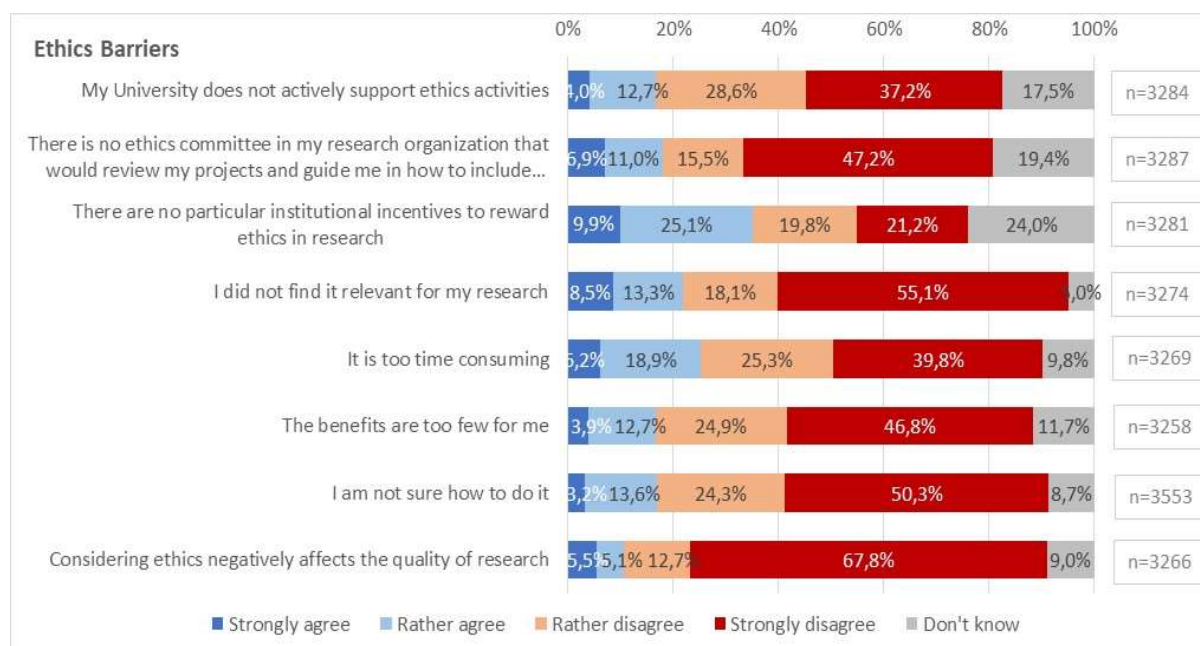


Figure 19: Barriers to ethical research

A total of 35% of respondents in total consider the absence of institutional incentives rewarding ethical conduct as a main barrier. While 21.8% of respondents express agreement that Ethics is not relevant for their research, another 17.9% agree that the absence of a guiding Ethics committee is a further main barrier. A majority of respondents (80.5%) disagreed with the statement that Ethics negatively affects the quality of research.

Among the numerous additional barriers mentioned by respondents, bureaucracy was the leader. Respondents consider changing regulations and complex, time-consuming approval procedures as a main hindrance to an ethical conduct of research and a factor preventing compliance. Respondents also express their frustration with the competitive dynamics in the research landscape in which ethical conduct creates a competitive disadvantage and is not rewarded accordingly.

2.8. Conclusion and outlook

The data presented here provides a focused entry point into the activities, motives, benefits, and barriers reported by researchers in relation to open and responsible research.

Results show that strong motives to engage in the responsible research practices are mostly of normative and intrinsic nature: respondents pursue all four RRI key areas because it reflects their understanding of good, ethical research practice that engages with the public and promotes gender equality. While respondents are also driven by the desire to maximize the reach and impact of their research, we find that the motivating force of institutional or other external rewards remains rather limited.



Engagement in RRI practices is linked with a multitude of benefits. A higher social relevance of scientific outputs and an increased social impact of research are listed as the most frequently observed benefits of Public Engagement. A further major benefit that relates to Gender Equality practices is the emergence of new research topics or findings which would not have occurred without the consideration thereof. As an overall tendency, we find that benefits occurring on a smaller, individual scale are (at the time of the survey) more frequently observed than large-scale benefits or impacts that (are still expected to) unfold over a longer period of time.

Ultimately, the RESU has helped to identify a wide range of obstacles to open and responsible research and innovation. High article processing charges are considered the largest barrier to Open Science, followed by the absence of institutional incentives to reward these activities - which also holds true for Public Engagement. Public Engagement as well as ethical activities are also mostly hampered by bureaucratic complexity or time-consuming (approval) procedures. While the motivating force of extrinsic factors is generally low, we observe a hampering effect of their absence: results provide evidence that the lack of particular institutional incentives reduce respondents' likelihood of engaging in a more active participation in open and responsible research. In the case of Gender Equality, unlike the other three key areas, a main reason for respondents' lack of engagement is the irrelevance of gender equality to their research.

Further analysis of these data will include a comparison with data gathered by the prior MoRRI project researcher survey, in order to assess changes in responses over time. Researchers' responses will also be examined in relation to how institutional policies and implementation mechanisms to support open and responsible research and innovation appear to affect their activities and attitudes. Further investigations will also consider how these effects differ between scientific field and by gender.



3. RRI in European Research Performing Organisations

This chapter presents new categorical indicators derived from the CCN-RPO study on the implementation of RRI in European research performing organizations (RPOs). The chapter contains indicators developed from qualitative research focused on how European RPOs work with five aspects of open and responsible research and innovation. Following the initial metrics and indicators presented in MR2, this chapter contains a detailed analysis of RPOs' policies and examines whether they provide aims, support, or support and incentives for five aspects.

The chapter begins with a short description of the aim and scope of the CCN-RPO study. The five following sections present metrics and qualitative contextualisation for how RPOs work with four areas familiar from the concept of RRI plus the Third Mission, which is included in order to capture RPOs efforts to transfer knowledge to society. Overall, the five dimensions for which indicators are developed include: 1) Gender Equality (GE); 2) Open Science (OS); 3) Public Engagement (PE); 4) Research Ethics and Integrity (REI); and 5) Third Mission (TM).

The indicators report on the proportion of RPOs that include these five dimensions in their policies and strategic documents, and whether the respective areas are covered through broad-based strategic aims, various 'soft' support structures, or through 'hard' support structures and incentives within the overall and sub-policy areas. The definition and instrumentation of the three categories are covered in the section below.

3.1. Aim and scope of the CCN-RPO study

The objective of the CCN-RPO study was to examine in greater detail how RPOs work to support the five dimensions of open and responsible research and innovation. The 2nd Monitoring Report (Chapter 6) examined whether RPOs included these five areas in their strategies and/or policies, the degree of strategic prioritization of the five areas, and whether these strategies were described in practical or aspirational terms. In this 3rd Monitoring Report, the reported indicators are the result of further development of the qualitative analysis of the CCN-PRO country reports. For a description of the CCN-PRO study and the qualitative analysis and coding of the documents, see the 2nd Monitoring Report (D2.3) and Annotated Methodological Procedures Report (D2.4).

The CCN-RPO data collection included, in addition to the quantifiable metrics and indicators used for analysis in MR2, qualitative descriptions of the organizations' aims within the five key areas analysed and the content of strategies and policies. This qualitative data has been analysed anew and the result of this analysis is presented below.

Building on the coding process described in D2.4, the SUPER MoRRI team conducted a secondary coding and analysis procedure in which Practical Implementation Codes (PICs) were allocated to one of three categories:



Table 2: Categorization procedure

Practical Implementation Codes (PICs)	Category	Explanation of category
Awareness campaigns	Aims	RPOs in this category have a RRI repertoire focused on aims and communication.
Expressed aims		
Reference to international or national networks, alliances, etc.		
Networks*,**		
Policy targets	Support	RPOs in this category has a RRI repertoire focused 'soft' support structures.
Recommendations and suggestions		
Reporting of progress		
Events		
Funds/funding	Support & incentives	RPOs in this category has a RRI repertoire focused on concrete incentives and support structures, which will often be the consequence of a more tangible policy.
Infrastructure		
Dedicated unit		
Rewards and recognition		
Rules and requirements		
Training		

*The PIC "Networks" was only used when coding the Gender Equality and Public Engagement part of the CCN-reports.

** Internally existing networks at the RPO.

A dichotomous coding was used, depending on whether the PIC was present within each RPO report. This coding was then used to assign the RPO a category within each sub-code. This coding strategy allowed for differentiation between RPOs and by the RRI keys, which in turn allowed for a more extensive analysis of the collected data.

Further, while the categories might appear to be hierarchical, they are not. The presence of 'support and incentives', for example, does not necessarily denote the presence of aims within a specific policy area. The categories are only hierarchical in the sense that the 'support' and 'support and incentives' categories require the RPOs to have more internally developed structures to support a policy area, as it is assumed to be more burdensome to provide infrastructure than to simply express aims. However, the categories should not be seen as a benchmarking tool for the RPOs, as they can more accurately be described as expressing policy commitments and repertoires. The focus of data collection and analysis was designed to build an understanding of each RPO's repertoires of policies and practices, whether these are already active or planned. The indicators developed can be considered to reflect RPOs actions both to shape their own actions and to influence the qualities of the research culture in which they are embedded.

Figure 20 summarises RPOs' repertoires within each of the five key areas analysed. In the following sections each of these areas will be described in more detail. The figure shows, that most RPOs have at least one mechanism by which each of the five areas is promoted. However, one out of five organisations neither support nor have explicit mention of Gender Equality and 25% have no current policy for Open Science. Importantly, this figure does not reveal the depth and breadth of support mechanisms and incentives, which is also highly skewed. A relatively small set of RPOs have a broad repertoire of mechanisms and incentives in place, while many have one or two mechanisms to support



or incentivise specific behaviours in their organisation. In the next section, the contours of this breadth and depth of support are expanded upon for each of the five areas of open and responsible research and innovation included.

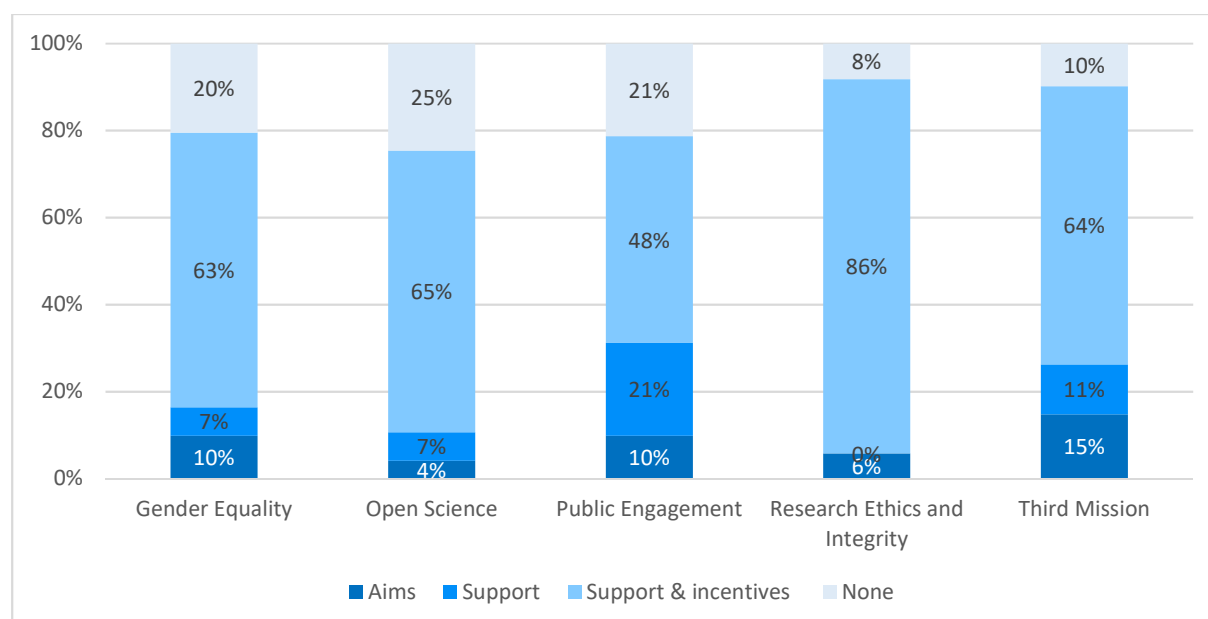


Figure 20: RRI in European Research Performing Organizations overview.

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

3.2. Gender Equality in European RPOs

This section reports to what extent and how the 122 European RPOs included in our study sample work with Gender Equality in their respective organizations. Compared to MR2, this section provides a deeper look into the gender equality work done at the respective RPOs and reports a more granular coding of the data collected. Gender Equality is one of the core priority areas within the European Union¹ and is included in the sustainable development goals (SDG5). Gender Equality in the setting of responsible research and innovation refers to a range of issues such as equality in employment, tenure, and wages as well as equality in research participation and research content. The way in which organizations work with Gender Equality varies and is sometimes included within other broader concepts and policy areas such as diversity and inclusiveness (See D2.3, pp. 88-89).

¹ Within the European Research Area (ERA), the European Commission has set the following three objectives regarding [Gender Equality](#): gender equality in careers at all levels, gender balance in decision making, and integration of the gender dimension into the content of research and innovation.

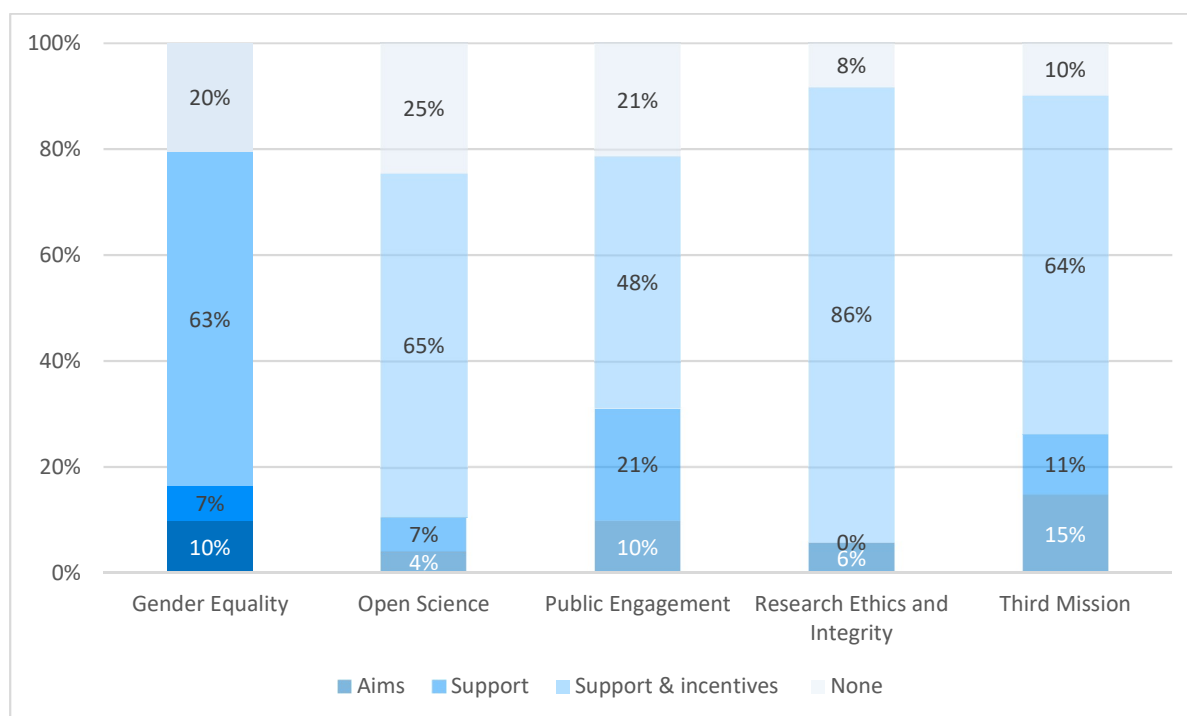


Figure 21: Proportion of the RPOs that highlight Gender Equality as either aims, support, or support & incentives in their core strategic documents.

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

Figure 21 illustrates the percentage of RPOs that include Gender Equality in their core strategic documents, along with their approach to its promotion. The Gender Equality policy approach is categorised either as ‘aims’, ‘support’, or ‘support and incentives’ (see table 3 for definitions). Figure 21 shows that four-fifths of the RPOs highlight or mention aspects of Gender Equality in core strategic documents. A total of 10% of the RPOs solely communicate aims within the Gender Equality policy area, while 7% provide support for Gender Equality. Finally, 63% of the RPOs provide some type of support and incentives towards at least one of the sub-policy areas of Gender Equality. It is important to note, when reading this figure, that there is a large variation in the extent and types of support mechanisms and incentives that individual RPOs employ. Moreover, some of the RPOs focus on narrow areas and niches within the frame of Gender Equality. The characteristics of these policy repertoires will be expanded on in the next section.

A detailed coding scheme was developed (see D2.3) for the many aspects of Gender Equality, as shown in Figure 22.

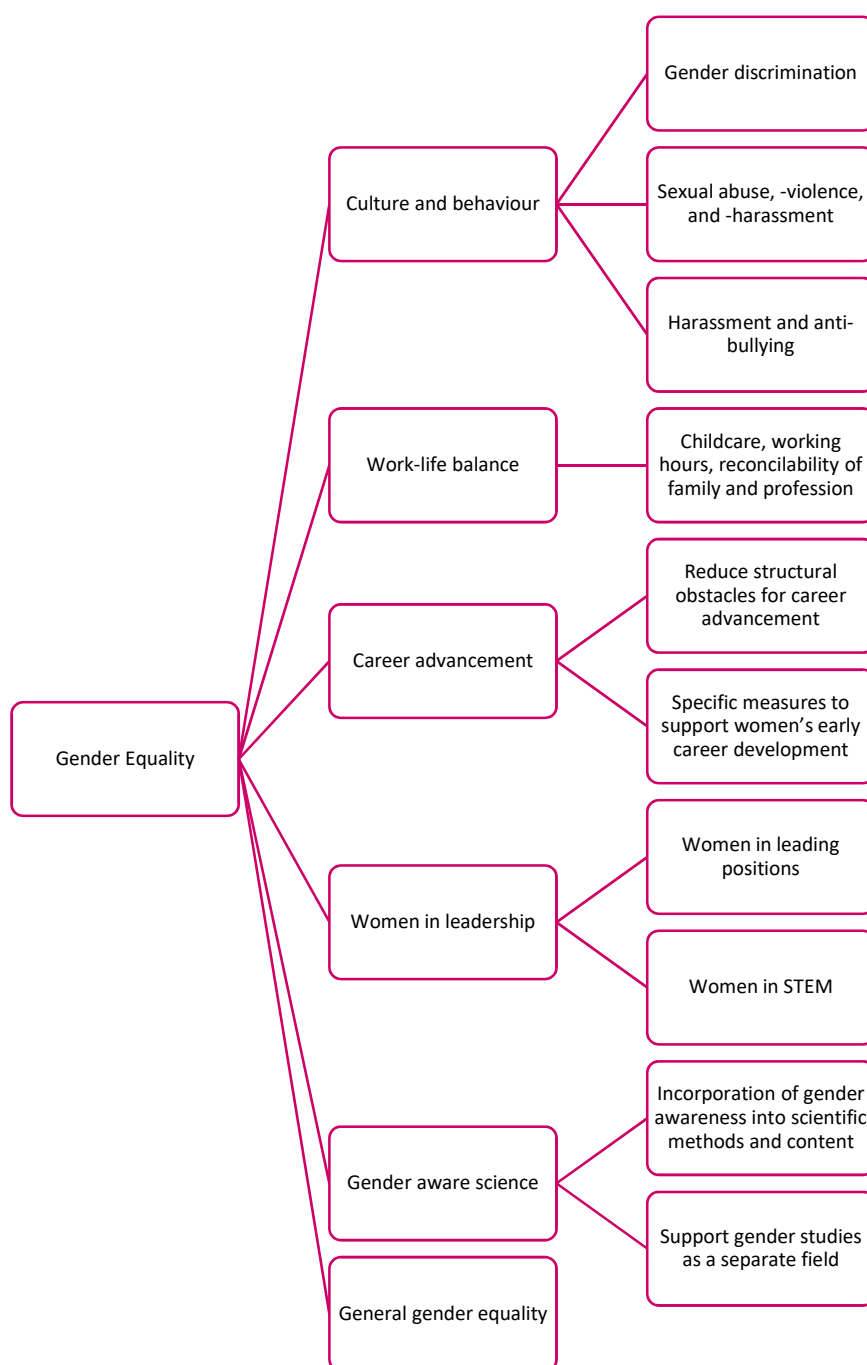


Figure 22: Gender Equality coding scheme

Note: The broad code, General gender equality, encompasses all areas not included in the remaining codes.

This section reports on the practical implementations of Gender Equality policy as either aims, support, or support and incentives, within each strategic focus sub-code (second-tier codes in Figure 22 above).

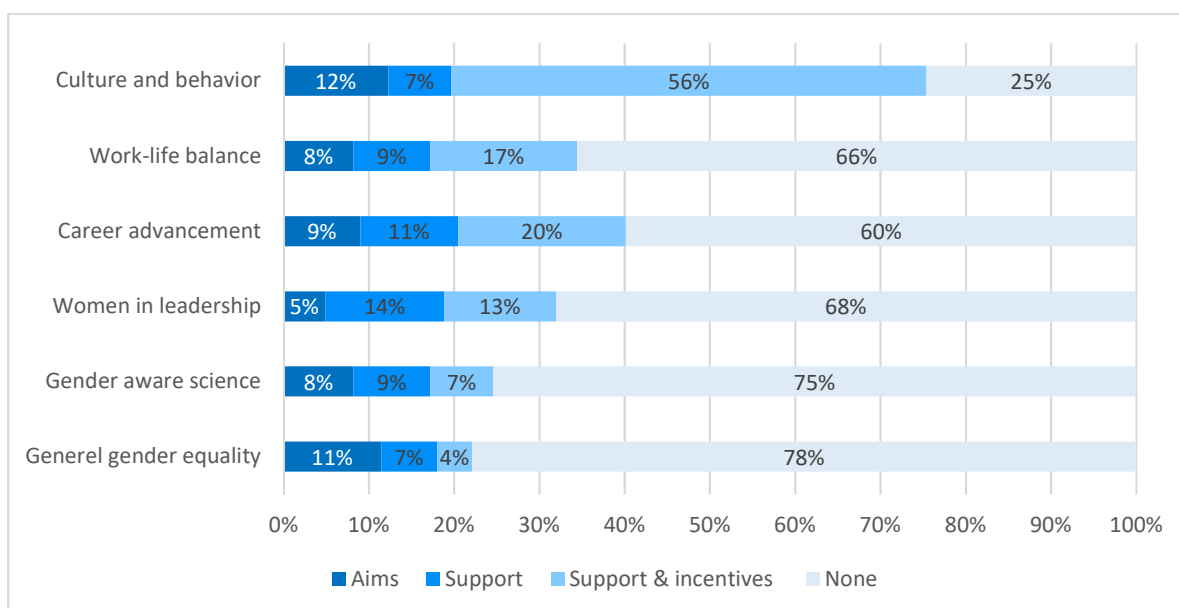


Figure 23: Focus and implementation of Gender Equality by sub-areas

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

Figure 23 presents how RPOs approach Gender Equality by sub-code. Overall, the figure illustrates that 'Culture and Behaviour' is the primary policy focus of most RPOs. Culture and Behaviour encompasses policies, support structures, and incentives addressing issues such as discrimination, sexual abuse, harassment, violence, and anti-bullying.

More than half of the organizations in the sample provide support and incentives in this policy area, which represents the highest percentage across all policy domains. A total of 12% of the RPOs have expressed aims within the Culture and Behaviour domain, with a notable emphasis on Gender Discrimination as a sub-policy area, as seen in Figure 24. Interestingly, references to international or national networks, alliances, or similar entities are most prevalent within the Gender Discrimination category. This suggests that these networks and alliances are particularly concerned with gender discrimination issues on a broader scale.

Finally, 7% of the RPOs incorporate policies supporting Culture and Behaviour as a policy area. This support takes various forms, including the establishment of gender equality networks, hosting or participating in events promoting gender equality and inclusion, and setting specific policy targets within the sub-policy areas.

'Career Advancement' is the second-largest sub-policy area, with 40% of RPOs implementing policies and providing various forms of support within this domain. Career Advancement encompasses policies aimed at reducing structural barriers to career growth and implementing specific measures to support women's early career development.

Among RPOs, 20% offer support and incentives within this category. This support includes initiatives such as allocating dedicated funding to establish an incentive system for hiring female professors, creating specialized units focused on promoting young female scholars, and conducting inclusive recruitment workshops to ensure a diverse hiring process.



Additionally, 11% of RPOs provide support in the form of setting policy targets to achieve gender balance in study programs or equal gender ratios in job applications. They also host events to attract young female scholars and offer recommendations on proactive recruitment from a more diverse talent pool.

Finally, 9% of RPOs express specific aims within the Career Advancement policy area. These aims may include actions such as 'raising awareness' as a primary focus or striving to apply equal opportunity and gender equality commitments throughout the entire employee lifecycle.

Figure 24 illustrates a relatively even distribution of policy areas and practical implementations between the two key areas 'Reducing structural obstacles for career advancement' and 'Specific measures to support women's early career development' within the Career Advancement policy area.

'Work-life Balance' and 'Women in Leadership' represent the third and fourth most utilised policy areas in which RPOs demonstrate their commitment to Gender Equality. Both policy areas are closely related to Career Advancement, focusing respectively on the reconciliation of family and profession and women's roles in leadership positions, particularly in STEM fields.

Within the Work-life Balance policy area, 34% of RPOs have policies and provide aims, support, or support and incentives. This policy domain addresses childcare, working hours, and work-family balance. Among these organizations, 17% provide support and incentives, primarily through the provision of infrastructure, such as increased flexibility for working mothers and on-campus facilities like childcare centres. Additionally, 9% offer support in the form of practical implementations like policy targets and recommendations.

Moreover, 8% of RPOs express aims within the Work-life Balance policy area, focusing on removing barriers preventing women from equal workplace participation and addressing the intersection of gender equality and work-life balance. Notably, a significant portion of work-life balance policies primarily target women, with fewer considering gender-neutral 'parental responsibilities,' indicating a gender-specific focus.

Within the 'Women in Leadership' policy area, 32% of RPOs implement policies and provide aims, support, or support and incentives. Figure 24 shows that the primary emphasis is on 'Women in leading positions', with 'Women in STEM' receiving less attention. Among these organizations, 5% express specific aims, such as increasing female representation in leadership roles. Moreover, 14% offer support in the form of concrete policy targets, often specifying desired gender ratios within university positions or STEM program enrolments.

Additionally, 13% of RPOs provide support and incentives, including funding for female professors, scholarship programs for women in STEM, working groups, dedicated units, and mentoring programs to boost female representation.

The policy area 'Gender-Aware Science' comprises sub-policy areas related to incorporating gender awareness into scientific methods and content and supporting gender studies as a separate field. Overall, a quarter of RPOs have practical implementations within these policy areas, with a slight preference for incorporating gender awareness into scientific methods and content.

Among these, 7% provide support and incentives, such as dedicated funds for gender-specific research or units ensuring gender awareness across all fields of study. An additional 9% offer support, often through policy targets and recommendations.



Another 8% express aims to make their curricula and research more gender aware.

The 'General Gender Equality' policy area serves as a catch-all for practical implementations within Gender Equality that do not fit into other sub-policy areas, or when the specific policy sub-area cannot be determined. Typically, this involves expressed aims or specific policy targets, often appearing in mission statements regarding gender equality at the RPO.

Figure 24 presents qualitative coding results for RPOs' Gender Equality repertoires and the number of practical implementations within each sub-policy area. Please note that RPOs may have multiple practical implementations in all three categories (aims, support, support with incentives), but they are assigned to the 'support and incentives' category in the categorization of policy repertoires. This should be kept in mind when analysing Figure 24.

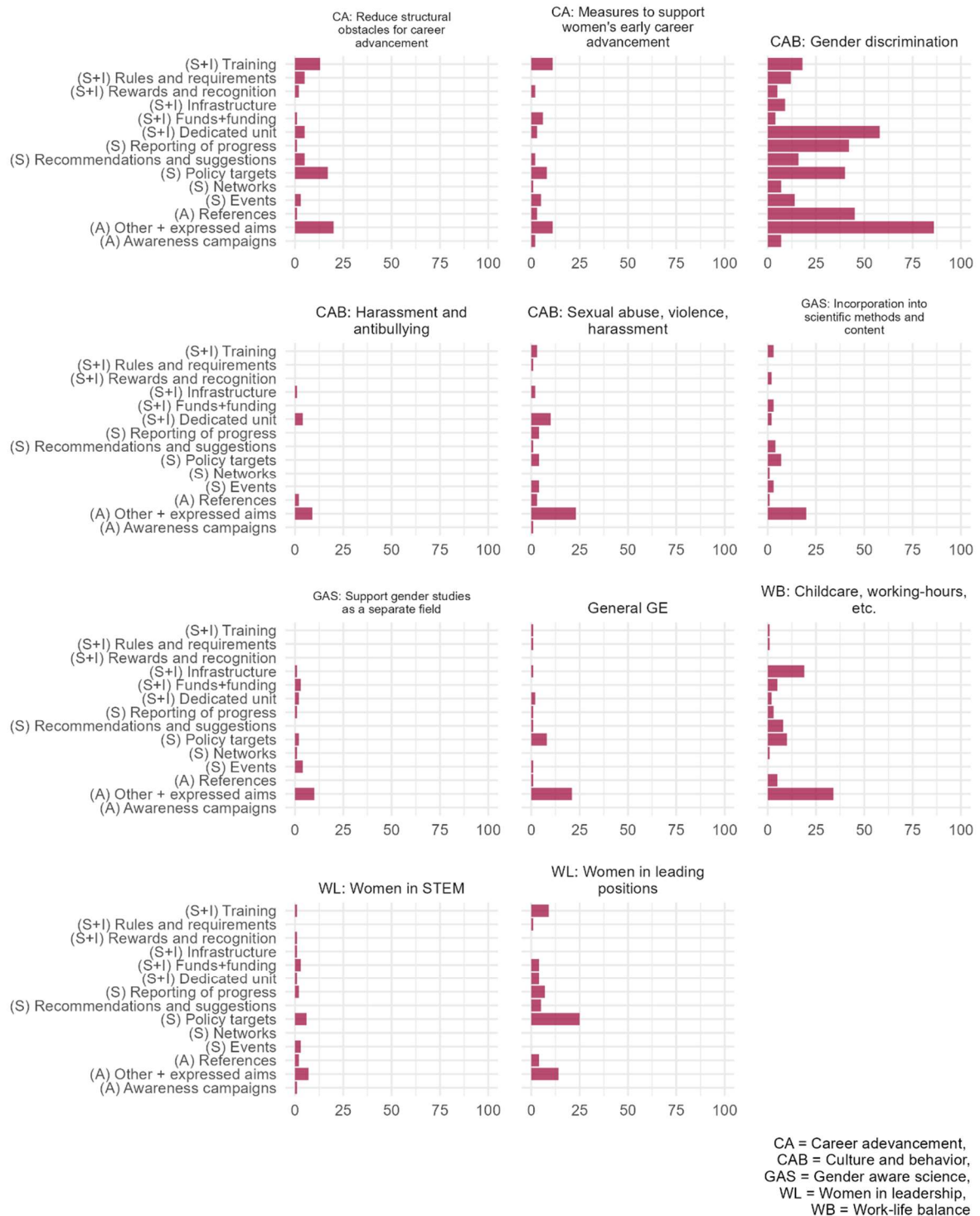


Figure 24: Gender Equality qualitative coding results

Note: The letters in parentheses indicate which category the practical implementation code is part of: aims (A), support (S) or support and incentives (S+I).

3.3. Open Science in European RPOs

This section reports how and to what extent the 122 European RPOs work with Open Science in their respective organisations. Open Science is a policy priority for the European Commission (EC) and a standard method of working under its research and innovation funding programs (see D2.3, p. 60). The EC argues that Open Science improves the quality, efficiency, and responsiveness of research.²

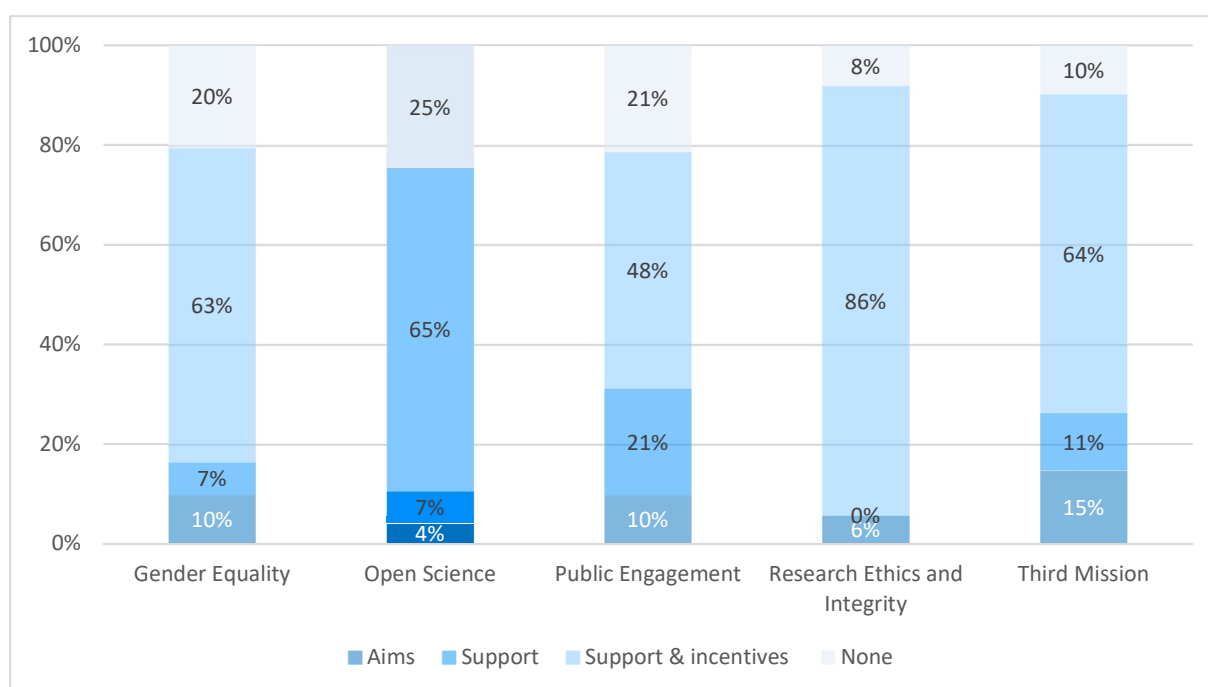


Figure 25: Proportion of the RPOs that highlight Open Science as either aims, support, or support & incentives in their core strategic documents.

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

Figure 25 depicts the percentage of RPOs that mention aims, provide support, or provide both support and incentives related to Open Science in their core strategic documents. A total of 25% of the RPOs do not mention any Open Science policy in their strategic documents, while 4% mention aims related to Open Science, 7% mention Open Science related support, and by far the largest percentage (65%) mention support and incentives concerning Open Science. Although the figure above offers initial insight into the Open Science policy repertoire of the RPOs, it should be noted that ‘aims’, ‘support’, and ‘support and incentives’ are broad categories, which introduces considerable variation in the specific practical implementation sub-codes (PICs) used within these categories. Furthermore, the sub-policy areas the RPOs choose to target can also vary across aims, support, or support and incentives. The coding schema for Open Science sub-policy areas is presented in Figure 26 (see D2.3 for detailed description).

²[Open Science \(europa.eu\)](https://open-science.europa.eu/)

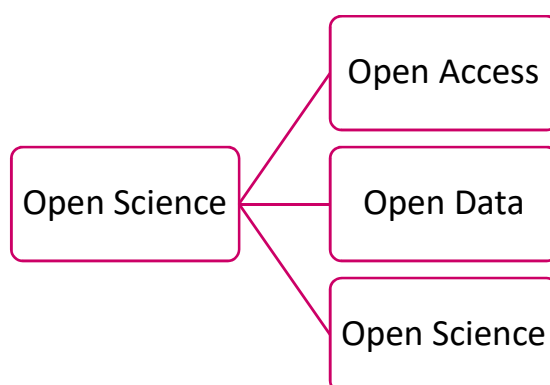


Figure 26: Open Science coding scheme

In this section we report on each PIC for Open Science within each strategic focus. The Open Science categories are minimal in number compared to the diverse sub-policies in Gender Equality. Figure 27 shows the percentage of the RPOs mentioning aims, support, or support and incentives related to each specific sub-policy area.

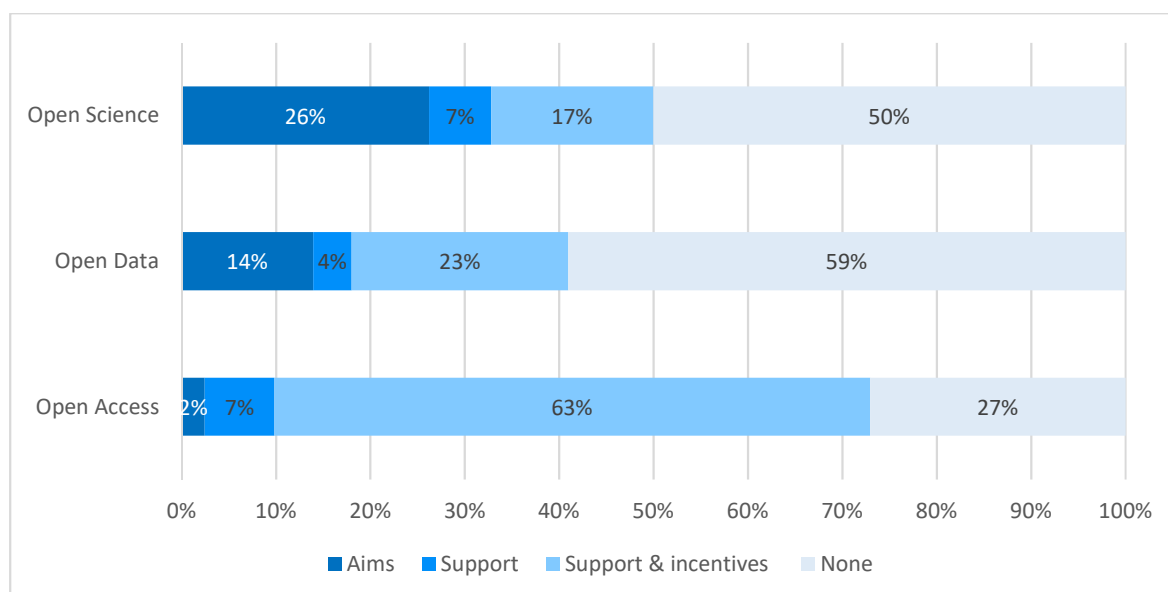


Figure 27: Open Science

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

As depicted in Figure 27, 'Open Access' is the policy area most of the RPOs include in their strategic documents, with only 27% having no content related to Open Access. A substantial portion (63%) have implemented support structures and incentives concerning Open Access, primarily consisting of infrastructure, dedicated units, and rules and requirements (Figure 28).

In more substantial terms, the infrastructure related to Open Science predominantly includes in-house Open Access repositories and/or in-house Open Access journals. The dedicated units primarily refer



to library staff responsible for maintaining the repositories and Open Access journals. In some cases, these library staff members are also responsible for training researchers in the use of the repositories and journals, as well as Open Access publishing in general.

Rules and requirements primarily refer to institutional expectations that prescribe researchers to publish Open Access. In some cases, it is specified whether green or golden path publishing is expected. A total of 7% of the RPOs mention support for Open Access initiatives, which mostly consist of policy targets and recommendations and suggestions. The policy targets primarily concern intentions to increase the amount of Open Access publishing and intentions to develop Open Access infrastructure, such as those mentioned above. Recommendations and suggestions are similar to the rules and requirements mentioned above; however, they are not mandatory for researchers to follow.

Finally, a marginal percentage (2%) solely communicate Open science policy aims. As depicted in Figure 28, quite a few RPOs refer to national or international networks or expressed aims. However, most of these also have either support measures or support and incentives in their initiatives, placing them under another policy category. The expressed aims primarily concern more abstract and diffuse ideas related to Open Access, for example, considerations concerning Open Access as an ethical standard or Open Access as a general societal benefit. The references primarily relate to either Horizon Europe at the international level or Open Access networks at the national level.

The second most frequently mentioned policy area is 'Open Science', where 50% of the RPOs include some type of content in their strategic documents. In comparison to Open Access, the Open Science policy area is mainly aspirational, with 26% of the RPOs mentioning aims as their Open Science approach, whereas half do not include any Open Science in their strategic documents. As with Open Access, most of the expressed aims concern general statements about Open Science or simply state that Open Science is a priority at the respective RPO. A total of 17% of the RPOs' approaches consist of support and incentives regarding Open Science, where 'infrastructure' is frequently mentioned (Figure 28). The infrastructure mentioned primarily refers to online platforms with Open Science guidelines or e-infrastructure to support Open Science. A total of 7% of the RPOs can be categorised as having 'support' for Open Science. Again, support mainly revolves around Policy Targets mentioning intentions to either develop or improve the RPO's Open Science infrastructure.

The least prevalent policy area in the sample of European RPOs was 'Open Data', with 59% of the RPOs not mentioning any sort of Open Data content. However, 23% of the RPOs have initiatives that include support and incentives in relation to Open Data, which again primarily consists of infrastructure (Figure 28). Like Open Access, the Open Data infrastructure mentioned is predominantly external or internal repositories, but with an explicit mention of data sharing and not just data publishing. Still, Open Data remains more aspirational than Open Access, as 14% of the RPOs have initiatives that consist of aims, predominantly references to international or national networks, or expressed aims. The majority of those RPOs that reference networks refer to FAIR-data.

Like the other sub-policy areas, the expressed aims generally either mention abstract statements about Open Data or that Open Data is a priority without further specificity. A total of 4% of the RPOs have Open Data initiatives that revolve around support, again mostly in terms of policy targets. Like the two other sub-policy areas, the policy targets mainly concern the development or improvement of Open Data repositories and increasing the amount of shared data.

An important point derived from the coding of the CCN reports is that empirically most RPOs tend to understand Open Science primarily as Open Access or use these terms synonymously. Open Science



primarily refers to the more abstract concepts and often bleeds into Research Ethics and the ideal of transparency in science, whereas Open Access functions as the practical implementation of these concepts and ideals. Open Data has the same function as Open Access in being a practical implementation of Open Science, but Open Data generally seems to be a less developed policy area than Open Access at this time.

Figure 28 presents qualitative coding results for RPOs' Open Science repertoires and the number of practical implementations within each sub-policy area. Please note that RPOs may have multiple practical implementations in all three categories (aims, support, support with incentives), but they are assigned to the 'support and incentives' category in the categorisation of policy repertoires. This should be kept in mind when analysing Figure 28.

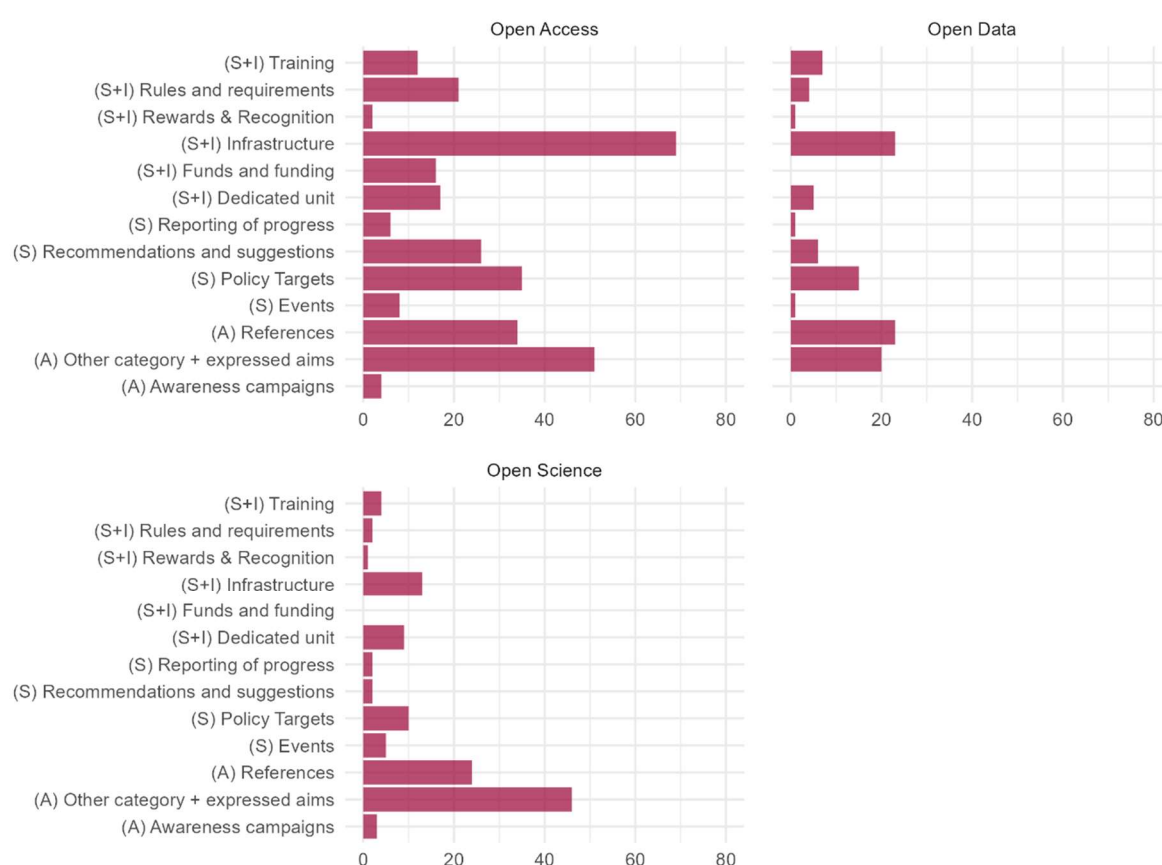


Figure 28: Open Science qualitative coding results

Note: The letters in parentheses indicate which category the practical implementation code is part of: aims (A), support (S) or support and incentives (S+I).

3.4. Public Engagement in European RPOs

This section reports to what extent and how the 122 European RPOs included in our study sample work with Public Engagement in their respective organisations. Public Engagement is part of the guidelines of the Horizon 2020 funding instrument and “implies establishing participatory multi-actor



dialogues and exchanges to foster mutual understanding, co-create research and innovation outcomes, and provide input to policy agendas”.³ Broadly, Public Engagement is concerned with the inclusion of citizens and societal stakeholders in agenda setting, decision-making, policy-forming, and knowledge production processes at RPOs (see D2.3, pp. 73-74).

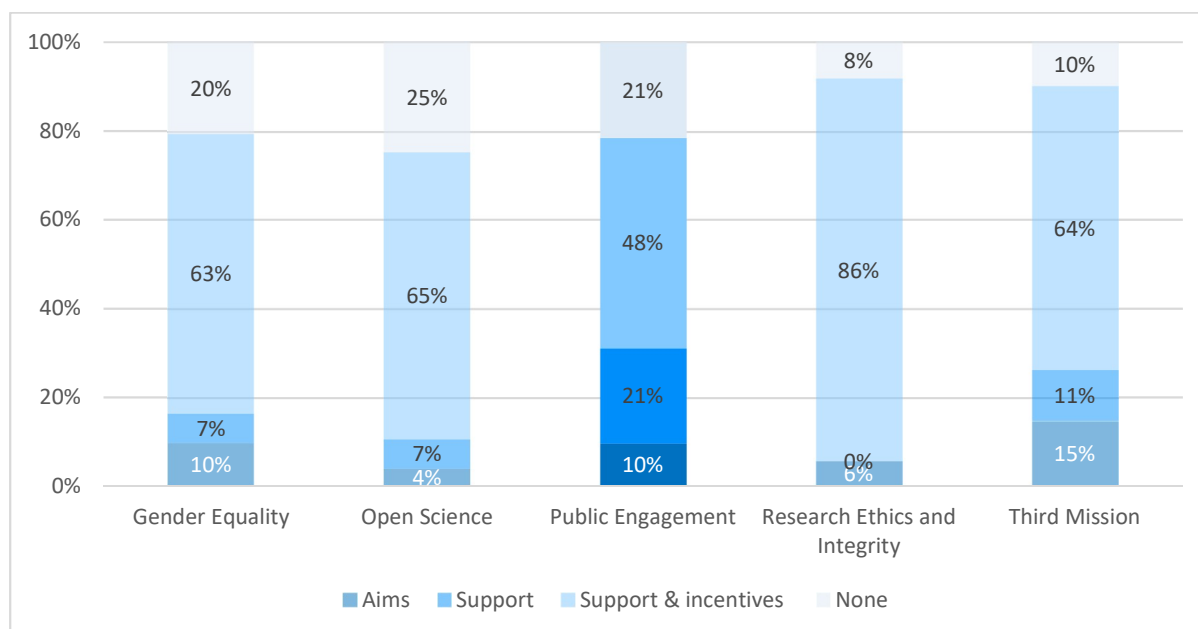


Figure 29: Proportion of the RPOs that highlight Public Engagement as either aims, support, or support & incentives in their core strategic documents.

Note: See table 2 for a description of aims, support, and support and incentives, respectively. N=122.

Figure 29 illustrates the percentage of RPOs that highlight Public Engagement in their core strategic documents and how they implement Public Engagement policy in their organisations. The figure shows that approximately four-fifths of the RPO sample highlight or mention aspects of Public Engagement in core strategic documents, while 21 % do not using any space in their core strategic documents to describe their aims and agenda with regards to Public Engagement. A total of 10 % of the RPOs communicate aims regarding Public Engagement, while 21 % provide support for Public Engagement. Finally, almost half of the RPOs provide support and incentives for Public Engagement. It is important to note, when reading this figure, that there is a large variation in the extent and types of support mechanisms and incentives that RPOs employ. Moreover, some RPOs focus on narrow areas and niches within the frame of Public Engagement. These policy repertoires will be expanded on in the next section.

The coding scheme developed for Public Engagement (see D2.3) is shown in Figure 30.

³ [Horizon 2020 Public Engagement](#)

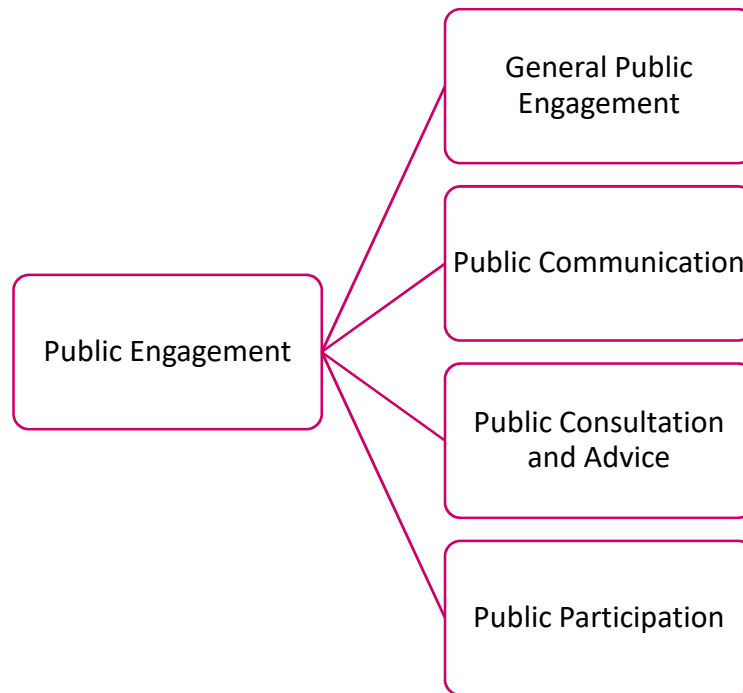


Figure 30: Public engagement coding scheme

This section reports practical implementations as either aims, support, or support and incentives for each of the four sub-codes, as summarised in Figure 31.

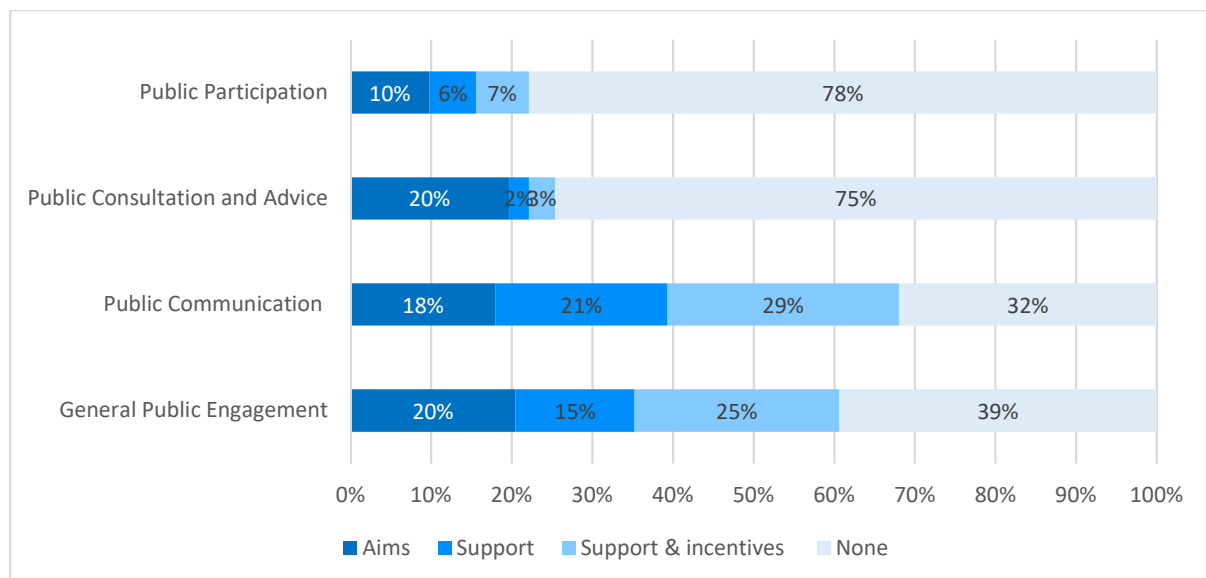


Figure 31: Public Engagement

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.



Figure 31 is ordered following three rungs of the “public engagement ladder” (PEL), with Public Communication as the first step, followed by Public Consultation and Advice, then Public Participation. General Public Engagement, placed at the bottom of the graph, is external to the PEL and was utilized when the RPOs mentioned a practical implementation within Public Engagement that either wasn’t encompassed by the other policy or sub-policy areas or when the sub-policy area within Public Engagement couldn’t be determined. ‘General Public Engagement’ was the second most used Public Engagement policy code. A total of 20% of the RPOs communicate general aims regarding Public Engagement. A total of 15% of the RPOs provide support, with 25% providing support and incentives for General Public Engagement.

‘Public Communication’ stands out as the most commonly employed element of Public Engagement, with 18% of RPOs stating aims in this policy area. A total of 21% of RPOs provide support within Public Communication, while 29% offer both support and incentives. Public Communication broadly pertains to communication from RPOs to the public, as reflected in the goals, support, and incentives provided by RPOs. As shown in Figure 32 (below), the practical implementations within Public Communication primarily involve expressed goals, hosting events, and having relevant infrastructure, followed by policy targets and the presence of a dedicated unit. While organized in various ways, the responsible unit is typically tasked with facilitating communication from the RPO to the public. These practical implementations align closely with the overall policy area of Public Communication, essentially serving as internal structures to support external communication.

Within Public Engagement, 25% of RPOs have a policy focus on ‘Public Consultation and Advice’, with the majority (20%) expressing goals in this sub-policy area. An additional 2% of RPOs provide support, and 3% offer both support and incentives. The aims expressed by RPOs often involve informing and contributing to public policy while emphasizing the RPOs impact on society and the environment.

Finally, 23% of RPOs have a policy focus on the sub-code of ‘Public Participation’. Figure 34 illustrates that Public Participation primarily consists of expressed aims from RPOs, although it is also implemented through hosting events and having supportive infrastructure, all of which facilitate activities such as citizen science participation.

Figure 34 summarises all the qualitative coding results for RPOs' Public Engagement repertoires and the number of practical implementations within each sub-policy area. Please note that RPOs may have multiple practical implementations in all three categories (aims, support, support with incentives), but they are assigned to the 'support and incentives' category in the categorization of policy repertoires. This should be kept in mind when analysing Figure 34.



Figure 32: Public Engagement qualitative coding results

Note: The letters in parentheses indicate which category the practical implementation code is part of: aims (A), support (S) or support and incentives (S+I).

3.5. Research Ethics and Integrity in European RPOs

This section reports to what extent and how the 122 European RPOs included in our study sample work to support Research Ethics and Integrity (REI) in their respective organisations. Compared to what was reported in MR2, this section provides a deeper look into the REI work done at the respective RPOs and reports a more granular coding of the material. Research Ethics and Integrity policy at the EU level aims to promote the *highest standards of ethics and integrity in the performance and governance of research and innovation in the EU, both within and beyond Horizon 2020. And focus on ensuring a dialogue between the EU countries' ethics and integrity bodies and the respective communities.*⁴ Research Ethics refers to the application of ethical principles to all stages and aspects of research, while Research Integrity refers to the attitude and habit of the researchers to conduct their research according to appropriate ethical, legal, and professional frameworks, obligations, and standards (Ryan et al., 2023, p- 81-82).

⁴ [Horizon 2020 Ethics](#)

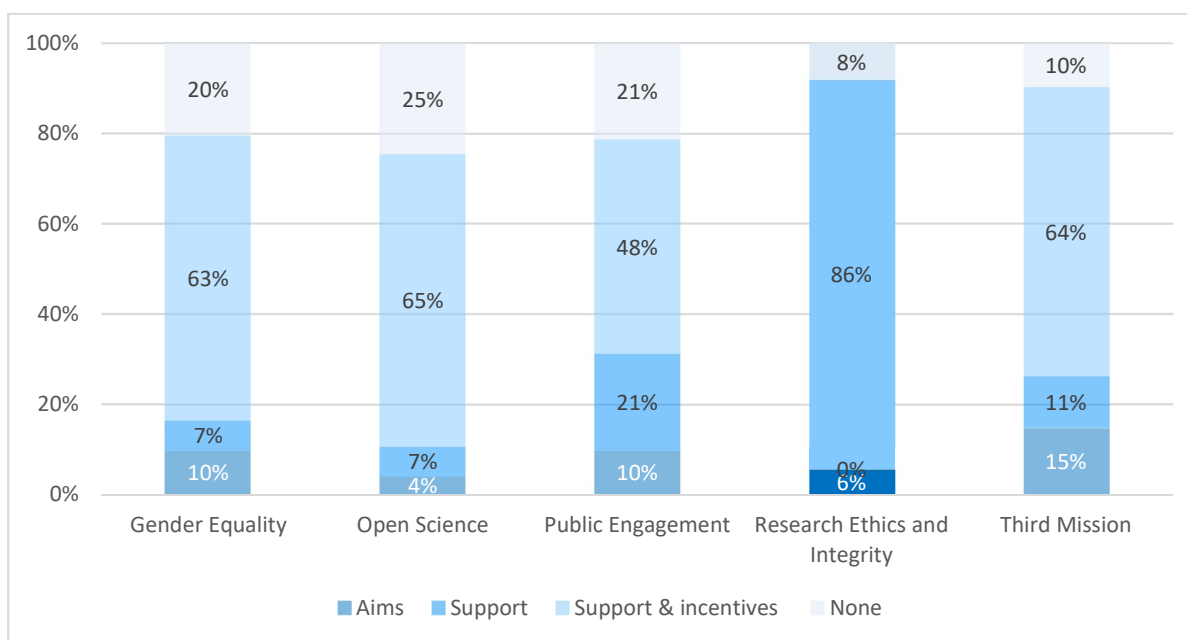


Figure 33: Proportion of the RPOs that highlight Research Ethics and Integrity as either aims, support, or support & incentives in their core strategic documents.

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

Figure 33 illustrates the percentage of RPOs that include Research Ethics and Integrity (REI) in their core strategic documents and the distribution of REI repertoires focusing on either aims, support, or support and incentives. The figure shows that more than 90% of the RPOs highlight or mention aspects of REI in core strategic documents, with just 8% of the RPOs in the sample not doing so. A total of 6% of the RPOs communicated their aims within the REI policy area. A large majority (86%) provide support and incentives towards one or more of the sub policy areas of REI. It is important to note, when reading Figure 33, that there is a large variation in the extent and types of support mechanisms and incentives the RPOs employ. Moreover, some of the RPOs focus on narrow areas and niches within the frame of REI. These policy repertoires are expanded on in the next section.

The coding scheme developed for Research Ethics and Integrity (see D2.3) is shown in Figure 34.

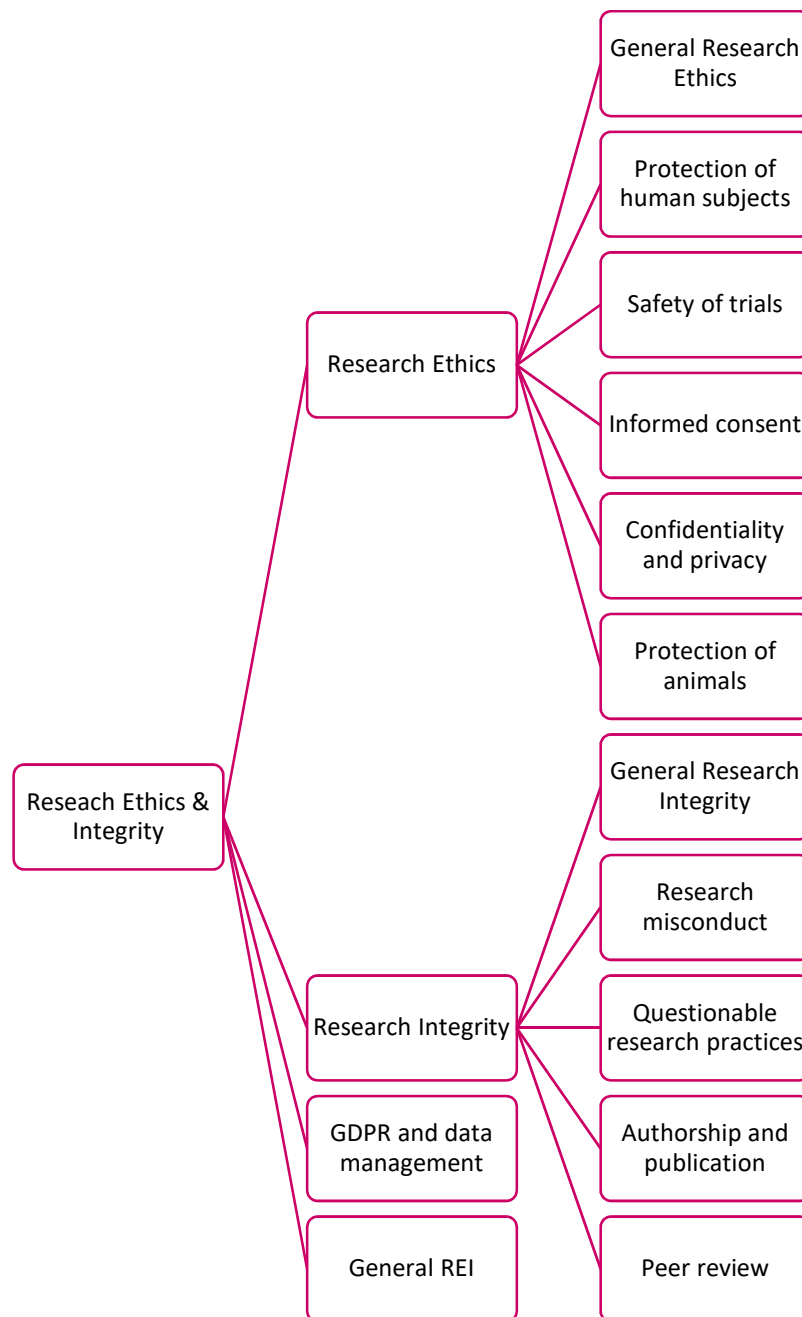


Figure 34: Research Ethics and Integrity coding scheme

This section reports practical implementations as either aims, support, or support and incentives for each of the four sub-codes in the middle tier of Figure 34, as summarised in Figure 35 (below).

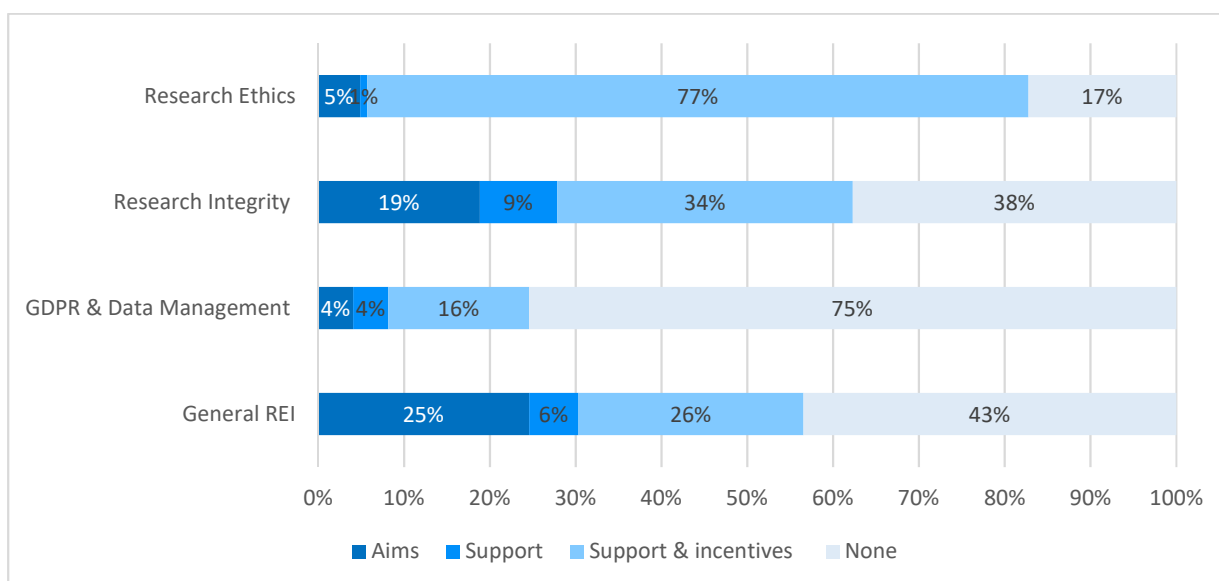


Figure 35: Research Ethics and Integrity

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

Overall, Figure 35 shows that a large majority of RPOs address 'Research Ethics' in strategic documents, with just 17% not doing so. Research Ethics contains policies, support structures and incentives on 'Protection of human subjects', the 'Safety of trials', 'Informed consent', 'Confidentiality and privacy', and the 'Protection of animals' – in short, different aspects of the ethical conduct of research. A total of 5% of the RPOs expressed aims as their Research Ethics repertoire, and Figure 36 (below) shows that expressed aims is especially prominent within Research Ethics as a general sub-policy area. Just 1% of the RPOs provide only support policies for Research Ethics. However, 77% of the RPOs provide both support and incentives for Research Ethics. Protection of human subjects and animals and Research Ethics as a general sub-policy area are the most prominent sub-codes in this area. Further, Figure 36 shows that many RPOs have rules and requirements and/or provide training, typically in the form of obligatory or optional training of researchers and students in the ethical conduct of research.

A majority (62%) of RPOs has policies and provides either aims, support, or support and incentives within 'Research Integrity' as a policy area. Research Integrity includes themes such as 'Research misconduct', 'Questionable research practices', 'Authorship and publication', 'Peer review', and 'Research Integrity in general'. A total of 19% of the RPOs communicate their aims regarding Research Integrity, with most expressing aims within the general sub-policy, and a few also within Authorship and publication and Research misconduct. A total of 9% of the RPOs provide support structures within Research Integrity, while 34% of the RPOs provides both support and incentives. The presence of a dedicated research integrity unit is especially prominent as a practical implementation of policy, and as this unit is often tasked with multiple areas within Research Integrity, the presence of a dedicated unit is most prominent within the general policy area.

Research Ethics and Research Integrity are often treated as interconnected policy areas, which is evident by the amount of RPOs having policies within the 'General Research Ethics and Integrity' policy area. This code is used to describe a repertoire when it is either impossible to distinguish between research ethics and research integrity, or when the RPOs treat ethics and integrity as a single entity.



A total of 25% of the RPOs express aims within Research Ethics and Integrity as a general policy area. A total of 6% provide support within the policy area, while 26% provide support and incentives for General Research Ethics and Integrity. Support and incentives, as portrayed in Figure 36 (below), typically entail a dedicated unit, with many RPOs also providing training and/or having rules and regulations within this policy area. Examples of the rules and regulations can be the requirement of staff and students to follow the principles of Research Ethics and Integrity at the RPO.

'GDPR and Data management' is not always included in the definition of research ethics and integrity, however in many RPOs these aspects were often included under the policy umbrella of ethics and integrity. A total of 24% of European RPOs included GDPR and Data management as part of their Research Ethics and Integrity policy. Of this 24%, two-thirds provided support and incentives within GDPR and Data management as a policy area, often by having a dedicated unit.

Figure 36 summarised the qualitative coding of RPOs' Research Ethics and Integrity repertoires and the number of practical implementations within each sub-policy area. Please note that RPOs may have multiple practical implementations in all three categories (aims, support, support with incentives), but they are assigned to the 'support and incentives' category in the categorization of policy repertoires. This should be kept in mind when analysing Figure 36.

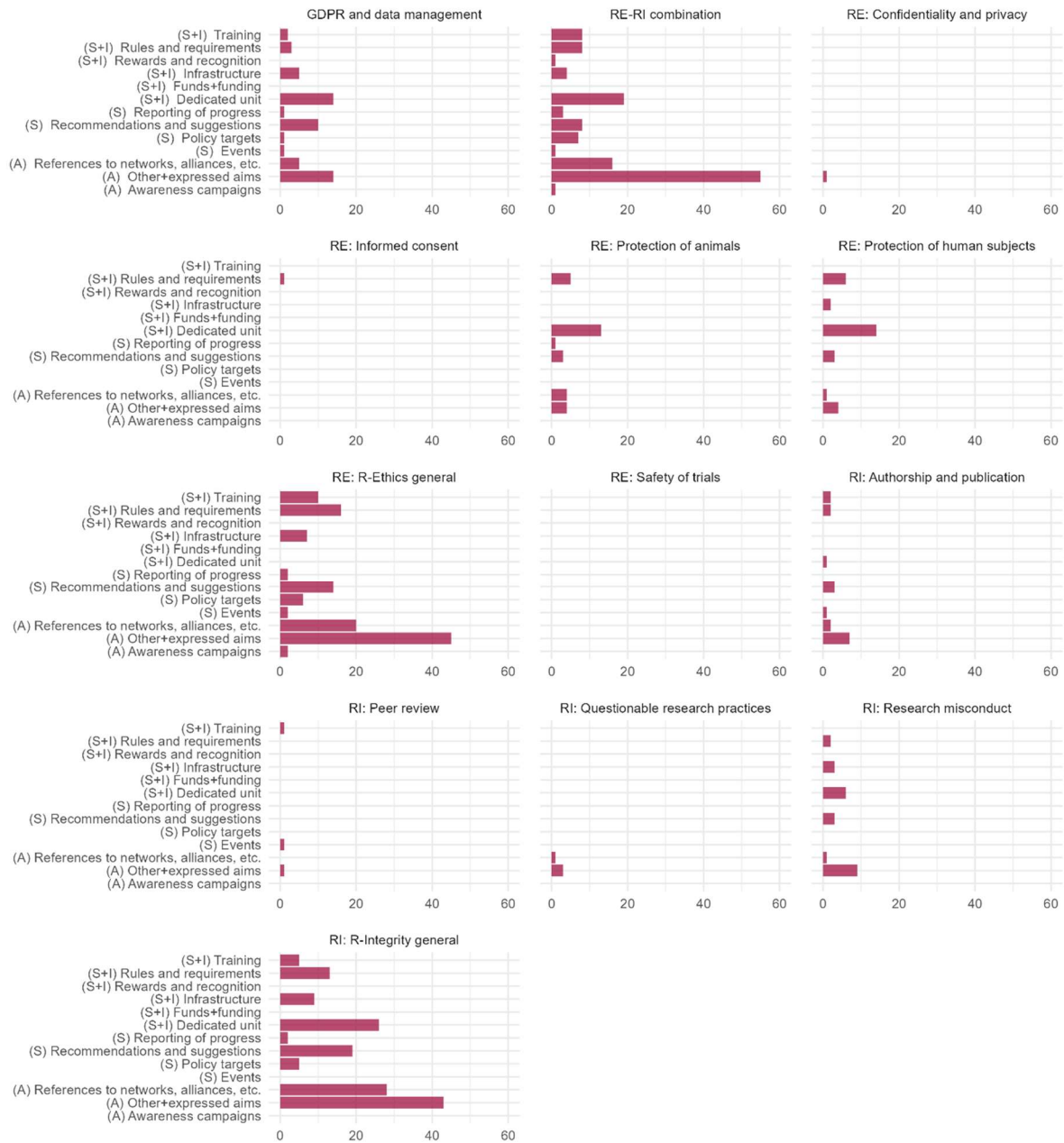


Figure 36: Research Ethics and Integrity qualitative coding results

Note: The letters in parentheses indicate which category the practical implementation code is part of: aims (A), support (S) or support and incentives (S+I).

3.6. Third Mission in European RPOs

This section reports to what extent and how the 122 European RPOs included in our study sample work to support the Third Mission in their respective organisations. Third Mission in a RPO context can be defined as the activities where knowledge is generated, exploited, or otherwise applied outside university environments (Molas-Gallart and Castro-Martínez, 2007). As such Third Mission activities are distinct from other RPO activities that do not involve interaction with external environments. The Third Mission instead includes a diverse set of interactions with external participants (Mejlgaard and Ryan, 2017). The Third mission is rarely included as a part of considerations of open and responsible research and innovation. However, it is closely related to notions of public engagement, participation, and knowledge transfer from publicly funded organisations to drive innovation (see D2.3, pp. 73-74).

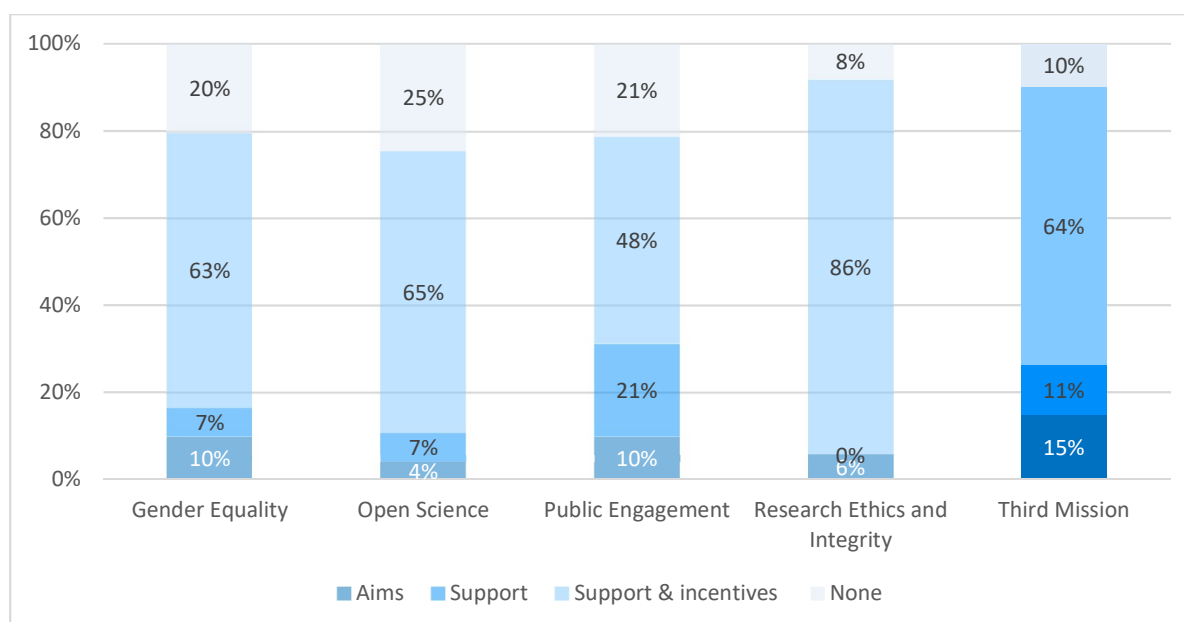


Figure 37: Proportion of the RPOs that highlight Third Mission as either aims, support, or support & incentives in their core strategic documents.

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

Figure 37 (above) illustrates the percentage of RPOs that include the Third Mission (or an equivalent term) in their core strategic documents and its distribution across the three policy implementation categories. The figure shows that 90% of the RPOs highlight or mention aspects of the Third Mission in core strategic documents, with 10% addressing Third Mission in their core strategic documents. A total of 15% of the RPOs communicate their aims regarding the Third Mission, while 11% provide support structures. Finally, two-thirds of the RPOs provide support and incentives for one or more of the sub-policy areas of Third Mission. It is important to note, when reading this figure, that there is a large variation in the extent and types of support mechanisms and incentives the RPOs employ. Moreover, some of the RPOs focus on narrow areas and niches within the frame of the Third Mission. Third Mission policy repertoires are expanded on in the next section.

The coding scheme developed for the Third Mission (see D2.3 for details) is shown in Figure 38.

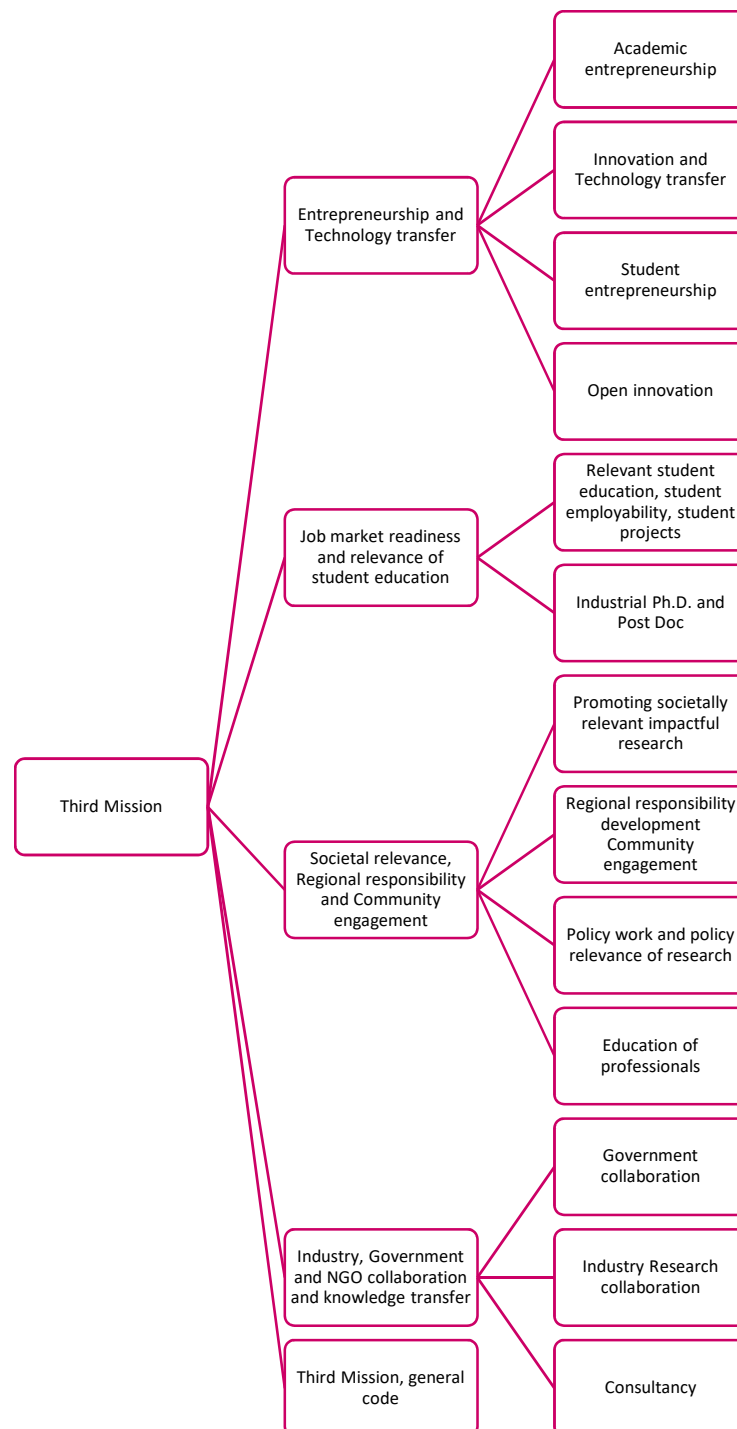


Figure 38: Third mission coding scheme



This section reports practical implementations as either aims, support, or support and incentives for each of the five sub-codes for the Third Mission (Figure 38), as summarised in Figure 39 (below).

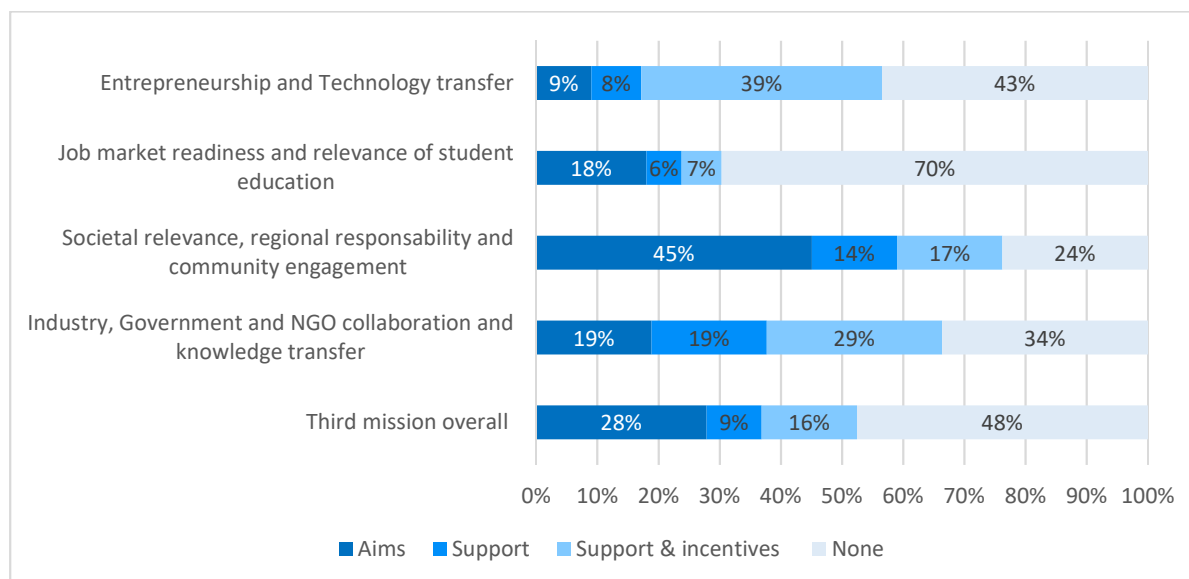


Figure 39: Third Mission

Note: See table 3 for a description of aims, support, and support and incentives, respectively. N=122.

Overall, ‘Societal relevance, regional responsibility, and community engagement’ is the sub-policy area in which the largest number of RPOs provide either aims, support, or support and incentives. This sub-policy area encompasses aims and measures that aim to support and promote societally relevant research, regional responsibility and community engagement, policy work and the policy relevance of research, and the education of professionals. Two-thirds of the RPOs have policies and provide either aims, support, or support and incentives within the policy area. A total of 45% of the RPOs has policy repertoires focused on aims, and Figure 40 (below) shows that ‘Expressed aims’ is most prevalent within ‘Promoting societally relevant research’, and ‘Regional responsibility and community engagement’. Another 14% provides support, often in the form of policy targets. Finally, 17% of RPOs have a sub-policy repertoire consisting of support and incentives. Figure 40 shows that it is often a matter of having a dedicated unit, and providing training, especially in the sub-policy area ‘Education of professionals’.

Within the ‘Industry, Government and NGO collaboration and knowledge transfer’ policy area, 19% of the RPOs have expressed aims, such as the intention to create more collaborative partnerships between the RPO and industry or government. Another 19% of the RPOs provide support within the policy area, often through setting policy targets. A total of 29% of the RPOs provides support and incentives, which includes measures such as having a dedicated unit and/or the availability of supportive infrastructure.

More than half of the RPOs has policies and provides either aims, support, or support and incentives within ‘Entrepreneurship and Technology transfer’. This sub-policy area encompasses entrepreneurship by academics and students, innovation and technology transfer, and overall open innovation, understood as open collaboration focused on marketable inventions. A total 39% of RPOs

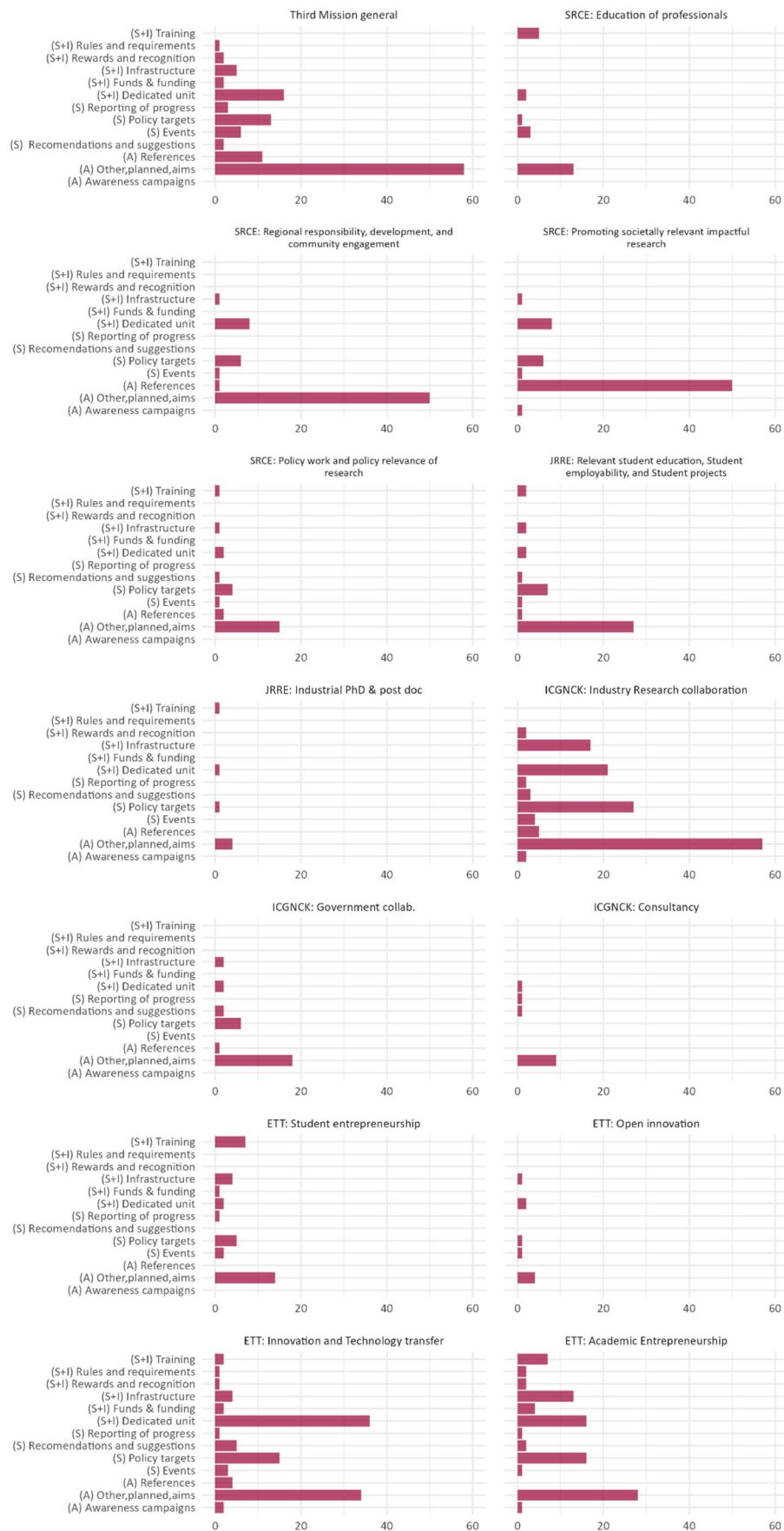


provides support and incentives, which includes entrepreneurship training, the availability of supportive infrastructure, and/or having a dedicated unit, which would often be a Technology Transfer Office. A total of 8% of the RPOs has policy repertoires where the RPO provides support within the policy area, typically through setting 'Policy targets'. Finally, 9% of the RPOs expressed aims, mostly within 'Innovation and Technology transfer' and 'Academic Entrepreneurship' as sub-policy areas.

'Job market readiness and student education' is a policy area that encompasses student education, student employability, and student projects, and industrial PhDs and post docs. Within this policy area, 31% of RPOs have policies and provide either aims, support, or support and incentives. As shown in Figure 40, the majority of these has expressed aims within student education, student employability, and student projects as a sub-policy area.

'Third Mission Overall' is used to describe policies and strategies, where it is either impossible to distinguish between the different aspects of Third Mission, or when the RPOs treat Third Mission as a single entity. Over half of the RPOs has policies and provides either aims, support, or support and incentives within this general policy area, with 28% expressing aims, 9% providing support, and 16% providing support and incentives within Third Mission as a general policy area.

Figure 40 summarises RPOs' Third Mission repertoires and the number of practical implementations within each sub-policy area. Please note that RPOs may have multiple practical implementations in all three categories (aims, support, support with incentives), but they are assigned to the 'support and incentives' category in the categorization of policy repertoires. This should be kept in mind when analysing the Figure 40.



SRCE = Societal relevance, Regional responsibility and community engagement,
JRRE = Job market readiness & relevance of student education,
ICGNCK = Industry, government and NGO collaboration and knowledge transfer,
ETT = Entrepreneurship & Technology transfer



Figure 40: Third Mission qualitative coding results

Note: The letters in parentheses indicate which category the practical implementation code is part of: aims (A), support (S) or support and incentives (S+I).

3.7. Summary and work in progress

This chapter has presented further analysis of the SUPER MoRRI CCN-RPO study. The study examined institutional policies, strategies, and structural support for Responsible Research and Innovation (RRI) in 122 European universities across the EU27 countries, Norway, and the UK. The 2nd Monitoring Report (MR2) presented initial results from the study, and in this 3rd Monitoring Report, we have developed a more detailed categorization based on the same CCN reports. Our aim was to explore how research performing organisations (RPOs) engage with RRI areas and the practical approaches they employ. Specifically, we investigated whether RPOs' policy portfolios include objectives regarding RRI policy areas and sub-areas, practical support for these policy and sub-policy areas, or a combination of support and incentives.

When examining the overarching policy areas, we found that the majority of RPOs had policy portfolios and provided information on how they practically implemented their policies and strategies, with most offering support and incentives. However, as we delved into the sub-policy areas within each RRI category, two notable trends emerged. First, it became apparent that the overall categorization was often driven by a few specific sub-policy areas, while some sub-policy areas had minimal practical implementation of policy. Second, while most RPOs have policies and strategies within each RRI key and subsequent policy area, RPOs differ in their prioritization of specific sub-policy areas and their practical approaches to implementation.

The analysis presented in this 3rd Monitoring Report complements and expands upon the findings presented in the 2nd Monitoring Report. Ongoing efforts are focused on preparing this data for an interactive interface on the PROMISE portal for monitoring open and responsible research and innovation (www.promise4era.eu). Users of the online solution in development will have the opportunity to work with selected data and explore the available information on RPOs' policies and strategies related to open and responsible research and innovation.



4. Research Funding Organisations' support for open and responsible research and innovation

This chapter presents updated information from the CCN-RFO study. The chapter contains categorical indicators of European RFOs efforts to support openness and responsibility in research cultures and practices. Funders are considered to be important actors, individually and collectively, when it comes to formulating and implementing science and research policies. RFOs have different remits and degrees of autonomy, which configures their capacity to influence what research is done and how it is done. Many RFOs are also part of a community of practice that shares policy intelligence and development, communicates funding experiments, and exchanges best practices. Funders are thus of great interest when considering how research and innovation can become more open and responsible. This chapter presents indicators of funders' shaping of research cultures and practices through their funding priorities, their funding instruments, and their assessment processes.

The chapter begins with a short description of the aim and scope of the CCN-RFO study. The second section presents summaries of the participating RFOs and the data collections.

In a final section, we provide an overview and discussion of the RRI repertoires of European RFOs. In this section we compare to non-European RFOs. We also briefly discuss other areas, which RFOs place strategic emphasis on, but which was not directly included as one of the areas of interest in the study.

4.1. Aim and scope of the CCN-RFO study

The overall aim of the CCN-RFO project was to examine the mechanisms through which research funding organisations (RFOs) enhance responsibility in research and innovation. Mechanisms that were the target of the study were:

1. priority setting for research funding;
2. funding instrument design; and
3. assessment of grant proposals (research and researchers).

A particular focus was how RFOs include scientific and societal stakeholders in the design and implementation of their research funding priorities, instruments, and assessments.

The CCN-RFO study was not designed to assess or evaluate RFOs either individually or comparatively. The focus of data collection was qualitative, designed to build an understanding of the repertoires of policies and practices RFOs use, or are planning to introduce, to shape both their own actions and the research culture in which they participate.

4.2. Participants and data collection

The RFOs that contributed to the study were of diverse types. A major public funding organisation from all EU-27 countries plus Norway and the UK participated, with a second RFO also participating in 27 countries. Figure 41 shows the various types of RFOs that participated in the CCN-RFO study.

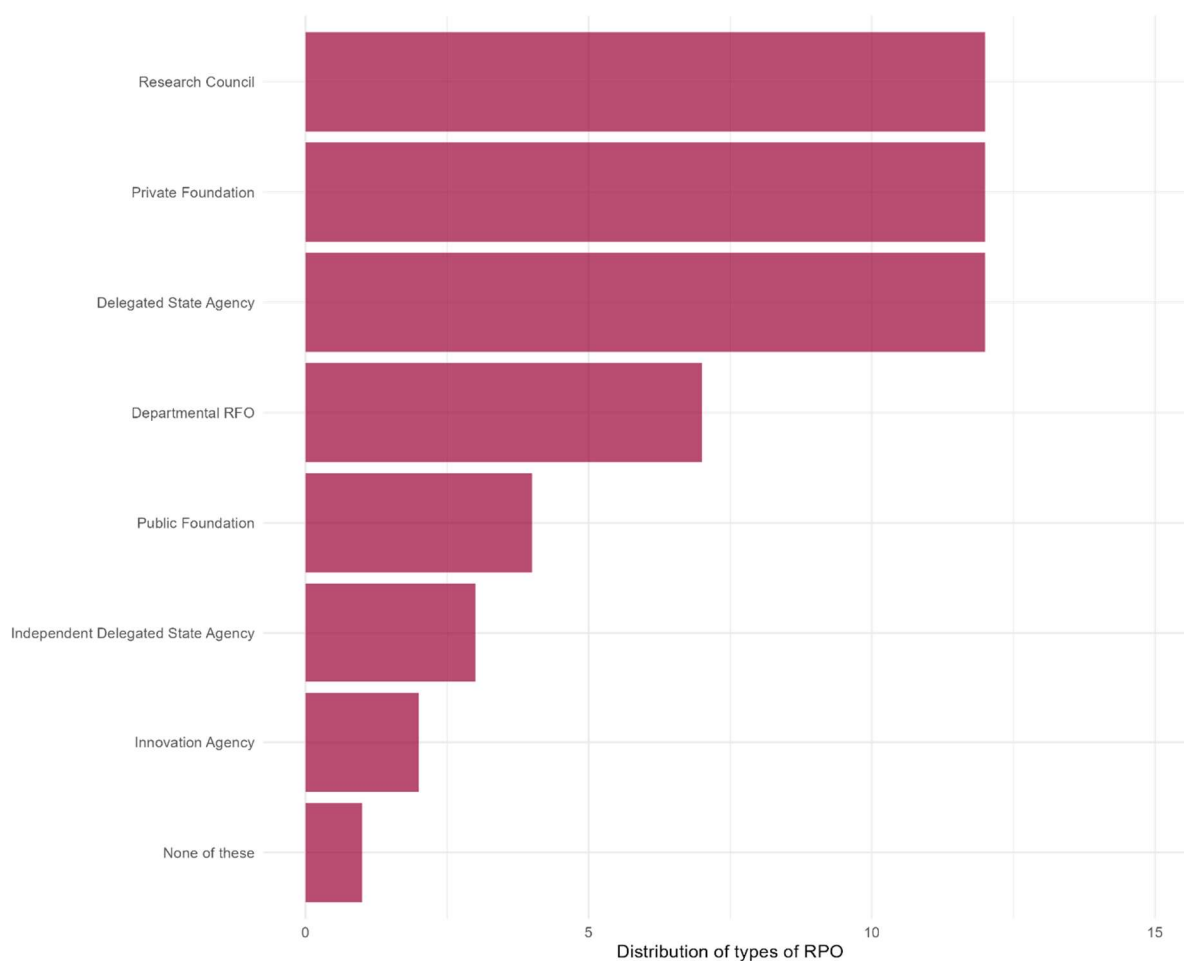


Figure 41: Participant RFOs, by organisation type. (n=55)

Note: Figure is reported originally in MR2, figure 47, p. 104.

Information and data collected in the CCN-RFO study included:

1. each organisation's formal policies to support open and responsible research;
2. the characteristics of each organisation's governance as it relates to engagement with scientific and societal stakeholders; and
3. the repertoires of procedures and processes followed by the organisation to a) ensure responsible conduct of its own activities, and b) promote responsibility in the research communities supported by its grants.

A comprehensive definition of what qualified as open and responsible research practices and cultures was used in the study, as summarised in table 4. While broad, the definition is not exhaustive, but provided guidelines for enquiries into the action areas in which RFOs are exerting 'responsibility pressure' either within their own organisation or in the research environment in which they operate.

Table 3: Definitions of responsible research practices and cultures (CCN-PFO study)

	Refers to all aspects of doing research
Open and responsible research practices	<p>Aspects of how research is designed: <i>gender analysis; pre-registration; reflection on potential negative consequences; citizen science; non-academic partners; consultation with stakeholders about research questions or methods; co-creation of research problems, questions, and approaches with diverse partners; etc.</i></p> <p>How a research design is implemented: <i>openness; reproducibility; research integrity; ethical conduct; transparency regarding design modifications; etc.</i></p> <p>How research is reported and disseminated: <i>FAIR open data deposited; no publication fraud; no p-hacking; dissemination to participants and stakeholders; communication to the public; etc.</i></p>
	Refers to all aspects of the research environment
Open and responsible research cultures	<p>Training of researchers: <i>open science; FAIR open data; principles of anticipation, inclusiveness, reflection and responsiveness (AIRR); societal readiness thinking tool; research integrity and ethics; cultural sensitivity; engaged research designs; etc.</i></p> <p>Assessment of research and researchers: <i>Declaration on Research Assessment (DORA)</i> <i>Recognition of and reward for both researchers' scientific contributions and their societal contributions: employment; promotion; evaluation; grant proposal assessment; alternative CV formats and criteria for assessments of various types; etc.</i></p> <p>Recognition of and reward for researchers' interdisciplinary contributions: <i>evaluation; grant proposal assessment; etc.</i></p> <p>Shared and systemic valuing of responsible research practices</p> <p>Support for developing responsible professional competences by leadership at all levels of formal and informal organisation of research: <i>groups; specialisations; epistemic communities; scientific fields.</i></p> <p>Formal support (incentives and rewards) for research careers that make both scientific and societal contributions: <i>universities; public sector research organisations; research funding organisation; accreditation agencies; evaluation frameworks; etc.</i></p> <p>Formal support (organisational procedures) for responsible research cultures: <i>gender equality in hiring panels, ethics committees, management committees; etc.</i></p>

4.3. Research funders' policy support for open and responsible research

This section summarises the various openness- and responsibility-related policies in the portfolios of the participating European RFOs. Figure 42 shows relevant funder policies across nine different thematic areas. These thematic areas are categorised according to whether an RFO has a standalone policy for the area, includes it within a broader policy document, or 'plans' to develop a policy. This final category refers to indications from RFO interviewees that policy development in this area is under consideration or can be considered to be on the organisation's 'to do' list.

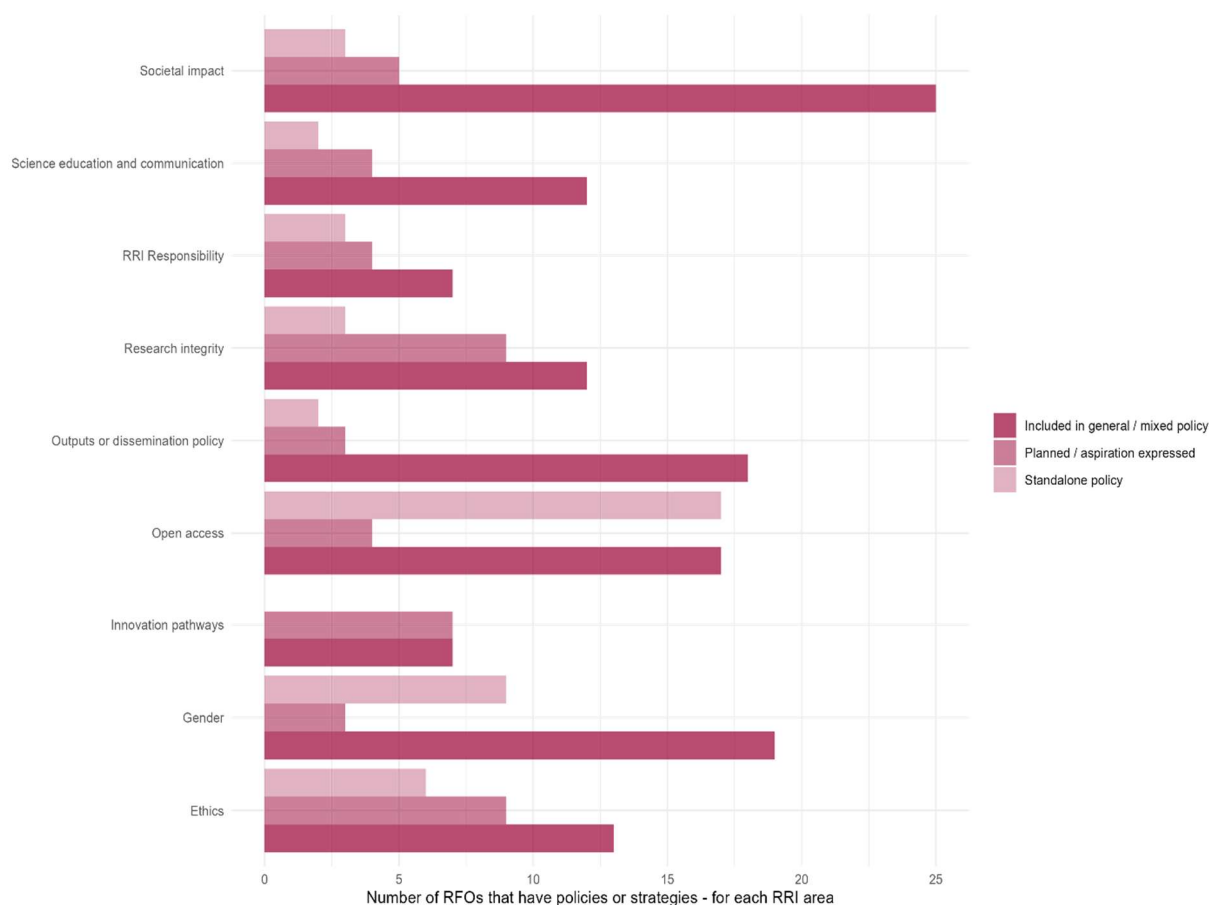


Figure 42: RFO policies supporting RRI and responsible research cultures and practices, by policy areas. (n=55)

Note: Figure is reported originally in MR2, figure 48, p. 107.

Gender and open access are the areas in which RFOs are most likely to have a dedicated policy. These same areas, along with ethics, science communication, and societal impact, are also likely to be included in policies with broader multi-thematic focus. Responsible research and innovation (RRI) was less commonly supported in policy documents. However, RRI appeared somewhere in the policy portfolio of approximately one-quarter of the participating RFOs.

4.4. Inclusion of stakeholders in funding priorities and strategy

In an era when mission-orientation and other forms of strategic prioritisation of funding are increasingly common, one dimension of openness and responsibility is the inclusion of scientific and societal stakeholders in funders' strategic processes. The different types of stakeholders that are involved in some way in the development of RFOs' funding priorities are shown in figure 43.

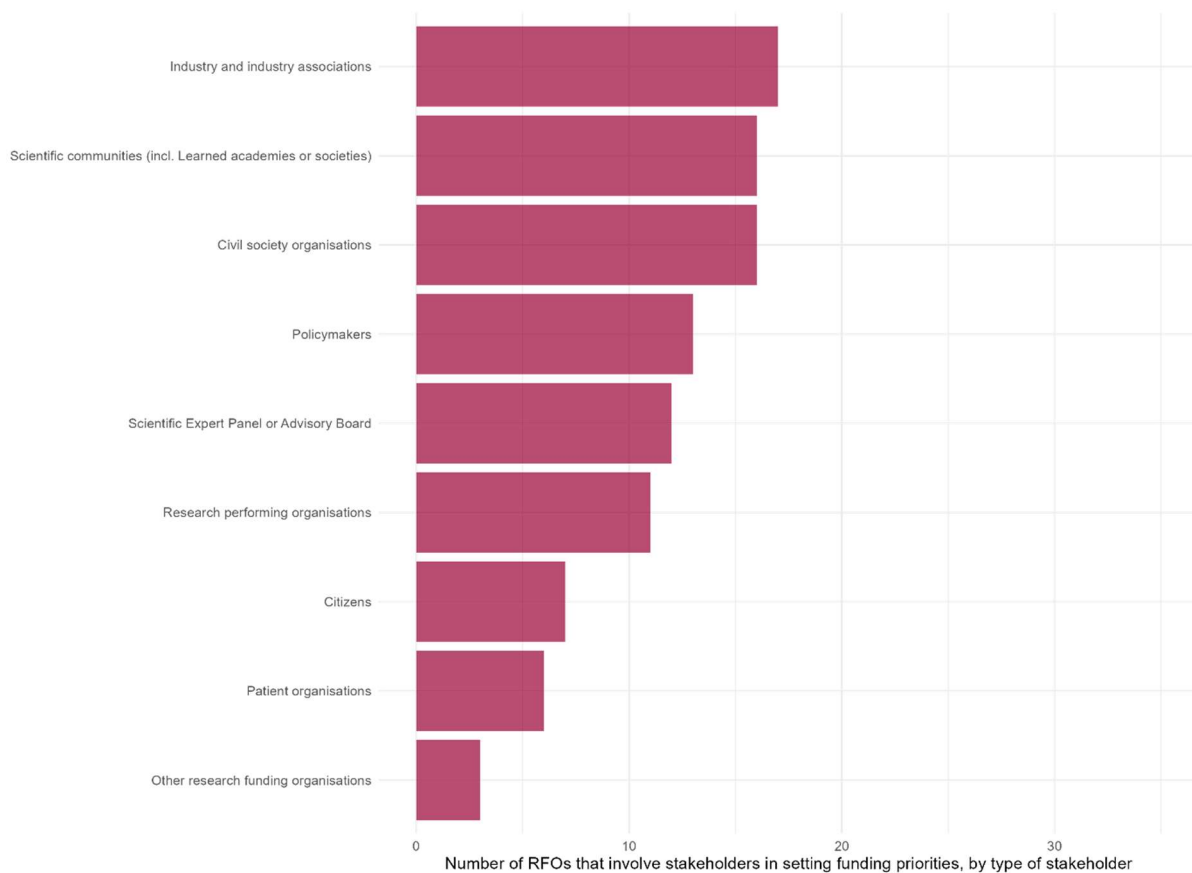


Figure 43: Stakeholders involved in research funding priority setting. (n=55)

A wide range of scientific and societal stakeholders can be involved in RFOs' funding priority setting. Various scientific stakeholders are strongly represented in priority setting processes, as would be expected. Industry representatives, civil society organisations, and policymakers are most strongly represented among societal stakeholders. Fifteen participating funders reported not involving any of these stakeholders in their funding priority setting activities.

More generally, many RFOs involve scientific and societal stakeholders in their governance structures. These stakeholders can be considered to make some contribution to funders' formal strategic thinking and decision-making. The balance of scientific and societal stakeholders involved in these governance structures is one way to differentiate among them. Based on the information collected, funders' formal advice bodies were classified in four groups (table 5).



Table 4: Types of formal advice in RFO governance structures

Type of formal advice	Descriptor 1	Descriptor 2
STEM Scientific Board	Natural and Physical science dominated	No social science and humanities (SSH); no societal stakeholders
Multidisciplinary Scientific Board	SSH included	No societal stakeholders
Scientific Expert Board	SSH included	Some societal stakeholders
Science-Society Expert Board	Even mixture of scientific and societal stakeholders	

Figure 44 shows the types of formal advice bodies that are part of RFOs' governance structures. Most RFOs have a Board or Expert Committee that serves as reference point for the executive of the organisation. Some have more than one, for example a management board and a scientific committee. These data refer to the governance body that advises or oversees the organisation management overall. The composition of these sources of advice is interesting, as the presence of societal stakeholders in its formal governance structure can be considered a relevant marker of openness and responsibility in the strategic vision of an RFO.

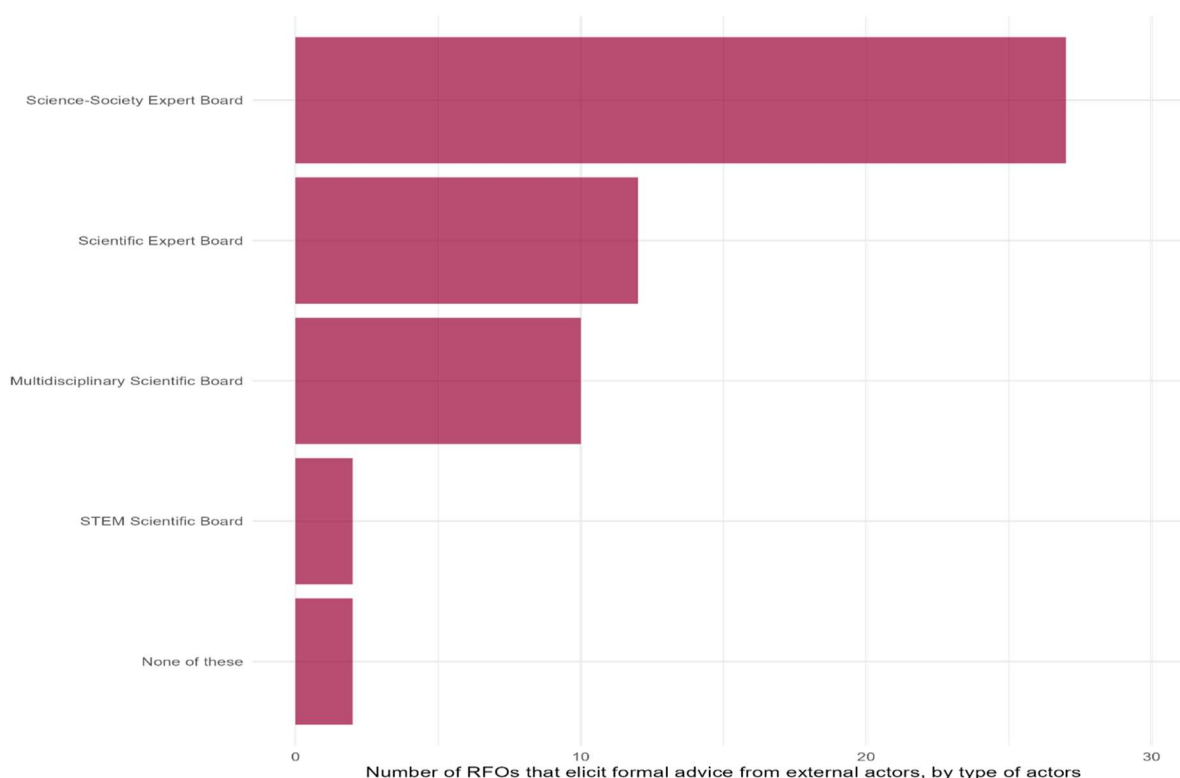


Figure 44: Type of formal advice (n=55)

Note: Figure is reported originally in MR2, figure 49, p. 109.



Half of the RFOs included and even mix of scientific and societal stakeholders in their governance arrangements for receiving formal advice. Of those Boards that were made up dominantly or completely by scientific stakeholders, less than half included representatives of the social sciences and humanities (SSH). Five RFOs did not have relevant formal body providing formal advice.

4.5. Openness and responsibility in research funding instruments

As was highlighted above (figure 42), RFOs have developed a diverse range of policies to support openness and responsibility in research and innovation. One of the key mechanisms through which RFOs can put such policy commitments into practice is through the design of funding instruments. Figure 45 shows the markers of open and responsible research and innovation mentioned in major funding instruments of the participating RFOs.

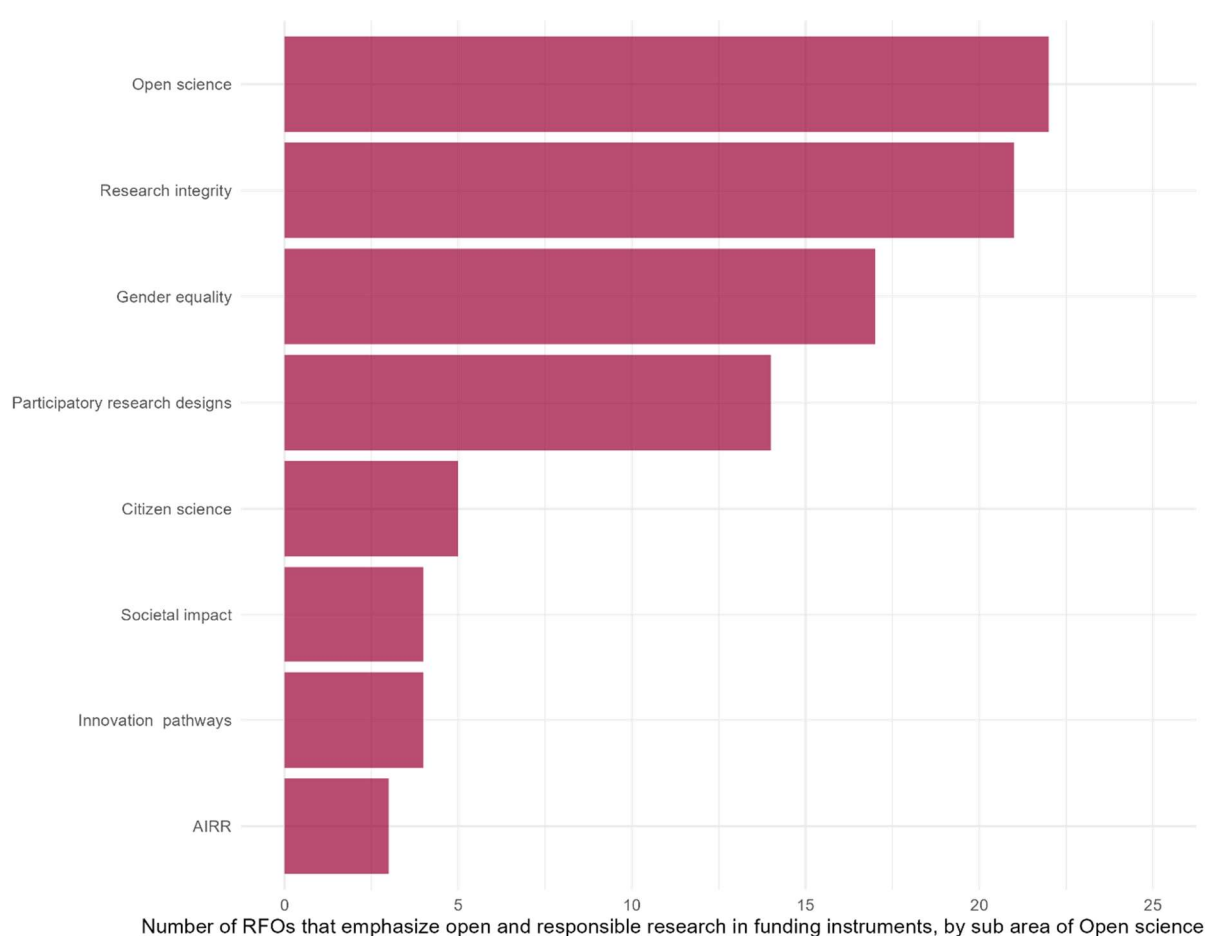


Figure 45: Open and responsible research in funding instruments (n=55)

The most common elements of open and responsible research included in funding instruments are open science and research integrity, followed by gender equality. Interestingly, many RFOs included some mention of participatory or engage research designs involving stakeholders in their funding instruments. Inclusion of innovation pathways and societal impacts also reflect this concern with integration of society in research proposals. Fifteen RFOs did not include any of these elements in the texts of their main funding instruments.



A set of classifications were developed categorising the extent to which open and responsible policy elements were integrated into individual RFOs' funding instruments (table 5).

Table 5: Inclusion of RRI and RRI-related elements in research funding instruments, classifications

Classification	Descriptor 1	Descriptor 2
Integrated	A broad set of open and responsible research and innovation elements included in call (5+ elements)	Mainly required approaches or actions
Spirit	An expanded set of open and responsible research and innovation elements included in call (3-4)	Mainly preferred approaches or actions
Standard	A typical set of open and responsible research and innovation elements included in call (1-2)	Mix of preferred and required approaches or actions

Figure below illustrates the extent to which individual RFOs include markers of open and responsible research elements in their main funding instruments.

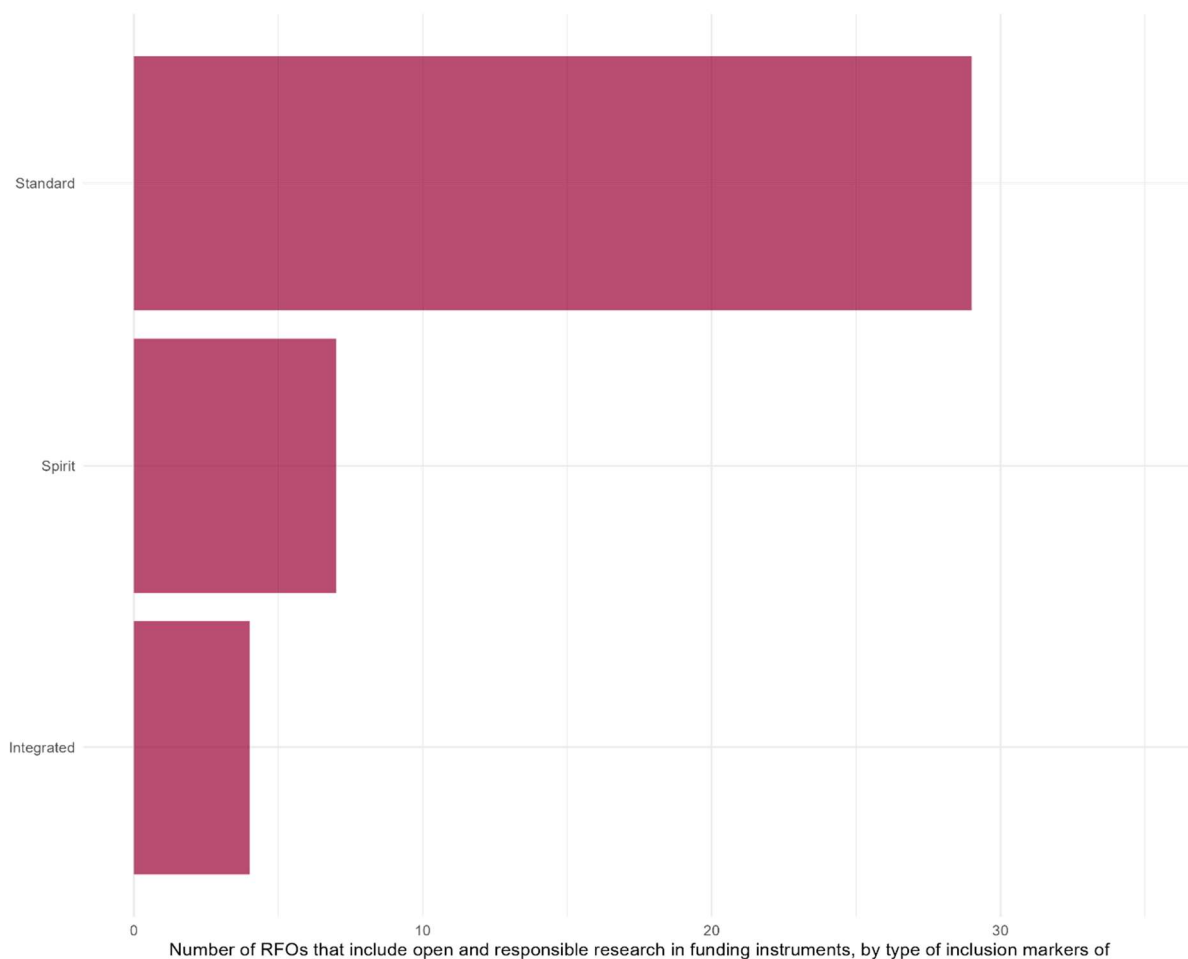


Figure 46: Inclusion of RRI and RRI-related elements in research funding instruments (n=55).

Note: Figure is reported originally in MR2, figure 50, p. 111.

More than half of all participating RFOs include a standard set of openness and responsibility elements in their funding instruments, specifying a mix of required and preferred approaches and/or actions. Seven RFOs include three or four dimensions of openness and responsibility, mainly as preferred approaches and/or actions. Finally, a small group of RFOs take the integration of openness and responsibility very seriously in their funding instruments, including five or more elements and making most of these required approaches and/or actions. Fifteen funding organisations do not include any of these elements in their main funding instruments in a meaningful way.

As a key mechanism by which research funders can influence what research is done and how it is done, it is also interesting to know whether stakeholders have the opportunity to contribute to their development.

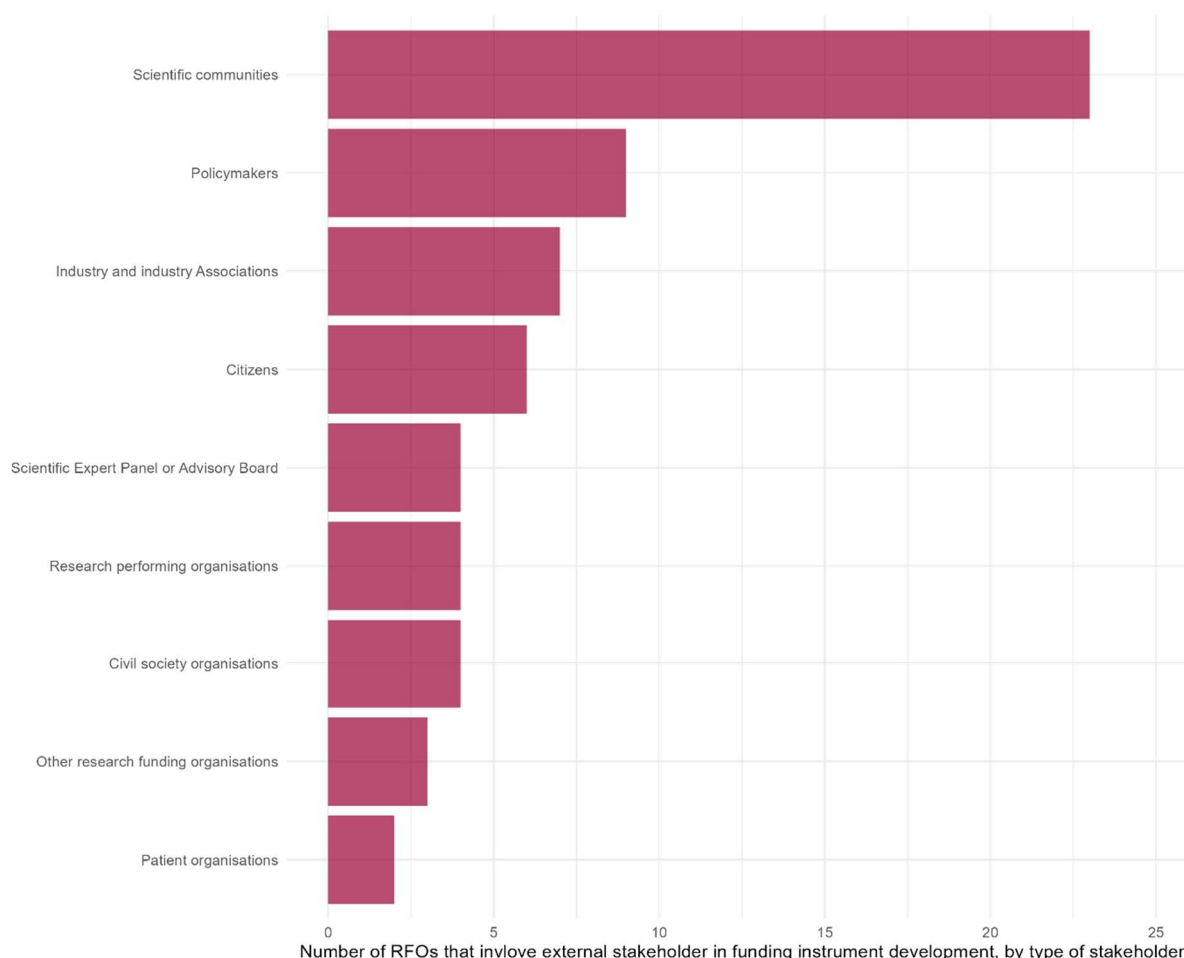


Figure 47: Stakeholders involved in funding instrument development (n=55).

Unsurprisingly, scientific communities including learned academies or societies are the stakeholders most likely to be involved in developing funding instruments. Overall, societal stakeholders are less likely to be included in this process. Around one-third of participating RFOs (n=18) do not involve stakeholders in the design of research funding instruments. The most common process for involving stakeholders is through a working group or committee (n=7), or through RFO led formal (n=5) or informal (n=5) consultations.

4.6. Openness and responsibility in grant assessments

Research assessment is a key issue in science and research policy generally. In the case of research funding organisations, the assessment of grant proposals, whether for individual researchers or for research projects, is a core activity. This section highlights the inclusion of open and responsible elements in grant assessment processes conducted by RFOs. Figure 48 summarises the most common markers of openness and responsibility mentioned in research assessment descriptions.

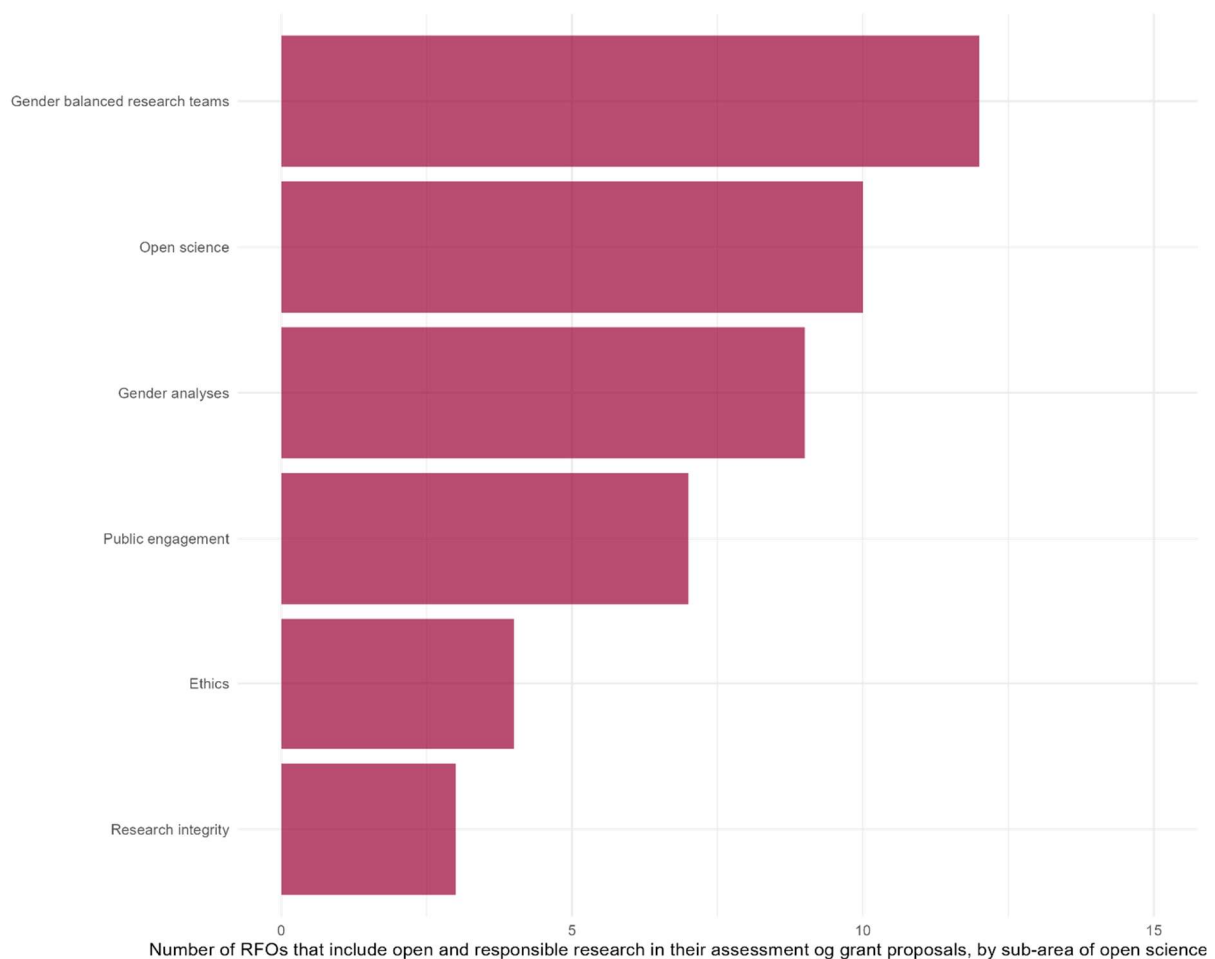


Figure 48: Assessment of open and responsible research in grant proposals (n=55).

Gender equality and open science are the markers of open and responsible research and innovation that are most likely to be taken into consideration in the assessment of grant proposals. It is not common for these elements to be meaningfully included in assessments or proposals, with two-thirds of funders not including any of these elements in their process. This needs to be interpreted carefully, as research integrity and ethics are often fundamental criteria for eligibility, with assessment processes focusing on only those proposals with integrity and ethics considerations accounted for adequately passing to review.

Some RFOs include a 'soft' assessment of societal contribution in their descriptions of how grant proposals will be assessed. This can include opportunities to highlight past contributions through a societal contribution statement or similar, or an opportunity to describe the expected societal impacts of the proposals. These soft assessments are not likely to affect grant assessment scores greatly and do not determine grant decisions. Nevertheless, some funders are allowing greater opportunities for proposals to showcase their societal impact potential. Figure 49 highlights the most common of these emerging mechanisms in assessment processes.

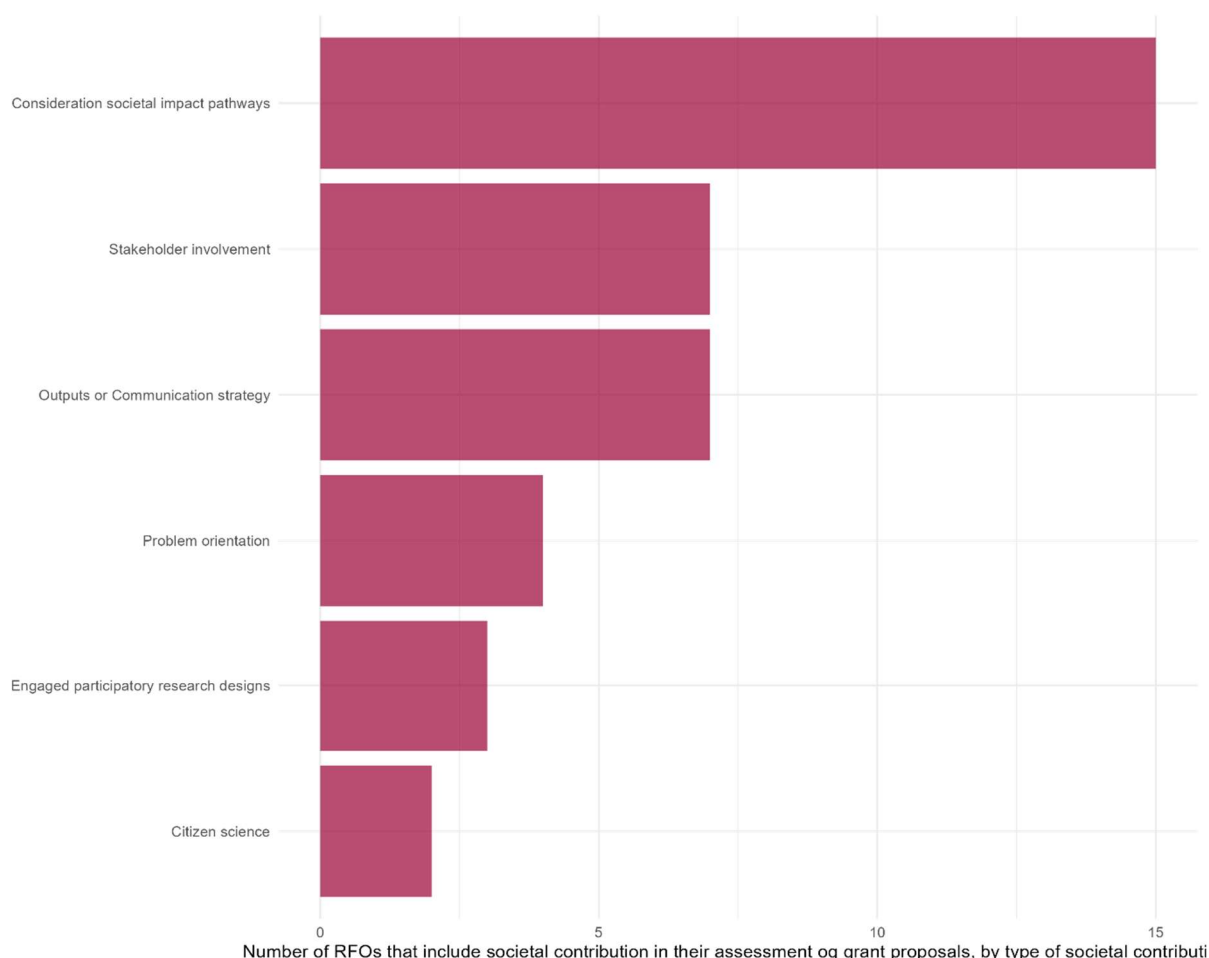


Figure 49: Assessment of societal contributions in grant proposals (n=55).

The most common way in which RFOs allow applicants to highlight societal contributions is through descriptions of ‘impact pathways’. Less common are assessments of citizen or stakeholder involvement in the design or conduct of research itself. Almost two-thirds of RFOs (n=35) do not promote societal contributions in grant assessments.

An important part of open and responsible research assessment relates to how research funders organise and conduct their assessment processes. RFOs enhance responsibility in the conduct of research assessment in two main ways:

- Composition of assessment panels
- Training or guidance support

Assessors of research funding applications rank and make decisions about successful and unsuccessful proposals. *Composition of assessment panels* refers to the selection of panel members to participate in assessment panels that make recommendations regarding the funding of grant applications. This category includes inviting assessors from different disciplines and from different types of organisations, the setting up of gender balanced assessment panels, and the presence of societal stakeholders and experts on these panels



Training or guidance support refers to all areas in which the RFO supports reviewers and assessors by providing specific training, guidelines, or instructions on how to conduct a responsible assessment. This includes training or guidance on how avoid unconscious biases, and for mitigation of gender biases to prevent discrimination against women grant applicants. This includes guidance on assessing achievement relative to opportunities, to better take account of career breaks or periods of underemployment due to maternity or other caring responsibilities that can impact on women researchers' careers.

A total of 22 RFOs ensure dimensions of openness and responsibility are taken into consideration in relation to organising assessment panels. The most common dimension is a requirement or preference for gender balanced panels. The inclusion of societal stakeholders is not a general priority, but is more likely to occur in specific calls related to industry collaboration for example. A smaller number of RFOs (n=14) ensure training or guidance for invited assessors. The most common training or guidance provided relates to eliminating gender bias from evaluations.

Overall, it is apparent that not all RFOs are yet working strongly towards organising and conducting responsible assessment. Those that are working most progressively in this area include diverse stakeholders and perspectives in assessment activities, and support reviewers appropriately to conduct these activities in a responsible manner.

4.7. International benchmarking

Comparisons with international RFOs revealed many consistent features of research assessment procedures. A number of innovative approaches were also noted. In one international RFO, unconscious bias training for all assessors is combined with innovative written guidance encouraging members of assessment panels to monitor the emergence of fellow panellists' biases in the interactive meetings that form part of the assessment process.

The inclusion of community assessors in panels selecting grants that will work with vulnerable communities was another innovation noted. In such applications, a statement of community engagement and relevance is also part of the application to be assessed.

Another RFO included technical stakeholders in the assessment of all grant applications with expected market or other outcomes. A relevance threshold had to be reached, based on the assessment of whether the application was sufficiently well linked to end-user needs.

4.8. Summary and work in progress

This chapter focuses on monitoring support for open and responsible innovation in research funding organisations. These efforts have focused on RFOs' strategic priorities, funding instruments, and grant assessments. In particular, the inclusion of scientific and societal stakeholders in various practices and processes was highlighted. A majority of RFOs have policies that are designed to exert pressure for more openness and responsibility in research and innovation. In some of these areas, RFOs can be considered to be key institutional drivers of improvements in research practices and cultures toward enhanced openness and responsible. At the same time, there is a minority of RFOs that have not adopted many of these approaches yet. It should also be noted that the concept of responsible



research and innovation (RRI) is not prominent in the policies and practices of a majority of RFOs, although much of the efforts of RFOs are in key areas associated with the concept.

The data presented in this MR3 complements and updates some of what was presented in MR2. Ongoing work is focused on the preparation of these data for an interactive interface at the PROMISE portal for monitoring open and responsible research and innovation (www.promise4era.eu). Users of the online solution being prepared will be able to select and combine different variables and dimensions and generate visualisations on demand. This will enable users to easily and dynamically interrogate the available information on RFOs' support for open and responsible research and innovation.



5. Responsible innovation in green technologies

5.1. Aims and background

The Green Economy and the promotion of gender equality are EU R&I policy agenda priorities. These priorities are covered by indicators related to responsible innovation in green technology patents, including an analysis of the rates of contribution of women inventors to these patents. The data and indicators refer to patterns of (largely) private sector innovation. Further discussion of these data in the context of pathways to benefits from open and responsible research and innovation are contained in the Pattern Studies Report (D5.2).

5.2. Green technology innovation: data overview

There are 1,906,973.41 patent families in PATSTAT 2020a that are identified as related to climate change mitigation and adaptation (tagged with the Y02 CPC class, called “green”), from 1971 to 2020. In order to avoid double counting, we assign to each inventor a fractional count of patent families, and we sum the fractions. This explains why the number of green patent families is not an integer. Table 6 summarises the number of patents by technology groups within the Y02 CPC (green) class.

Table 6: Green patents, by technology group*

CPC Code	Description	Patent families (N)
Y02A	Technologies for adaptation to climate change	226011.103
Y02B	Climate change mitigation technologies (CCMTs) related to buildings, e.g. housing, house appliances or related end-user applications	162510.279
Y02C	Capture, storage, sequestration or disposal of greenhouse gases [GhG]	7762.178
Y02D	CCMTs in information and communication technologies [ICT], i.e. information and communication technologies aiming at the reduction of their own energy use	73831.546
Y02E	Reduction of greenhouse gas [ghg] emissions, related to	492671.436



	energy generation, transmission or distribution	
Y02P	CCMTs in the production or processing of goods	423804.190
Y02T	CCMTs related to transportation	320036.985
Y02W	CCMTs related to wastewater treatment or waste management	200345.732

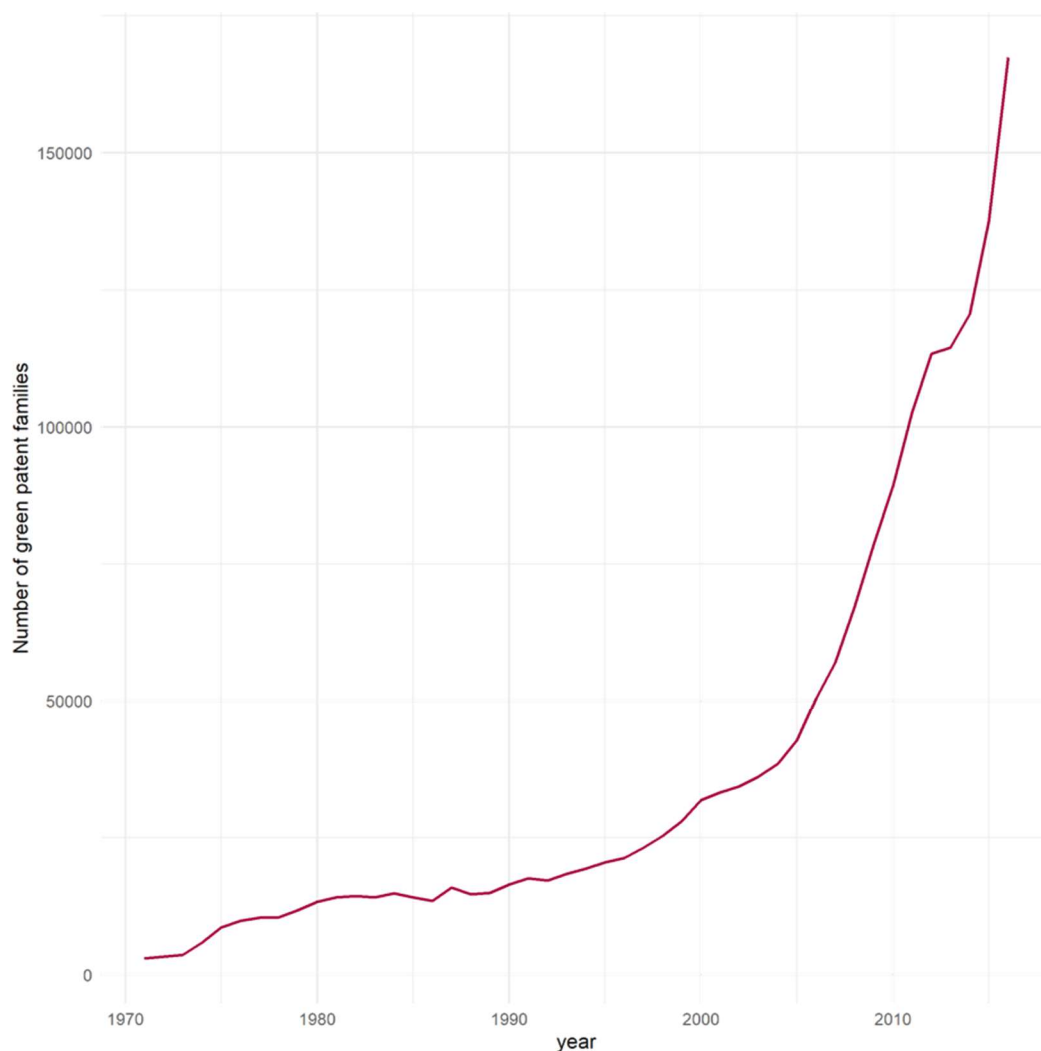


Figure 50: Green Patent Families (fractional counting), 1971-2016

Figure 51 shows the evolution of the number of green technology patent families per year using a fractional count.

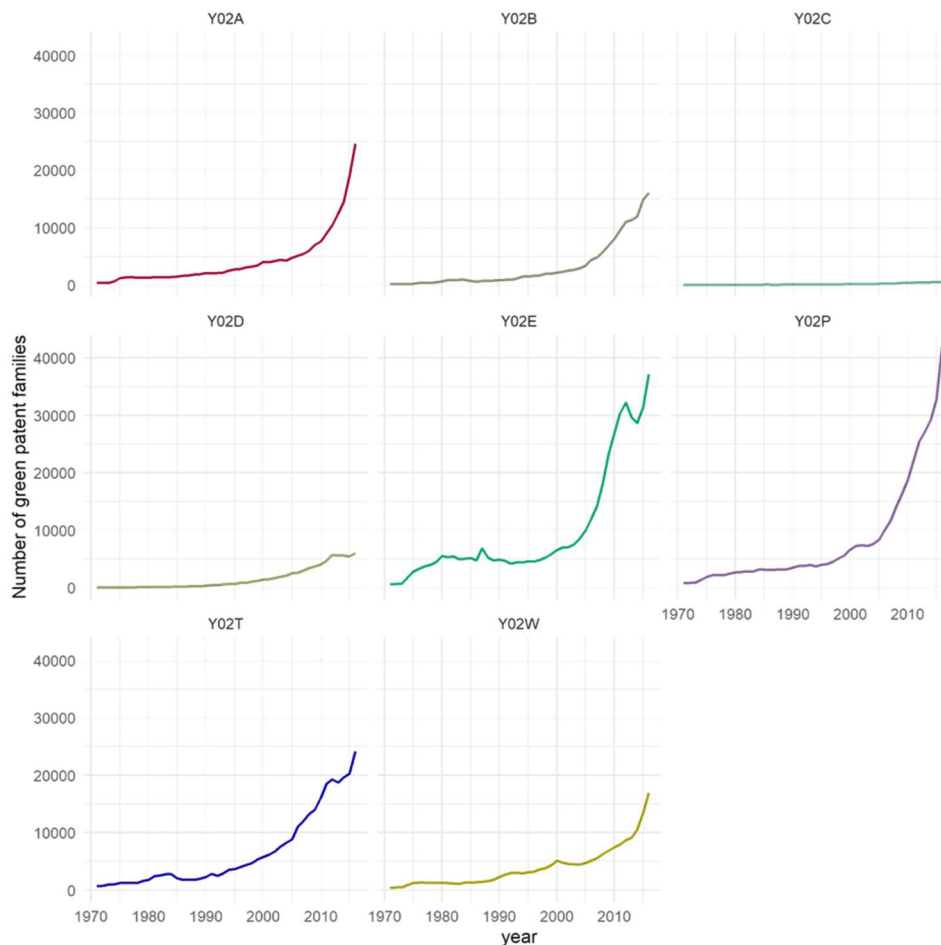


Figure 51: Green patent families, by technology group, fractional count, 1971-2016

Figure 52 represents the evolution of the fractional count of green patent families per technology group. The two most important groups are Climate Change Mitigation Technologies (CCMTs) related to Energy (Y02E) and to the production of goods (Y02P), while the technologies for capture, storage, sequestration, or disposal of greenhouse gases (Y02C) is the smallest.

5.3. Women inventors in green technology innovation

An important indicator of women's participation in responsible innovation is their presence as inventors on green patents. Figure 58 represents the evolution of the number of green patent families by inventor gender. An increase in the presence of women among green inventors can be observed.

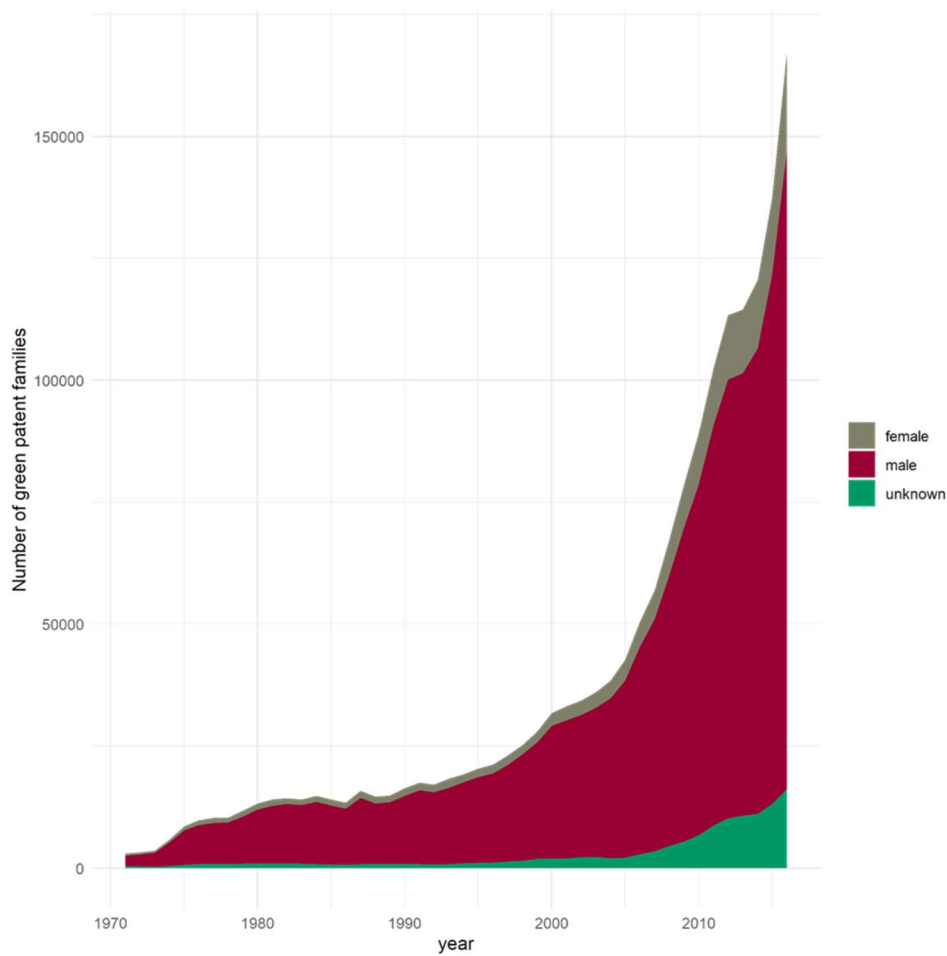


Figure 52: Green patent families, by gender of inventor, 1971-2016

Considering only those inventors classified as men or women, we can compute a ratio of women inventors for each patent family. Figure 53 represents the evolution of the average of this ratio (which goes from 0 to 1) by technology family, for the period 1971-2020.

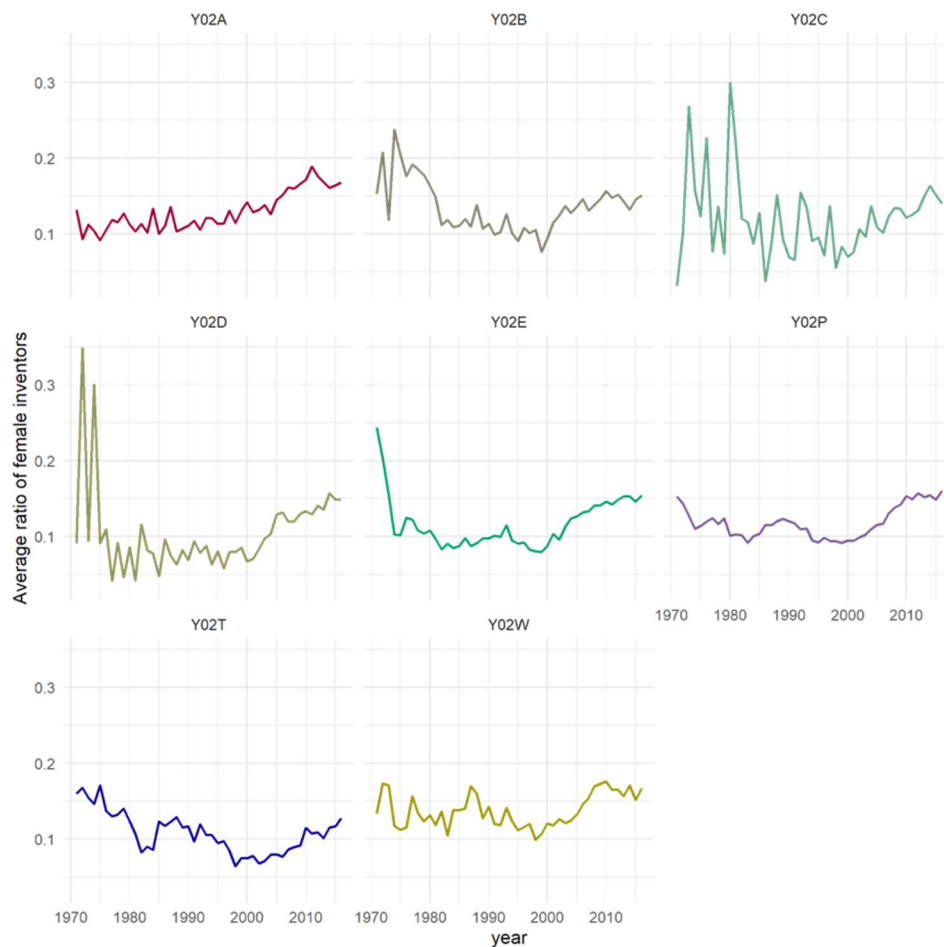


Figure 53: Ratio of women inventors, by technology family, 1971-2016

5.4. Responsible innovation indicators

This section provides a specification of the indicators that will be made available at the PROMISE portal. The data described in this section will be updated before publication in the portal in order to use consolidated results for additional years of the series (up to 2019-20).

5.4.1. Green technology innovation indicators

Patent data is the most commonly used proxy for innovation activity. The indicators described in this section use data for the class of green patents. Table 8 provides short summaries of the data fiches for these indicators.

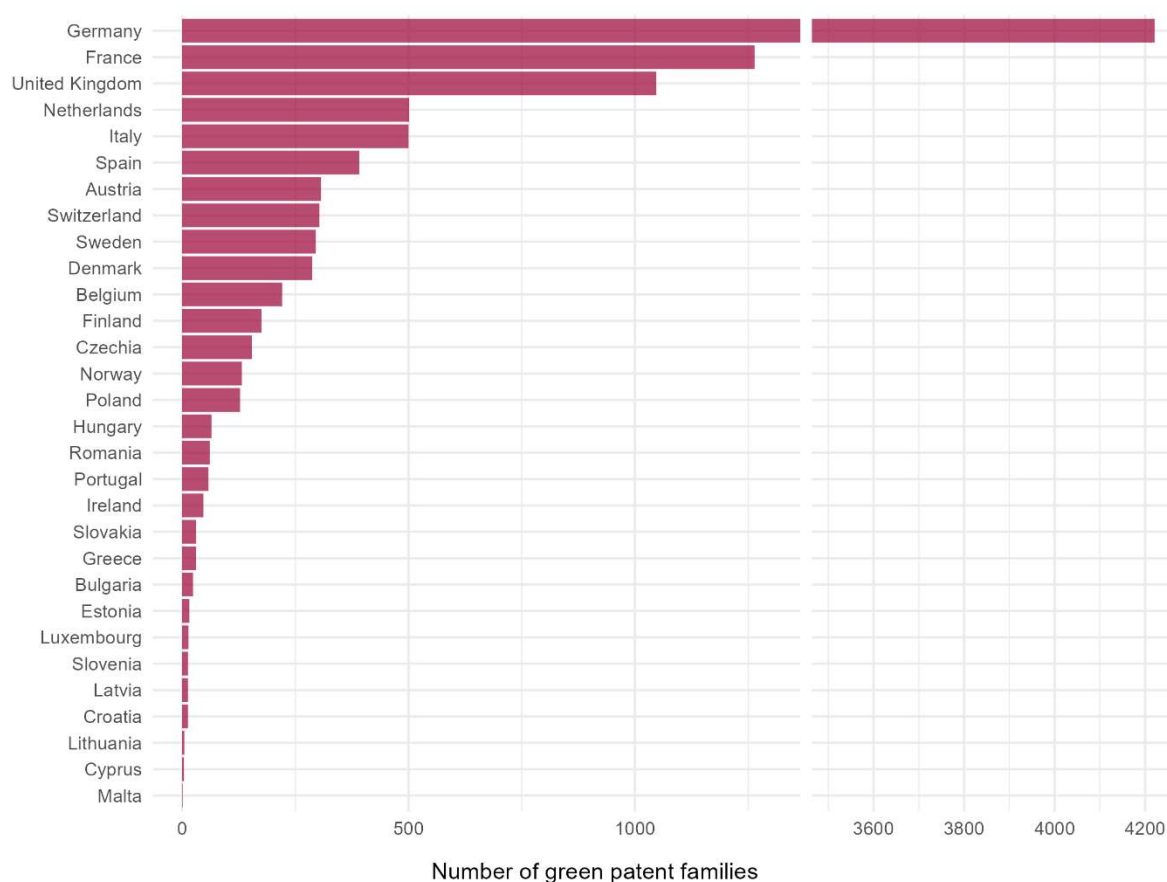


Table 7: Green technology innovation, short indicator descriptions

Indicator name	Short description	Coverage
Green technology innovation	Time series data, Y02 CPC class 'green' patents. Source: PATSTAT. Series: 2005-2017 inclusive. Type: fractional count	Country level, Europe.
Green technology innovation, main technology field	Time series data; Y02 CPC class 'green' patents, main technology patent family. Source: PATSTAT. Series: 2005-2017 inclusive. Type: fractional count	Country level, Europe.

Figure 55 shows a snapshot for 2017 of the number of green patents by country, for the EU-27 plus Norway, Switzerland and the UK.

Figure 54: Number of green patents by country in 2017





Presentation options for these data at the PROMISE portal will include visualisations of the time-series data on evolving geographic maps at the national level. These visualisations will also have functionalities for displaying data by main technology fields.

5.5. Women inventors in green technology indicators

The indicators described in this section use data for the class of green patents. These indicators described were produced after 'genderising' data on green technology patents. Table 9 provides short summaries of the data fiches for these indicators.

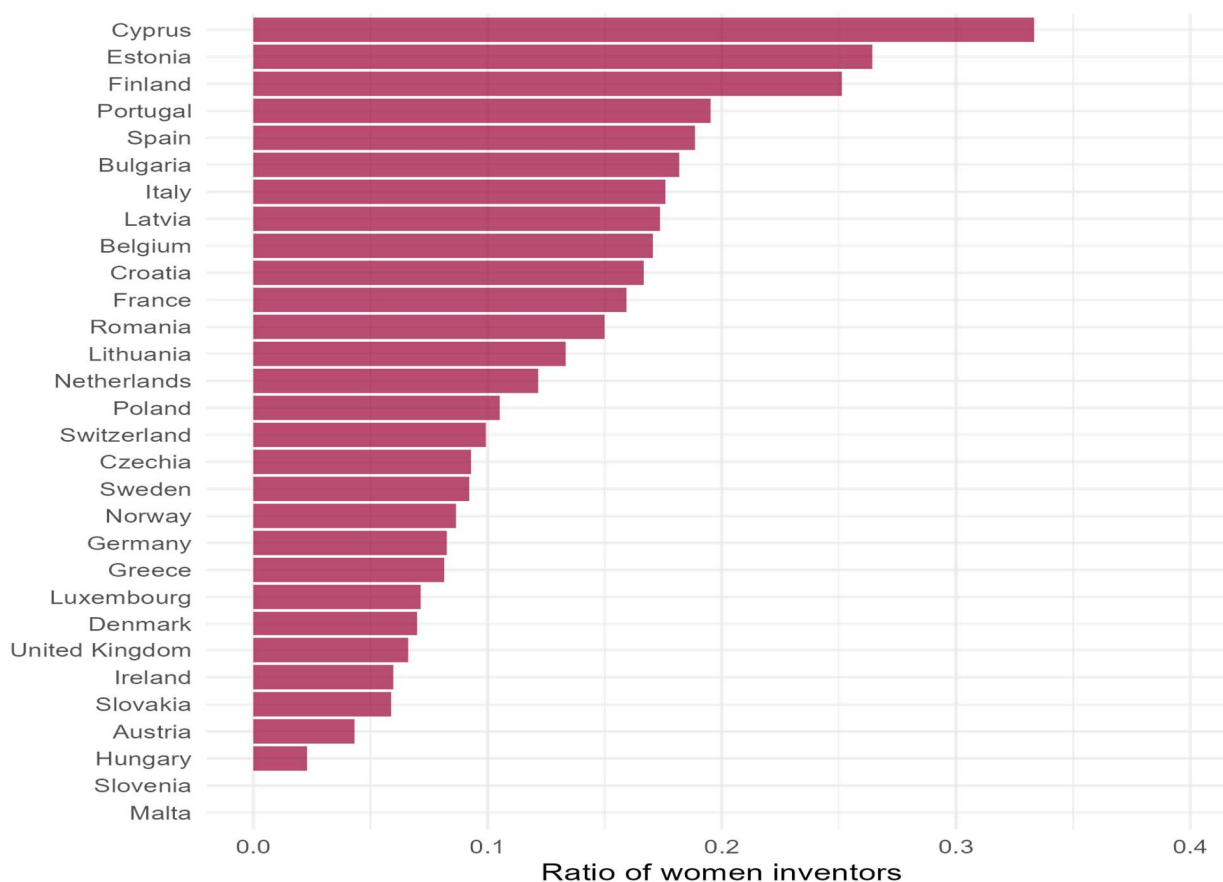
Table 8: Women inventors in green technology innovation, short indicator descriptions

Provisional indicator name	Short description	Coverage
Women inventors in green-technology innovation	Time series data, Y02 CPC class 'green' patents, gender of inventor. Source: PATSTAT; Green-tech database (GTDB). Series: 2005-2017 inclusive. Type: ratio (0-1)	Country level, Europe.
Women inventors in green-technology innovation, main technology fields	Time series data; Y02 CPC class 'green' patents, gender of inventor, main technology patent family. Source: PATSTAT; Green-tech database (GTDB). Series: 1971-2020 inclusive. Type: ratio (0-1)	Country level, Europe.

Figure 56 shows a snapshot for 2017 of the ratio of women inventors on green patents by country, for the EU-27 plus Norway, Switzerland and the UK. The Ratio of women inventors is calculated as number of woman inventors / number of men and women inventors (excluding inventors with unknown genders) The ratio thus provides an adjusted calculation of the share of women inventors.



Figure 55: Ratio of women inventors, (ratio 0-1) 2017



number of woman inventors / number of men and women inventors (excluding inventors with unknown genders)
The ratio thus provides an adjusted calculation of the share of women inventors.

Presentation options for these data in the SUPER MoRRI dashboard will include visualisations of the time-series data on women inventors at the national level. These visualisations will also have functionalities for displaying the ratio of women inventors by country and by main technology fields.

5.6. Summary and work in progress

This chapter focuses on monitoring responsible innovation. The data utilised for this line of monitoring is on patenting activity in green technologies in the EU-27 plus Norway, Switzerland and the UK. The volume of green technology patents has been rising. Growth in patent numbers has occurred in all the main technology fields covered in the green technology classification. In particular there has been rapid rise in patents for technology for adaptation to climate change (Y2A), for waste water management and waste treatment (Y2W), and for the production or processing of goods (Y2P). Three of the largest countries in Europe, Germany, France and the United Kingdom are responsible for a very large proportion of green patents.

The ratio of women inventors on green technology patents was calculated for the EU-27 plus Norway, Switzerland, and the UK. Overall, these ratios show that women's participation as inventors of green technologies remains modest, but that it is increasing. The ratios of women inventors have risen most consistently in patents for technology for adaptation to climate change (Y2A), for ICTs (Y2C) and transport (Y2T). The countries that perform best in terms of the participation of women inventors in



green technology patents include a mix of countries from different regions of Europe. The largest producer countries perform less well in terms of the ratio of women inventors. However, it is also important to note that this ratio remains quite low in the majority of countries.

Data presented in this Monitoring Report 3 complements and updates some of what was presented in Monitoring Report 2. Ongoing work is focused on the preparation of these data for the PROMISE portal dashboard. These data will be updated to include three more years of the series 2018-2020.



6. Secondary data - Eurostat Indicators

The 2nd Monitoring Report (MR2) provided a range of secondary data that provided context to and indicators of RRI. The list of indicators is presented in the table below. In this chapter, we provide the indicators that have been updated since the publication of MR2, including indicators based on Eurobarometer and on She-figures data. In Table 10 (below) information on which indicators are included in the three monitoring reports is provided.

Table 9: Indicators

Indicator title	Source	Updated in Monitoring Report 2	Updated in Monitoring report 3
Intramural R&D expenditure per inhabitant in all sectors	Eurostat	Updated to include 2018 and 2019 See Table 15	Updated to include 2019 and 2020 See Table x
Intramural R&D expenditure as a percentage of GDP in all sectors	Eurostat	Updated to include 2018 and 2019 See Table 16	Updated to include 2019 and 2020 See Table x
Patent applications to the EPO by priority year per million inhabitants	Eurostat	Not updated – see Monitoring Report 1	Not updated – see Monitoring Report 1
Share of female researchers by sectors of performance (all sectors)	Eurostat	Updated to include 2018 and 2019 See Table 11	Updated to include 2019 and 2020 See Table x
Share of female researchers by sectors of performance (business enterprise sector)	Eurostat	Updated to include 2018 and 2019 See Table 12	Updated to include 2019 and 2020 See Table x
Share of female researchers by sectors of performance (higher education sector)	Eurostat	Updated to include 2018 and 2019 See Table 13	Updated to include 2019 and 2020 See Table x
Share of female researchers by sectors of performance (government sector)	Eurostat	Updated to include 2018 and 2019 See Table 14	Updated to include 2019 and 2020 See Table x
The Glass Ceiling Index	She Figures	Updated to include 2015 and 2018 See Table 17	Not updated – see Monitoring Report II
Dissimilarity Index (higher education sector)	She Figures	Updated to include 2014 and 2018 See Table 18	Not updated – see Monitoring Report II
Dissimilarity Index (government sector)	She Figures	Updated to include 2014 and 2018 See Table 19	Not updated – see Monitoring Report II
Gender pay gap (%) in the economic activity 'Scientific research & development'	She Figures	Not updated – see Monitoring Report 1	Not updated – see Monitoring Report II



Percentage of a country's publications with a sex or gender dimension in their research content	She Figures	Updated to include 2015-2019 (pooled) See Table 20	Not updated – see Monitoring Report II
Women to men ratio of inventorships, all International Patent Classification (IPC) sections	She Figures	Not updated – see Monitoring Report 1	Not updated – see Monitoring Report I
Women to men ratio of corresponding authorship in all fields of R&D	She Figures	Not updated – see Monitoring Report 1	Not updated – see Monitoring Report I
Percentage of open access publications	WoS and Unpaywall	Updated to include new data for the whole time series + 2020 See Table 27	Not updated – see Monitoring Report Not updated – see Monitoring Report II
Percentage of open access publications (Green)	WoS and Unpaywall	Updated to include new data for the whole time series + 2020 See Table 28	Not updated – see Monitoring Report II
Percentage of open access publications (Gold)	WoS and Unpaywall	Updated to include new data for the whole time series + 2020 See Table 29	Not updated – see Monitoring Report II
Percentage of open access publications (Hybrid)	WoS and Unpaywall	Updated to include new data for the whole time series + 2020 See Table 30	Not updated – see Monitoring Report II
Percentage of open access publications (Bronze)	WoS and Unpaywall	Updated to include new data for the whole time series + 2020 See Table 31	Not updated – see Monitoring Report II
Percentage of publications classified as industry co-publications	WoS and Unpaywall	Not updated – see Monitoring Report 1	Not updated – see Monitoring Report II
Percentage of the EU-public interested in scientific discoveries	Eurobarometer	Updated to include 2020 See Table 21	Not updated – see Monitoring Report II
Percentage of the EU-public that feels informed about science	Eurobarometer	Updated to include 2020 See Table 22	Not updated – see Monitoring Report II



Percentage of correct science quiz answers in the EU-public	Eurobarometer	Updated to include 2020 See Table 23	Not updated – see Monitoring Report II
Percentage of the EU-public that believes that scientists are among the best qualified to explain the impact of scientific and technological developments	Eurobarometer	Updated to include 2020 See Table 24	Not updated – see Monitoring Report II
Percentage of the EU-public that attends public meetings or debates about science and technology	Eurobarometer	Updated to include 2020 See Table 25	Not updated – see Monitoring Report II
Percentage of the EU-public that sign petitions or join street demonstrations on science and technology matters	Eurobarometer	Updated to include 2020 See Table 26	Not updated – see Monitoring Report II



6.1. Share of female researchers by sectors of performance, all sectors

Figure 57 depicts change in the share of female researchers in all sectors for the period 2005-2020. For a detailed data fiche for the indicator see Table 15 in appendix III.

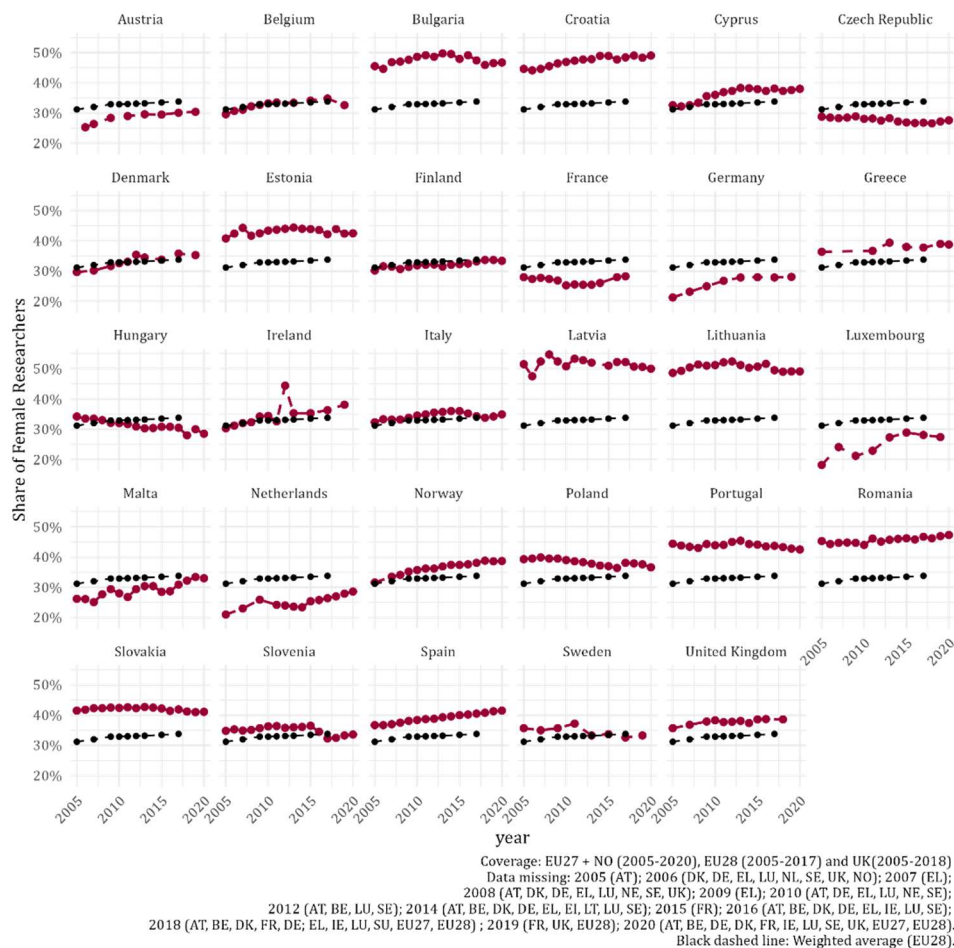


Figure 56: Share of female researchers by sectors of performance, all sectors



6.2. Share of female researchers by sectors of performance, Business enterprise sector

Figure 58 depicts the development in the share of female researchers in the business enterprise sector for the time period 2005-2020. For a detailed data fiche for the indicator see Table 16

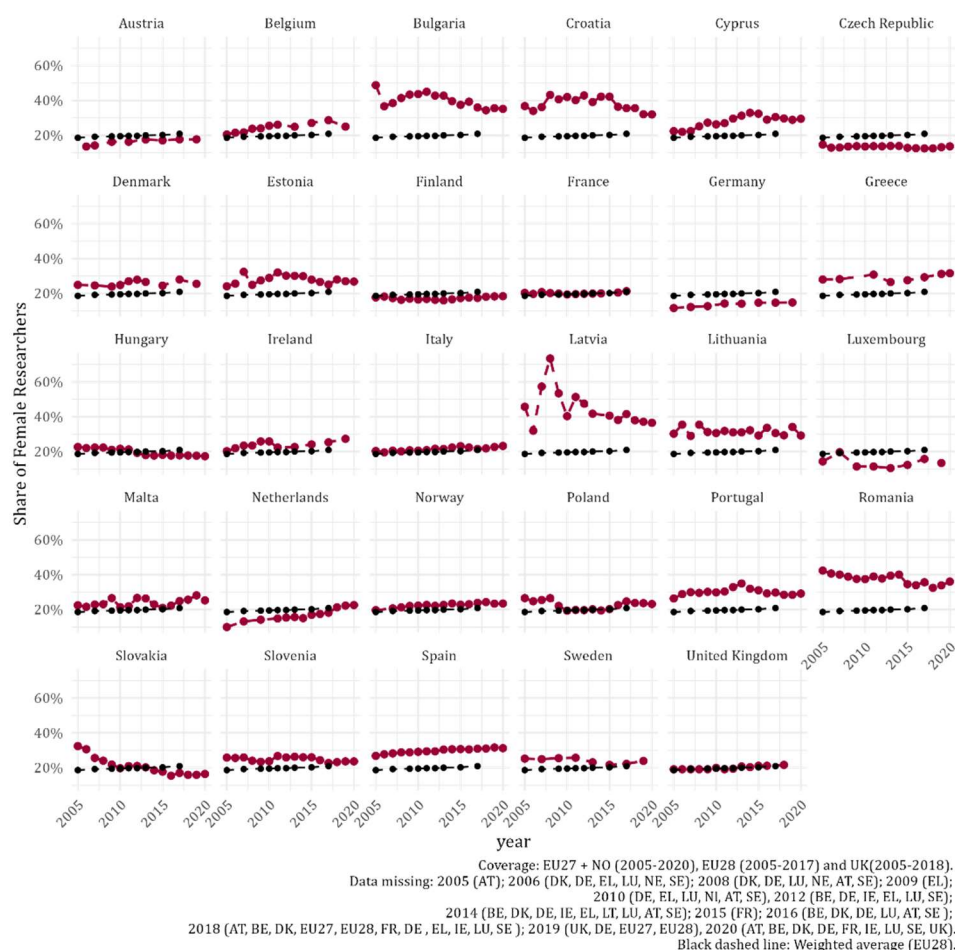


Figure 57: Share of female researchers by sectors of performance, Business enterprise sector



6.3. Share of female researchers by sectors of performance, Government sector

Figure 59 depicts the development in the share of female researchers in the government sector for all countries (EU28 + NO) in the time period 2005-2019. For a detailed data fiche for the indicator see table 18.

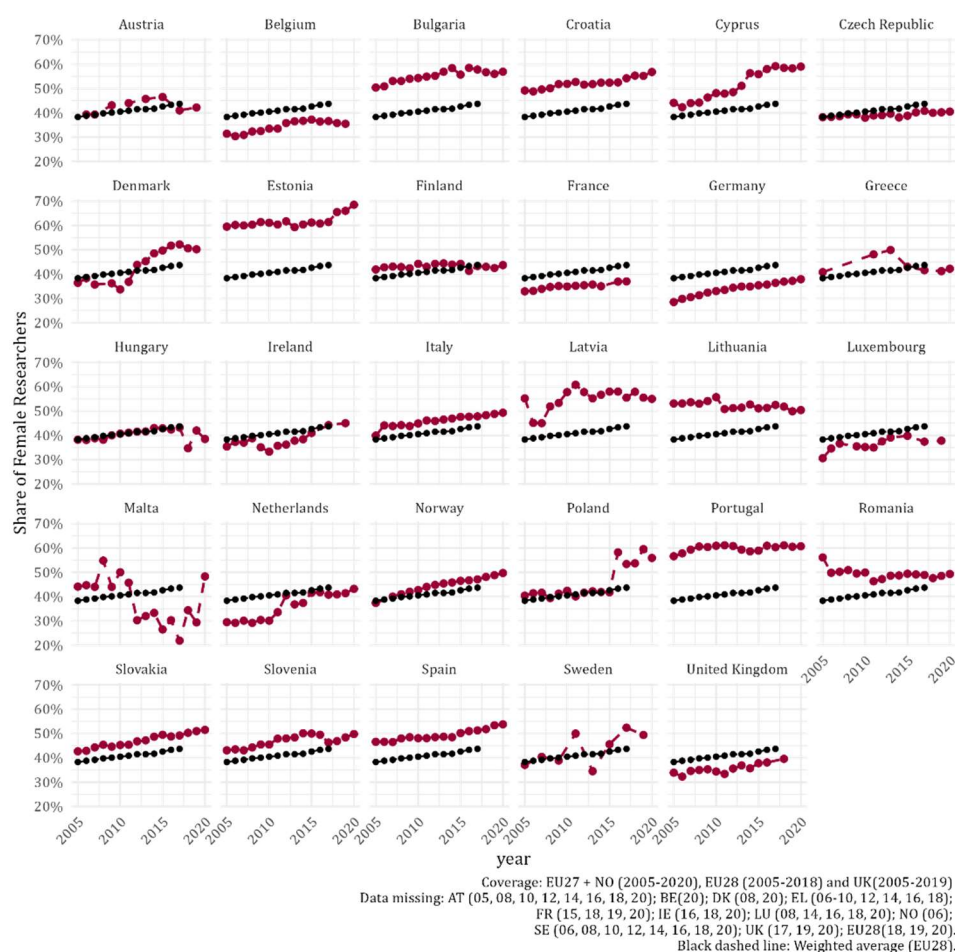


Figure 58: Share of female researchers by sectors of performance, Government sector



6.4. Share of female researchers by sectors of performance, Higher Education sector

Figure 60 depicts the development in the share of female researchers in the higher education sector for all countries (EU28 + NO) in the time period 2005-2019. For a detailed data fiche for the indicator see Table 17

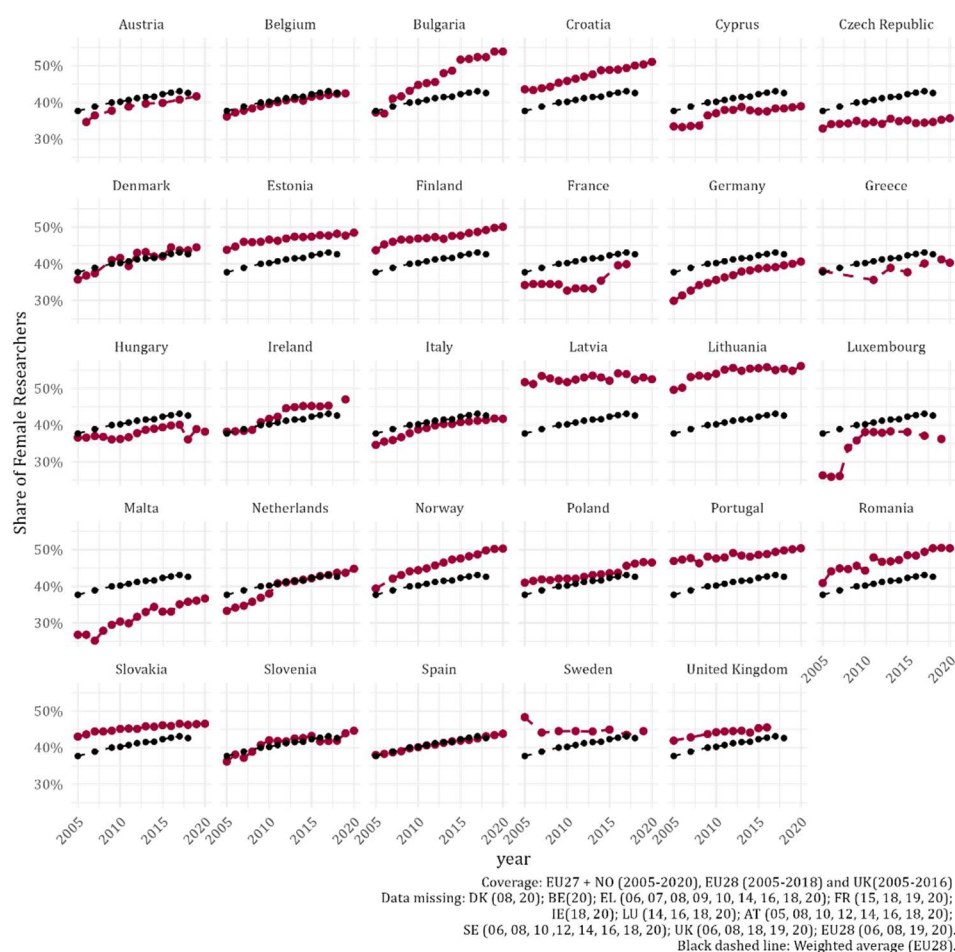


Figure 59: Share of female researchers by sectors of performance, Higher Education sector



6.5. Intramural R&D expenditure per inhabitant in all sectors

Figure 61 depicts the intramural R&D expenditure per inhabitant in all sectors for all 28 EU countries and Norway (EU27 + NO & UK) for the period 2005-2019.

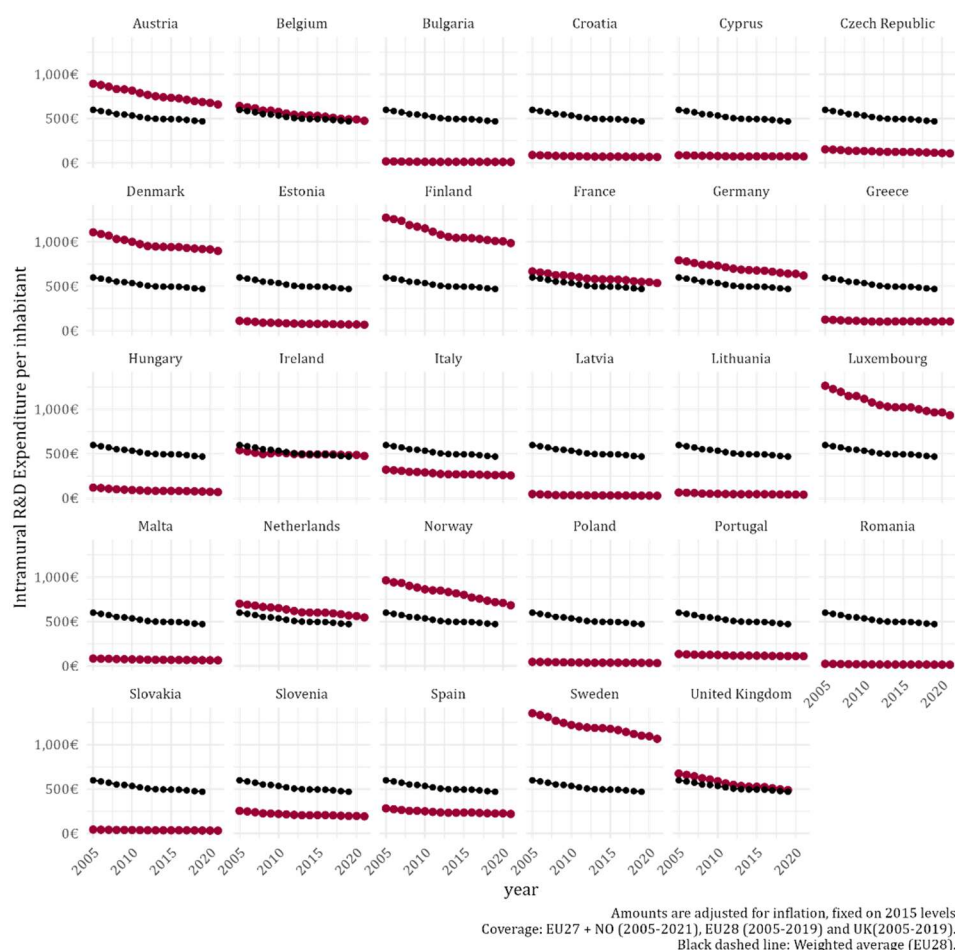


Figure 60: Intramural R&D expenditure per inhabitant in all sectors

The expenditure is adjusted for inflation and is shown in fixed 2015 prices. For a detailed data fiche for the indicator see Table 13 Intramural R&D expenditure (GERD) as a percentage of GDP in all sectors.

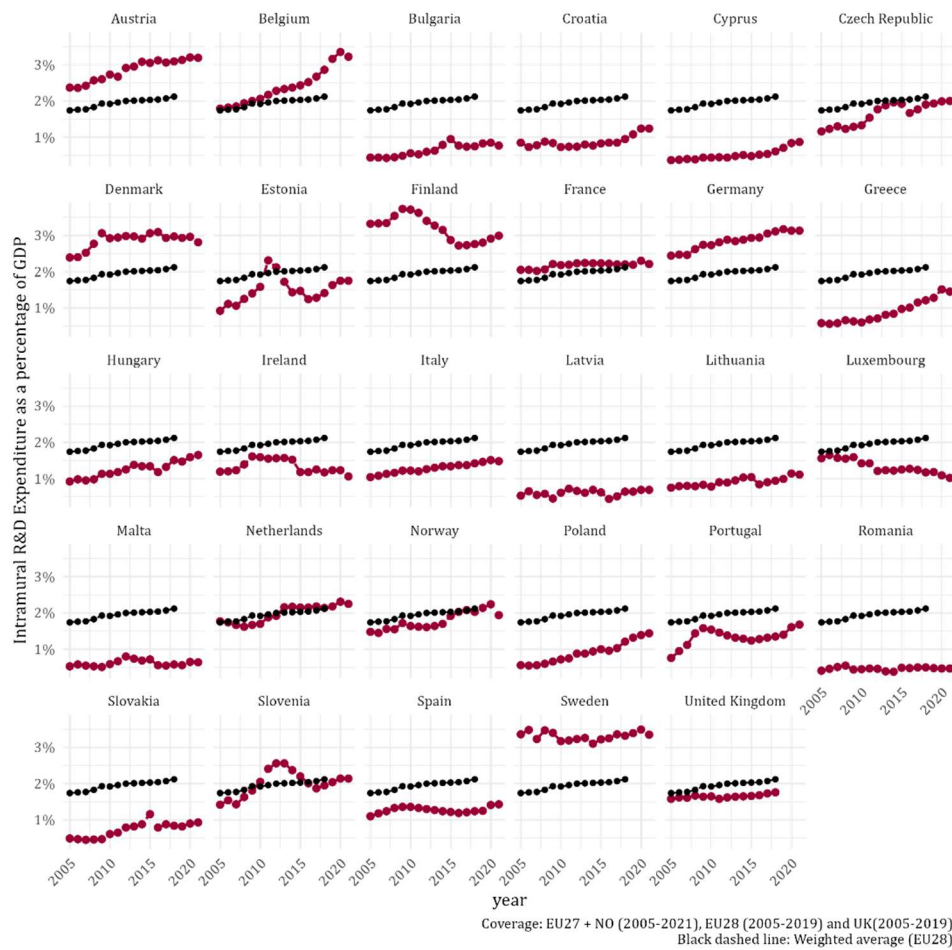


Figure 61: Intramural R&D expenditure as a percentage of GDP

Figure 62 depicts the intramural R&D expenditure as a percentage of GDP in all sectors for all 28 EU countries and Norway (EU27 + NO & UK) for the period 2005-2019. For a detailed data fiche for the indicator see Table 14



7. Conclusion

The SUPER MoRRI project is concerned with promoting openness and responsibility in research and innovation through the provision of a monitoring framework that can support learning and organisational change. The development of the framework has drawn on existing resources and data, and primary data collection through the SUPER MoRRI empirical research programme. Three periodic Monitoring Reports summarised the development of the data and information produced and curated in the project over time. Descriptive analyses were also provided as outlined in the project Implementation Plan (D2.1).

In the 1st Monitoring Report (MR1), secondary data-based indicators were presented at the country level, covering EU27, Norway and the United Kingdom. The 26 indicators provided were drawn from Eurostat, She Figures, Web of Science, Unpaywall, and various Eurobarometers. The majority of these were also included among the MoRRI indicators, covering particularly the RRI key areas of Gender Equality and Open Access.

In the 2nd Monitoring Report (MR2), an update was provided on most of the data and indicators from MR1. Notably, new Eurobarometer data on EU citizens' attitudes towards science and technology became available. These data refreshed long-running time-series information. The SUPER MoRRI study examined research performing organizations, specifically a sample of European universities, assessing their policies and strategies in five areas of open and responsible research and innovation: Gender Equality, Open Science, Public Engagement, Research Ethics and Integrity, and the Third Mission. The study involved 122 European universities and revealed varied results regarding the coverage of these areas and their status as strategic priorities.

Another SUPER MoRRI study focused on research funding organizations (RFOs), exploring how they exerted responsibility pressure through priority setting, funding instruments, and research assessment. Over 50 European funders participated, and the initial findings indicated policies related to responsibility and research assessment in line with international approaches. New indicators were also introduced in MR2, specifically for responsible innovation in green technologies, with a focus on sustainability. These indicators covered patents associated with climate change mitigation and sustainable socio-economic development. A special focus was placed on the presence of women inventors in green technology patents, providing valuable insights at the country level.

In MR3, the chapter on RPOs (Research Performing Organizations) explores more detailed categorical indicators of RRI implementation. It shows that while most RPOs have policies and strategies in place, their prioritization and practical approaches vary. The chapter on RFOs discusses their support for openness and responsibility in research cultures and practices, including their funding priorities, instruments, and assessment processes. It highlights the inclusion of scientific and societal stakeholders in RFOs' core activities. It provides a snapshot of RFOs' contributions to driving improvement in open and responsible research and innovation through their own practices and through their expectations of grant beneficiaries.

Overall, MR3 contributes to the ongoing effort to make these data available in a dynamic format through the PROMISE portal (www.promise4era.eu). These efforts will culminate in December 2024 with the launch of the portal.



8. Recapping the series of Monitoring Reports

The series of three Monitoring Reports produced across the lifespan of the SUPER MoRRI project reported on the progress of the project empirical research programme in real time. Each report both continued reporting and updated existing indicators as well as reporting on continuing data collection and development of new indicators. It is the intention to make as much of the data collected available as possible within the parameters of GDPR. The interface at the PROMISE portal will allow users to interact and understand the available data and the usefulness of the indicators for understanding specific contexts.

A fourth report that accompanies the Monitoring Reports closely is the Annotated Methodological Procedures Report (D2.3). This report is openly available and allows outsiders to understand and repeat similar data collection exercises.

In the final table we present a full list of the indicators for RRI that have been presented in the three Monitoring Reports. These span various contexts, years, and levels and units of analysis. These data provide an encompassing web of information that can aid in understanding the progress, implementation, and uptake of open and responsible research and innovation in the European community as a whole.

Table 10 - List of indicators presented in the Monitoring Report series

Indicator title	Source	Appears in:
Intramural R&D expenditure per inhabitant in all sectors	Eurostat	MR1, MR2, MR3
Intramural R&D expenditure as a percentage of GDP in all sectors	Eurostat	MR1, MR2, MR3
Patent applications to the EPO by priority year per million inhabitants	Eurostat	MR1
Share of female researchers by sectors of performance (all sectors)	Eurostat	MR1, MR2, MR3
Share of female researchers by sectors of performance (business enterprise sector)	Eurostat	MR1, MR2, MR3
Share of female researchers by sectors of performance (higher education sector)	Eurostat	MR1, MR2, MR3
Share of female researchers by sectors of performance (government sector)	Eurostat	MR1, MR2, MR3
The Glass Ceiling Index	She Figures	MR1, MR2
Dissimilarity Index (higher education sector)	She Figures	MR1, MR2
Dissimilarity Index (government sector)	She Figures	MR1, MR2
Gender pay gap (%) in the economic activity 'Scientific research & development'	She Figures	MR1, MR2
Percentage of a country's publications with a sex or gender dimension in their research content	She Figures	MR1, MR2



Indicator title	Source	Appears in:
Women to men ratio of inventorships, all International Patent Classification (IPC) sections	She Figures	MR1
Women to men ratio of corresponding authorship in all fields of R&D	She Figures	MR1
Percentage of open access publications	WoS and Unpaywall	MR1, MR2
Percentage of open access publications (Green)	WoS and Unpaywall	MR1, MR2
Percentage of open access publications (Gold)	WoS and Unpaywall	MR1, MR2
Percentage of open access publications (Hybrid)	WoS and Unpaywall	MR1, MR2
Percentage of open access publications (Bronze)	WoS and Unpaywall	MR1, MR2
Percentage of publications classified as industry co-publications	WoS and Unpaywall	MR1
Percentage of the EU-public interested in scientific discoveries	Eurobarometer	MR2
Percentage of the EU-public that feels informed about science	Eurobarometer	MR2
Percentage of correct science quiz answers in the EU-public	Eurobarometer	MR2
Percentage of the EU-public that believes that scientists are among the best qualified to explain the impact of scientific and technological developments	Eurobarometer	MR2
Percentage of the EU-public that attends public meetings or debates about science and technology	Eurobarometer	MR2
Percentage of the EU-public that sign petitions or join street demonstrations on science and technology matters	Eurobarometer	MR2
Activities regarding Public Engagement	RESU	Figure 4 MR3
Motivations to engage in Public Engagement activities	RESU	Figure 5 MR3
Observed and Expected Benefits of Public Engagement	RESU	Figure 6 MR3
Barriers to the promotion of Public Engagement	RESU	Figure 7 MR3
Activities regarding Open Science	RESU	Figure 8 MR3
Motivations to engage in Open science activities	RESU	Figure 9 MR3



Indicator title	Source	Appears in:
Observed and Expected Benefits of Open Science	RESU	Figure 10 MR3
Experienced barriers of Open science	RESU	Figure 11 MR3
Activities regarding Gender Equality	RESU	Figure 12 MR3
Motivations to engage in Gender Equality activities	RESU	Figure 13 MR3
Observed and Expected Benefits of Gender Equality	RESU	Figure 14 MR3
Barriers to the promotion of Gender Equality	RESU	Figure 15 MR3
Activities regarding Ethics	RESU	Figure 16 MR3
Motivation to engage in Ethics activities	RESU	Figure 17 MR3
Observed and Expected Benefits of Ethics	RESU	Figure 18 MR3
Barriers to ethical research	RESU	Figure 19 MR3
RRI in European Research Performing Organizations overview.	CCN-RPO	Figure 20 MR3
Proportion of the RPOs that highlight Gender Equality as either aims, support, or support & incentives in their core strategic documents.	CCN-RPO	Figure 21 MR3
Focus and implementation of Gender Equality by sub-areas	CCN-RPO	Figure 23 MR3
Proportion of the RPOs that highlight Open Science as either aims, support, or support & incentives in their core strategic documents.	CCN-RPO	Figure 25 MR3
Focus and implementation of Open Science by sub-areas	CCN-RPO	Figure 27 MR3
Proportion of the RPOs that highlight Public Engagement as either aims, support, or support & incentives in their core strategic documents	CCN-RPO	Figure 29 MR3
Focus and implementation of Public engagement by sub-areas	CCN-RPO	Figure 31 MR3
Proportion of the RPOs that highlight Research Ethics and Integrity as either aims, support, or support & incentives in their core strategic documents.	CCN-RPO	Figure 33 MR3
Focus and implementation of Research Ethics and Integrity by sub-areas	CCN-RPO	Figure 35 MR3
Proportion of the RPOs that highlight Third Mission as either aims, support, or support & incentives in their core strategic documents.	CCN-RPO	Figure 37 MR3



Indicator title	Source	Appears in:
Focus and implementation Third Mission by sub-areas	CCN-RPO	Figure 39 MR3
RFO policies supporting RRI and responsible research cultures and practices, by policy areas.	CCN-RFO	Figure 42: MR3
Stakeholders involved in research funding priority setting.	CCN-RFO	Figure 43: MR3
Type of formal advice	CCN-RFO	Figure 44: MR3
Open and responsible research in funding instruments	CCN-RFO	Figure 45: MR3
Inclusion of RRI and RRI-related elements in research funding instrument	CCN-RFO	Figure 46: MR3
Stakeholders involved in funding instrument development	CCN-RFO	Figure 47: MR3
Assessment of open and responsible research in grant proposals	CCN-RFO	Figure 48 MR3
Assessment of societal contributions in grant proposals	CCN-RFO	Figure 49 MR3
RFOs supporting responsible research assessment practices	CCN-RFO	Figure 50 MR3
Green Patent Families (fractional counting), 1971-2016	Gendered eco-innovations	Figure 51 MR3
Green patent families, by technology group, fractional count, 1971-2016	Gendered eco-innovations	Figure 52 MR3
Green patent families, by gender of inventor, 1971-2016	Gendered eco-innovations	Figure 53 MR3
Ratio of women inventors, by technology family, 1971-2016	Gendered eco-innovations	Figure 54 MR3
Number of green patents by country in 2017	Gendered eco-innovations	Figure 55 MR3
Share of women inventors, 2017	Gendered eco-innovations	Figure 56 MR3



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Appendix I: SUPER MoRRI Researcher Survey Questionnaire

Introduction / Introductory Questions / Characteristics

Q1: Researchers might identify themselves with different roles in research. Please put the following roles in the order in which you identify most with.

To do so, please click on the role item and drag it into the right field.

- Reflexive Scientist
 - Reflecting the rules, norms and values of doing research
 - Developing theories and methods of research
- Fact Finder
 - Collecting, analysing and interpreting empirical data
 - Formulating and discussing new theories and facts within the scientific community
- Agenda Setter
 - Communicating science in media, policy-making and other societal contexts
 - Intervening in public debate on the basis of the latest scientific results
- Participation Facilitator
 - Selecting appropriate extra-scientific stakeholders
 - Stakeholder analysis and setting up criteria for participation
- Knowledge Broker
 - Translating knowledge between scientific disciplines, professions, stakeholders
 - Making implicit knowledge from different practice domains visible

Q2: Please select your country of work.

Please select a country from the drop-down list.

Q3: Please select the Research Performing Organisation (RPO) that you mainly work at.

Please select the RPO from the sample in the drop-down list. If you cannot find your RPO or your RPO does not appear in the list, please select 'other'.

The concept and practice of responsible research and innovation (RRI)

Q4: Being responsible in research and innovation can mean many things. What comes to your mind when thinking about responsible research and innovation?

Multiple Answer Possible

- Citizen Science
- Corporate Social Responsibility
- Ethics
- Excellence



- Gender Equality
- Inclusive Innovation
- Open Access / Open Science
- Open Innovation
- Public Engagement
- Science Communication
- Science Education
- Social Equality
- Sustainability
- Transparency
- Other (please specify)

Questions on individual RRI-related activities

In the following we ask you several questions on selected topics related to Responsible Research and Innovation (RRI). These are Public Engagement, Open Science, Gender Equality and Ethics.

Public Engagement

By Public engagement we understand the engagement of non-academic actors in science, in order to facilitate interaction and dialogue, and involve those actors in decision-making.

Q5: Please answer in how far you have cooperated with the following non-academic actors in your research in the last three years

- Matrix Question, response Options: Yes, in all projects I have been a part of, Yes, in most of the projects, Yes, in few of them, No, in none of them
 - Citizens
 - Government and agencies (Administration, Ministries, etc.)
 - Non-Governmental Organisations (NGOs) / Civil Society Organisations (CSO)
 - Companies / Enterprises
 - Consumer and / or applicants patient groups
 - Other types of non-academic actors (please specify)

Q6a: How did you interact with citizens in your research?

- Multiple Answer Question
 - Development of research agenda and research questions
 - Conducting the research (data collection, data analytics)
 - Decision making (e.g. on the implementation of research activities)
 - Discussing the consequences of research / its application (including technology assessment)
 - Commercialisation and exploitation
 - Dissemination
 - Presentation of research results to citizens



- Other activities (please specify)

Q6b: How did you interact with government and agencies (administration, ministries) in your research?

- Multiple Answer Question
 - Development of research agenda and research questions
 - Conducting the research (data collection, data analytics)
 - Decision making (e.g. on the implementation of research activities)
 - Discussing the consequences of research / its application (including technology assessment)
 - Commercialisation and exploitation
 - Dissemination
 - Presentation of research results to government and agencies
 - Other activities (please specify)

6cf. Continued for NGOs and CSOs, companies / enterprises, consumer / applicants groups etc.

Q7: If you engage with non-academic actors, what is your main motivation?
Please indicate to what extent you agree with the following statements:

- Matrix Question, response options: Strongly agree, rather agree, rather disagree, strongly disagree, don't know
 - I see it as part of good research practice
 - My institute rewards these activities
 - It is a requirement of the research funders
 - I see it as an opportunity to attract further research funding
 - I want to comply with the respective legal requirements of my country
 - I wish to maximize the reach and impact of my research
 - I am convinced that research must engage with the public
 - I have a personal interest to better involve the public in research
 - Other reason (please specify)

Q8: In your experience, what are the barriers to engage with non-academic actors?
Please indicate to what extent you agree with the following statements

- Matrix Question, response options: Strongly agree, rather agree, rather disagree, strongly disagree, don't know
 - It is too time consuming
 - My University does not actively support Public Engagement activities
 - There are no particular institutional incentives to reward Public Engagement activities
 - I did not find it relevant for my research
 - The benefits are too few for me



- I am not sure how to do it
- Considering Public Engagement negatively affects the quality of research
- Other reason please specify)

Q9: Does one of the following institutional offers exist at your university?

- Multiple Answer Question, response Options: Yes, No, Don't know, Not applicable
 - A practical Public Engagement guide I can follow
 - Funding available for Public Engagement activities
 - A Public Engagement team I can contact
 - Public Engagement training sessions I can attend
 - An institutional policy for integrating Public Engagement activities in my research
 - Other (please specify)

Q10: When engaging with non-academic actors, do you expect or have you already observed the following benefits

- Matrix Question, response Options: Yes, I have already observed the benefit; No, I have not observed such a benefit but I expect it to arise; No, I have not observed, nor do I expect such a benefit; Don't know
 - Emergence of new research topics
 - Higher social relevance of scientific outputs
 - Higher quality of scientific outputs
 - Increased societal impact of my research
 - Improved products and services
 - More innovations, including social innovations
 - Inclusion of disadvantaged groups
 - Recognition of citizens' knowledge in research
 - Increasing citizens competencies / Empowering citizens
 - Changed approach to risk in my research
 - Other benefit (please specify)

Open Science

The term Open Science bundles activities that aim to make all components of the scientific process openly accessible and usable. These include an unrestricted access to scientific publications (Open Access) and research data (Open Data).

Q11: Please answer whether you enacted any of the following Open Science activities in your research during the past three years

- Matrix Question, response options: Yes, in all projects I have been a part of, Yes, in most of the projects, Yes, in a few of them, No, in none of the projects
 - Pre-registered studies or in other ways shared



- Considered how to make data and analysis openly available in the planning phase of the project
- Published working papers that are freely accessible
- Shared data in open repositories
- Published open access
- Improved data infrastructures to ease the use of data
- Made data available for free to other researchers after it was requested

Q12: If you practice Open Science, what is your main motivation?

- Matrix Question, Response Options: Yes, No, Don't know, Not applicable
 - I see it as part of good research practice
 - My institute rewards these activities
 - I want to comply with the respective legal requirements of my country
 - I have a personal interest to make my research results publicly available
 - I wish to maximize the reach and impact of my research
 - I am convinced that research must be open
 - Other reason (please specify)

Q13: In your experience, what are the barriers to practice Open Science? Please indicate to what extent you agree with the following statements

- Matrix Question, response options: strongly agree, partly agree, rather disagree, strongly disagree, don't know
 - It is too time consuming
 - My University does not actively support Open Science, by, for example, offering financial support
 - There are no particular institutional incentives to reward Open Science activities
 - I did not find it relevant for my research
 - Article processing charges (APCs) are too expensive
 - The benefits are too few for me
 - I am not sure how to do it
 - The most important journals in my field do not regularly foresee Open Access
 - Other (please specify)

Q14: Does one of the following institutional offers exist at your University?

- Matrix Question, response options: Yes, No, Don't know, Not applicable
 - An institutional repository
 - Institutional software for data processing
 - A practical Open Science guide I can follow
 - Funding available for Open Access publishing
 - An Open Science team I can contact
 - Open Science training sessions I can attend



- An institutional policy for publishing Open Access
- An institutional policy for practicing Open Data
- Others (please specify)

Q15: When practicing Open Science, do you expect or have you already observed the following benefits?

- Matrix Question, response options: Yes, I have already observed the benefit; No, I have not observed such a benefit but I expect it to arise; No, I have not observed, nor do I expect such a benefit; Don't know
 - Emergence of new research topics
 - Enhanced visibility in the research community
 - Higher social relevance of scientific outputs
 - Higher quality of scientific outputs
 - Faster diffusion of knowledge
 - Increased societal impact of my research
 - Mobilizing further research funding
 - Cost reduction due to improved access to knowledge and / or data
 - Other (please specify)

Gender Equality

Information Box: Gender equality refers to the equal representation of women in research and innovation and the inclusion of gender aspects in research and innovation content.

Q16: Please answer whether Gender Equality was taken into account in your research during the past three years

- Matrix Question, response options: Yes, in all projects I have been a part of, Yes, in most of the projects, Yes, in a few of them, No, in none of the projects
 - Attempted to obtain a gender-balanced composition of the research team?
 - Consider gender aspects (content) in the research design phase?
 - Consider gender aspects (content) in the implementation phase of research?
 - Consider gender aspects (content) when analysing the data?
 - Consider gender aspects (content) when disseminating the results?

Q17: If you consider gender equality in your research, what is your main motivation?

Online-Version: If you consider gender aspects and / or Gender Equality in your research, what is your motivation?

- Matrix Question, response options: strongly agree, partly agree, rather disagree, strongly disagree, don't know
 - I have to comply with the respective legal requirements of my country
 - It is a requirement of the research funders
 - My institute rewards these activities



- I wish to maximize the reach and impact of my research
- It is good research practice
- I have a personal interest in better addressing gender aspects and gender equality in research
- Other reason (please specify)

Q18: Why have you not considered Gender Equality in your research so far?

- Matrix Question, response options: strongly agree, partly agree, rather disagree, strongly disagree, don't know
 - My University does not support Gender Equality activities
 - There are no particular institutional incentives to promote Gender Equality activities
 - Considering Gender Equality negatively affects the quality of research
 - I did not find it relevant for my research
 - I am not sure how to do it
 - It is too time consuming
 - The benefits are too few for me
 - Others reasons (please specify)

Q19: Does one of the following institutional offers exist at your University?

- Matrix Question, response options: Yes, No, Don't know
 - An institutional policy for integrating Gender Equality in my research
 - Funding available for Gender Equality activities
 - A practical Gender Equality guide I can follow
 - A Gender Equality team I can contact
 - Gender Equality training sessions I can attend
 - Others (please specify):

Q20: When taking Gender Equality into account in your research, do you expect or have you already observed the following benefits

- Matrix Question, response options: Yes, I have already observed the benefit; No, I have not observed such a benefit but I expect it to arise; No, I have not observed, nor do I expect such a benefit; Don't know
 - Emergence of new research topics
 - Findings which would not have occurred without taking gender aspects into account
 - Enhanced visibility in the research community
 - Higher social relevance of scientific outputs
 - Higher quality of scientific outputs
 - Increased societal impact of my research
 - Mobilizing further research funding
 - Products & services with higher comparative advantage due to ensured gender suitability



- More innovations, including social innovations
- Inclusion of disadvantaged groups
- Other (please specify)

Ethics

Information Box: By Ethics we understand the application of ethical principles or values to various issues and fields of research, including ethical aspects of the design and conduct of research, , whether research results may be misused, and aspects of scientific misconduct.

Q21: Please answer whether you considered Ethics in your research during the past three years

- Matrix Question, response options: Yes, in all projects I have been a part of, Yes, in most of the projects, Yes, in a few of them, No, in none of the projects
 - I consider ethical issues when designing my own research
 - I involve other researchers competent in ethics in my research projects, e.g. in interdisciplinary research or as ethics advisors
 - I include work packages in my research that deal particularly with ethical issues that arise in my research.
 - I submit my research projects to ethical review
 - I act as reviewer in ethics reviews for projects
 - I contribute to the development of ethical standards in my disciplines
 - I contribute to training on ethical issues in my discipline

The following question is about questionable research practices. These are less than ideal research practices which might happen unintentionally. They are not research misconduct (i.e. fabrication, falsification, or plagiarism). We will present you a set of research practices and ask you to what extent you have engaged in them.

Q22: Thinking about your research carried out over the last three years, how often has the following occurred?

- Matrix Question, response options: often, sometimes, rarely, never, does not apply in my case
 - Wilfully failing to cite relevant publications that contradict your own beliefs, theories, hypotheses, methods or findings
 - When reviewing a manuscript, not investing the effort necessary to conduct a thorough review
 - Choosing not to report your findings if they could weaken or contradict your theories of hypotheses
 - Deliberately using another researcher's unpublished idea without giving credit. For example, publishing an idea voiced by a colleague at an informal meeting without giving them credit.
 - In a publication, failing to disclose relevant personal, financial, political or intellectual conflicts of interests
 - Including authors on a paper who had not contributed sufficiently to the work to merit authorship



- Inadequately supervising or mentoring junior co-workers
- Carrying out research without getting the required ethical approval

Q23: If you consider Ethics, what is your main motivation?

- Matrix Question, response options: strongly agree, partly agree, rather disagree, strongly disagree, don't know
 - I see it as part of good research practice
 - It is a requirement of the research funders
 - My institute rewards these activities
 - I want to comply with the respective legal requirements of my country
 - I wish to maximize the reach and impact of my research
 - I am convinced that research must be ethical
 - I have a personal interest in Ethics
 - Other reason (please specify):

Q24: In your experience, what are the barriers to consider Ethics in your research?

- Matrix Question, response options: strongly agree, partly agree, rather disagree, strongly disagree, don't know
 - My University does not actively support ethics activities
 - There is no ethics committee in my research organization that would review my projects and guide me in how to include ethics in my research
 - There are no particular institutional incentives to reward ethics in research
 - I did not find it relevant for my research
 - It is too time consuming
 - The benefits are too few for me
 - I am not sure how to do it
 - Considering Ethics negatively affects the quality of research
 - Other (please specify)

Q25: Does one of the following institutional offers exist at your University?

- Matrix Question, response options: Yes, No, Don't know, Not applicable
 - A practical Ethics guide I can follow
 - Funding available for Ethics activities
 - An Ethics team I can contact
 - Ethics training sessions I can attend
 - An institutional policy for integrating Ethics in my research
 - A policy for designing ethical values and principles into projects and digital systems
 - Others (please specify):



Q26: When taking Ethics into account in your research, do you expect or have you already observed the following benefits?

- Matrix Question, response Options: Yes, I have already observed the benefit; No, I have not observed such a benefit but I expect it to arise; No, I have not observed, nor do I expect such a benefit; Don't know
 - Higher relevance of scientific outputs
 - Higher quality of scientific outputs
 - Increased societal impact of my research
 - Changed approach to risk in my research team
 - Other (please specify)

Cluster: Socio-demographic characteristics

You almost arrived at the end of the questionnaire. Finally, we would like to ask you for some information about your socio-demographic background and your research funding sources.

Q27: Have you received funding from any of the funding sources listed below in the last five years?

- Single answer question,
 - Application-based project funding in your country, e.g. from science foundations:
 - Yes
 - No
 - I don't know
 - If yes, please specify the type of application-based project funding in your country
 - Funding from national Science Funds (e.g. Austrian FWF, German DFG, Dutch NOW etc.)
 - Funding from national research funding programs from ministries or research funding agencies
 - Funding from private foundations
 - Others (please specify)
 - EU Funding:
 - Yes
 - No
 - I don't know
 - If yes, please specify
 - European Research Council (ERC Grants, Marie Skłodowska-Curie Actions (MSCA))
 - Horizon2020 / Horizon Europe
 - EUREKA
 - European Cooperation in Science and Technology (COST)
 - European Innovation Council (EIC)
 - European Institute of Innovation and Technology (EIT)
 - Others (please specify)
 - Contract research:



- Yes
- No
- If yes, please specify funded by
 - Studies and services for public national authorities like research ministries
 - Studies and services for the European Commission
 - Studies and services for private companies
 - Studies and services for Non-Governmental Organisations (NGOs) / Civil Society Organisations (CSOs)
 - Others (please specify)
- Others (please specify)

Q28: What is your current gender?

- Single Answer Question, response Options:
 - Women
 - Man
 - Non-binary
 - Prefer not to state
 - A gender identity not listed here (please specify)

Q29: What is the scientific field in which you mainly do research?

- Single answer question, response options:
 - Medical and Health Sciences
 - Agricultural and Veterinary Science
 - Engineering and Technology
 - Structural Sciences (Mathematics, Informatics, Logic)
 - Natural Sciences (Physics, Chemistry, Geosciences, Astronomy, Biology)
 - Social Sciences and Economics
 - Arts and Humanities
 - Others (please specify)

Q30: How long have you been working in research / as a researcher (years after Masters level)?

- Single answer question, response options:
 - 0-5 years
 - 6-10 years
 - 11-20 years
 - >20 years

Q31: What is your current (scientific) career stage? (for details, see EURAXESS Research Profile Descriptors will be included <https://euraxess.ec.europa.eu/europe/career-development/training-researchers/research-profiles-descriptors>)



- Single answer question, response options:
 - R1: First Stage Researcher (up to the point of PhD),
 - R2: Recognised Researcher (PhD holders or equivalent who are not yet fully independent);
 - R3: Established Researcher (researchers who have developed a level of independence);
 - R4: Leading Researcher (researchers leading their research area or field)
 - Other (please specify)

You have reached the last page of the survey. If you click “next”, you will finish the survey.

Thank you very much for your participation! Your response is very important to us. You can now close this window.



Appendix II: RESU RPOs and country of residence

Table 11: RESU respondents' country of residence

Country of Residence	Frequency	Valid Percent
Denmark	432	10,4
Sweden	404	9,7
Italy	394	9,4
Norway	304	7,3
Germany	285	6,8
Belgium	251	6
Finland	244	5,8
The Netherlands	235	5,6
Slovenia	187	4,5
Ireland	173	4,1
Austria	165	4
Spain	167	4
The United Kingdom	121	2,9
Portugal	105	2,5
Greece	90	2,2
Poland	80	1,9
Czech Republic	70	1,7
Estonia	68	1,6
Latvia	67	1,6
France	52	1,2
Lithuania	40	1
Malta	43	1
Bulgaria	36	0,9
Croatia	32	0,8
Hungary	30	0,7
Republic of Cyprus	22	0,5
Slovakia	21	0,5
Luxembourg	16	0,4
Romania	15	0,4
Cyprus	3	0,1
Switzerland	3	0,1
Cambodia	1	0,0
Canada	1	0,0
Colombia	1	0,0
Iceland	1	0,0
India	1	0,0
Japan	1	0,0
Norway	1	0,0
Taiwan	1	0,0



Turkey	2	0,0
Ukraine	1	0,0
United States	1	0,0
USA	1	0,0
Australia	1	0

Table 12: RESU survey RPOs

RPOs	Frequency	Valid Percent
Uppsala University	205	4,9
University of Oslo	189	4,5
Sapienza University of Rome	178	4,3
Ghent University	174	4,2
University of Helsinki	171	4,1
Aarhus University	158	3,8
University of Copenhagen	145	3,5
Technical University of Munich	137	3,3
University of Ljubljana	139	3,3
Technical University of Denmark	115	2,8
University of Florence	118	2,8
Leiden University	117	2,8
University of Vienna	102	2,4
Linköping University	98	2,3
University of Minho	78	1,9
University College Dublin	71	1,7
Jagiellonian University in Cracow	71	1,7
Swedish University of Agricultural Sciences	66	1,6
Masaryk University	62	1,5
University of Agder	59	1,4
University of Antwerp	54	1,3
Aristotle University of Thessaloniki	54	1,3
VU University Amsterdam	56	1,3
Universidad de Cantabria	54	1,3
University of Bremen	49	1,2
Eindhoven University of Technology	52	1,2
Carlos III University of Madrid	51	1,2
University of Turku	44	1,1
National University of Ireland, Galway	46	1,1
University of Calabria	45	1,1
University of Tromsø - Norway's Arctic University	47	1,1
The University of Sheffield	45	1,1
University of Limerick	43	1
University of Malta	41	1



Medical University of Vienna	38	0,9
National University of Distance Education	36	0,9
The Open University	36	0,9
University of Bayreuth	32	0,8
University of Latvia	33	0,8
Tallinn University	28	0,7
University of Duisburg-Essen	31	0,7
University of Maribor	28	0,7
London School of Hygiene and Tropical Medicine	29	0,7
University of Lapland	24	0,6
Université de Rennes 1	24	0,6
Paisii Hilendarski University of Plovdiv	19	0,5
Estonian University of Life Sciences	22	0,5
University of Pécs	22	0,5
Riga Technical University	19	0,5
Mykolas Romeris University	19	0,5
Dalarna University	22	0,5
Hasselt University	16	0,4
Lille University	16	0,4
Riga Stradiņš University	15	0,4
University of Luxembourg	15	0,4
Pavol Jozef Šafárik University in Košice	17	0,4
University of Zadar	13	0,3
University of Nicosia	11	0,3
Copenhagen Business School	11	0,3
Tallinn University of Technology	12	0,3
University Of Thessaly	14	0,3
Athens University of Economics and Business	11	0,3
Maynooth University	12	0,3
University of Macerata	12	0,3
Università degli Studi di NAPOLI ^Parthenope""	11	0,3
Angel Kanchev University of Ruse	10	0,2
University of Zagreb	8	0,2
Cyprus University of Technology	9	0,2
Harokopio University	8	0,2
Pedagogical University in Cracow	7	0,2
ISCTE - University Institute of Lisbon	8	0,2
Open University of Portugal	8	0,2
Egas Moniz Higher Institute of Health Sciences	7	0,2
University of Nova Gorica	7	0,2
University of Primorska	8	0,2
Universidad Católica San Antonio de Murcia	7	0,2
Autonomous University of Barcelona		
Vytautas Magnus University	9	0,2



International Business School	4	0,1
University North, Koprivnica	5	0,1
University of Dubrovnik	3	0,1
Frederick University	3	0,1
Brno University of Technology	6	0,1
Estonian Business School	4	0,1
Finnish Academy of Fine Arts	3	0,1
University of Angers	3	0,1
Bauhaus-Universität Weimar	6	0,1
Corvinus University of Budapest	5	0,1
LCC International University	5	0,1
ISM University of Management and Economics	4	0,1
University of Humanistic Studies	3	0,1
Grigore T. Popa University of Medicine and Pharmacy Iasi	6	0,1
^Vasile Alecsandri^ University of Bacau	5	0,1
University of Constanta	3	0,1
University of Ss. Cyril and Methodius in Trnava	3	0,1
Queen Margaret University	4	0,1
The University of Greenwich	3	0,1
Austrian Academy of Sciences	3	0,1
CNRS	3	0,1
TU Wien	4	0,1
Universidad Complutense de Madrid	3	0,1
Vrije Universiteit Brussel	4	0,1
Danube University Krems	1	0
University of Music and Performing Arts in Vienna	1	0
Open University of Cyprus	2	0
Pázmány Péter Catholic University	2	0
Online University ^Pegaso^	1	0
Aleksandras Stulginskis University	2	0
LUNEX University	1	0
Malta College of Arts, Science & Technology	2	0
University School of Physical Education in Wrocław	1	0
^Ion Mincu^ University of Architecture and Urbanism	1	0
University of the Basque Country	1	0
Agricultural institute of Slovenia	1	0
ATB	1	0
Austrian Academy of Science	1	0
Bambino Gesù Children's Hospital	1	0
BIBA - Bremer Institut für Produktion und Logistik GmbH	1	0



Blekinge Institute of Technology	1	0
Bogomolets National Medical University	1	0
Bombardier Aerospace	1	0
central european university	1	0
Centre for social innovation	1	0
Centre for Social Studies	1	0
CNR	2	0
CNRS and University of Rennes	1	0
Consejo Superior de Investigaciones Científicas	1	0
Consejo Superior de Investigaciones Científicas	1	0
Consiglio Nazionale delle Ricerche	1	0
CSIC	1	0
CTO at Startup	1	0
Currently unemployed	1	0
Czech Academy of Sciences	1	0
Danmarks Frie Forskningsfond	1	0
Delft Technical University	1	0
DKFZ	1	0
Economic Research Institute at the Bulgarian Academy of Sciences	1	0
European Commission	1	0
European Space Agency	1	0
Federl Agency for Water Management	1	0
Finnish Meteorological Insitute	1	0
Flinders University	1	0
Fondazione Bruno Kessler	1	0
Freie Universität Berlin	2	0
Frisch Centre	1	0
Ghent University, BELGIUM	1	0
Goethe Universität Frankfurt am Main	1	0
Heidelberg University	1	0
Hellenic Ministry of Culture and Sports	1	0
Helmut-Schmidt-University	1	0
IATA CSIC	1	0
IMT	1	0
IMT Atlantique	1	0
INESCTEC	1	0
INFN	1	0
Inland Norway University of Applied Sciences	1	0
INRAE	1	0
Institute for Advanced Studies Vienna	1	0
Institute for Population and Human Studies at the Bulgarian Academy of Sciences	1	0
Institute for Social research	1	0



Institute of Ethnology and Folklore Research, Zagreb, Croatia	1	0
Institute of public finances	1	0
Institute of Science and Technology Austria	1	0
Institute of Social Sciences Ivo Pilar	1	0
International Iberian Nanotechnology Laboratory	1	0
IQOQI Vienna	1	0
Istituto superiore di sanità	1	0
Italian Institute of Technology (IIT)	1	0
Jožef Stefan Institute	3	0
KIT	1	0
Kristianstad university	1	0
KU Leuven	1	0
Kuffner Sternwarte, Wien	1	0
Leibniz Institute for Prevention Research and Epidemiology-BIPS, Bremen	1	0
Leuphana University	1	0
Lithuanian Health Science	1	0
LMU	1	0
Ludwig Maximilian University	1	0
Luiss University	1	0
LUMC	1	0
Lund university	3	0
Malmö University	2	0
Marie Cederschiöld university	1	0
Mary Immaculate College, Limerick	1	0
Max IV Lab	1	0
Max Planck Institute	1	0
Medical University of Graz	1	0
Medical University Vienna	1	0
Moesgaard Museum	1	0
Muséum National d'Histoire Naturelle	1	0
National Research Council of Italy	1	0
NCSR Demokritos and Aristotle University of Thessaloniki	1	0
NLA University College	1	0
Norwegian Institute of Bioeconomy Research	1	0
Odisee Centre for Family Studies	1	0
Oslo New University College	1	0
Oticon a/s	1	0
Padova university	1	0
Polish Academy of Sciences	1	0
Politecnico di Torino	1	0
Pompeu Fabra	1	0



prefer not to tell	1	0
Private	1	0
Public university	1	0
Research, development and education	1	0
Ruhr-University Bochum	1	0
Santa Lucia Foundation Rome	1	0
Sigmund Freud University Vienna	1	0
Slovak Academy of Sciences	1	0
SLU	1	0
Södertörns högskola	1	0
Sofia university	1	0
Sorbonne Université	1	0
Spanish National Research Council (CSIC)	1	0
stanford	1	0
Stockholm Environment Institute	1	0
Stockholm University	1	0
Tampere University	1	0
The University hospital of North norway	1	0
The university of Manchester	1	0
TÜBITAK	1	0
UCAM	1	0
UNED	1	0
Universidad Autonoma de Madrid	1	0
Universidad de Ibagué	1	0
Universidad de Málaga	1	0
Universidad Nacional de Educación a Distancia	1	0
Universidad Nacional de Educación a Distancia (UNED)	1	0
Universidad Rey Juan Carlos	1	0
Universidade Aberta	1	0
Universität Göttingen	1	0
Universität Innsbruck	1	0
Universitat Intenational de Catalunya	1	0
Universität Potsdam	1	0
Université Claude Bernard Lyon 1	1	0
University	1	0
University College London	1	0
University College of Teacher Education	1	0
University of Applied Sciences Wiener Neustadt	1	0
University of Augsburg	1	0
University of Bergamo	1	0
University of Birmingham	1	0
University of Cologne	1	0
University of Copenhagen	1	0
University of Crete	1	0



University of Exeter	1	0
University of Fribourg	1	0
University of Glasgow	1	0
University of Gothenburg	1	0
University of Göttingen	1	0
University of Groningen	1	0
University of Hamburg	1	0
University of Heidelberg	1	0
University of Iceland	1	0
University of Innsbruck	2	0
University of Konstanz	2	0
University of Leicester	1	0
University of Oulu	1	0
University of Palermo	1	0
University of Perugia	1	0
University of Pisa	1	0
University of Rome Tor Vergata	1	0
University of Salzburg	1	0
University of Siena	1	0
University of South Bohemia	1	0
University of South Eastern Norway	1	0
University of Southern Denmark	1	0
University of Stuttgart	1	0
University of Tartu	1	0
University of Trento	1	0
University of Trieste	2	0
University of Tuscia	1	0
University of Urbino	1	0
University of Vaasa	1	0
University Osnabrück	1	0
University Magna Graecia Catanzaro	1	0
VIB	1	0
VRIJE UNIVERSITEIT BRUSSEL	1	0
World Health Organisation	1	0
ZRC SAZU, Research Centre of the Slovenian Academy of Sciences and Arts	1	0



Appendix III: Data fiches for Secondary data

Table 13: Intramural R&D expenditure (GERD) as a percentage of GDP in all sectors

Metric/indicator	2.1.1.2 Intramural R&D expenditure (GERD) as a percentage of GDP in all sectors [rd_e_gerdtot]
Source	Eurostat
Source website and metadata	https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en https://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm
Source methodology	Member state gross domestic expenditure on research and development (GERD) divided by member state gross domestic product (GDP). GERD/GDP = Intramural R&D expenditure as a percentage of GDP
Coverage	EU27, EU28 (2005-2020) & NO
Data Missing	No missing data
Flagged observations	Break in time series: DK (2007); EL (2008); FR (2010); IT (2016); LU (2012); NL (2011, 2012); PT (2008); RO (2011); SI (2008, 2011); SE (2005); UK (2011) Estimated: IE (2009-2013, 2018, 2020); EL (2006-2010); AT (2005, 2008, 2010, 2012, 2014, 2020); PT (2006); SE (2006, 2008, 2010, 2012, 2013, 2014); UK (2008-2010, 2012, 2014, 2016); BE (2018, 2020), LU (2020), DE (2020) Other: DK (2019); FR (2015, 2017, 2018); SE (2016); UK (2017, 2019)
Data comments	
Description	Current expenditures plus gross fixed expenditure for R&D performed in a country as a percentage of GDP
Extraction date	26-11-2021
Unit	Percentage of GDP
Name in MoRRI	Not included in MoRRI
Important definitions	Intramural R&D expenditures are all current expenditures plus gross fixed expenditure for R&D performed within a statistical unit during a specific period, whatever the source of funds." (§ 4.10, Frascati Manual, OECD 2015).



Table 14: Intramural R&D expenditure (GERD) per inhabitant in all sectors

Metric/indicator	2.1.1.1 Intramural R&D expenditure (GERD) per inhabitant in all sectors [rd_e_gerdtot]
Source	Eurostat
Source website and metadata	https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en https://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm
Source methodology	Member state gross domestic expenditure on research and development (GERD) divided by number of member state inhabitants (I). Intramural R&D expenditure is adjusted for inflation, fixed on 2015 GERD/I = Intramural R&D expenditure per inhabitant
Coverage	EU27, EU28 (2020-2020) & NO
Data Missing	No missing data
Flagged observations	Break in time series: DK (2007); EL (2008); FR (2010); IT (2016); LU (2012); NL (2011, 2012); PT (2008); RO (2011); SI (2008, 2011); SE (2005); UK (2011); HU (2018) Estimated: IE (2009-2013, 2018); EL (2006-2010); AT (2005, 2008, 2010, 2012, 2014, 2018, 2020); PT (2006); SE (2006, 2008, 2010, 2012, 2013, 2014); UK (2008-2010, 2012, 2014, 2016); BE (2020); DE (2020); LU (2020), Other: DK (2019); FR (2015, 2017, 2018); SE (2016); UK (2019)
Data comments	
Description	Current expenditures plus gross fixed expenditure for R&D performed in a country per inhabitant.
Extraction date	26-11-2021
Unit	Euro per inhabitant
Name in MoRRI	Not included in MoRRI
Important definitions	Intramural R&D expenditures are all current expenditures plus gross fixed expenditure for R&D performed within a statistical unit during a specific period, whatever the source of funds." (§ 4.10, Frascati Manual, OECD 2015).

Table 15: Share of female researchers by sectors of performance, all sectors

Metric/indicator	Share of female researchers by sectors of performance, all sectors [rd_p_femres]
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Source	Eurostat
Source website and metadata	https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_femres&lang=en https://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm
Source methodology	At national level R&D data are compiled by the national statistical authorities: National Statistical Offices, Research Councils and Ministries. The data are collected through sample or census surveys, from administrative registers or through a combination of sources.
Coverage	EU27, EU28 (2005-2020) & NO
Data Missing	2005 (AT); 2006 (DK, DE, EL, LU, NL, SE, UK, NO); 2007 (EL); 2008 (AT, DK, DE, EL, LU, NE, SE, UK); 2009 (EL); 2010 (AT, DE, EL, LU, NE, SE); 2012 (AT, BE, LU, SE); 2014 (AT, BE, DK, DE, EL, EI, LT, LU, SE); 2015 (FR); 2016 (AT, BE, DK, DE, EL, IE, LU, SE); 2018 (AT, BE, DK, FR, DE; EL, IE, LU, SU, EU27, EU28) ; 2019 (FR, UK, EU28); 2020 (AT, BE, DE, DK, FR, IE, LU, SE, UK, EU27, EU28)
Flagged observations	Break in time series: 2005 (SE); 2007 (DK, SE); 2008 (PO, SI); 2009 (SE); 2010 (FR); 2011 (EL, NL, RO, SI); 2012 (NL); 2013 (PO, SE); 2014 (FR); 2016 (IT); 2018 (HU) Estimated: 2005 (EU28, EU27, SE, UK); 2006 (PT); 2007 (EU28, EU27, LU, SE, UK); 2009 (EU28, EU27, SE, UK); 2010 (EU28, DK, IE, FR, UK); 2011 (FR, UK); 2012 (EU28, FR, UK); 2013 (FR, SE); 2014 (FR, UK); 2015 (EU28, EU27, SE); 2016 (SE); 2017 (EU28), 2018 (UK), 2019 (EU28, EU27) Other: FR (2007, 2008, 2009, 2017); SE (2005); DK (2017, 2019)
Data comments	Also reported in She Figures on the basis of Eurostat data
Description	The indicator provides an aggregate measure of how the labour market participation of women researchers is developing over time in the member states.
Extraction date	29.11.21
Unit	Percentage based on head count (HC)
Name in MoRRI	GE2.1
Important definitions	"Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture and society - and to devise new applications of available knowledge." (§ 2.5, Frascati Manual, OECD 2015). "Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned." (§5.35, Frascati Manual, OECD 2015)

Table 16: Share of female researchers by sectors of performance, Business enterprise sector

Metric/indicator	Share of female researchers by sectors of performance, Business enterprise sector [rd_p_femres]
Source	Eurostat



Source website and metadata	https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_femres&lang=en https://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm
Source methodology	At national level R&D data are compiled by the national statistical authorities: National Statistical Offices, Research Councils and Ministries. The data are collected through sample or census surveys, from administrative registers or through a combination of sources.
Coverage	EU27, EU28 (2005-2020) & NO
Data Missing	2005 (AT); 2006 (DK, DE, EL, LU, NE, SE); 2008 (DK, DE, LU, NE, AT, SE); 2009 (EL); 2010 (DE, EL, LU, NL, AT, SE), 2012 (BE, DE, IE, EL, LU, SE); 2014 (BE, DK, DE, IE, EL, LT, LU, AT, SE); 2015 (FR); 2016 (BE, DK, DE, LU, AT, SE); 2018 (AT, BE, DK, EU27, EU28, FR, DE, EL, IE, LU, SE); 2019 (UK, DE, EU27, EU28), 2020 (AT, BE, DK, DE, FR, IE, LU, SE, UK)
Flagged observations	Break in time series: 2005 (SE); 2006 (FR); 2007 (DK, SE); 2008 (SI); 2011 (EL, NL, RO, SI); 2012 (NL); 2013 (PO, SE, NL); 2016 (IT); 2018 (LU) Estimated: EU28 (2005, 2009, 2010, 2012, 2015, 2017); EU27 (2005, 2009, 2015, 2019); DK (2010); IE (2010); LU (2007); PO (2006); UK (2005-2009) Other: NO (2007-2014); DK (2017, 2019); FR (2017)
Data comments	Also reported in She-figures on the basis of Eurostat data
Description	The indicator provides an aggregate measure of how the labour market participation of women researchers is developing over time in the member states.
Extraction date	29.11.21
Unit	Percentage based on head count (HC)
Name in MoRRI	GE2.2
Important definitions	"Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture and society - and to devise new applications of available knowledge." (§ 2.5, Frascati Manual, OECD 2015). "Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned." (§5.35, Frascati Manual, OECD 2015)

Table 17: Share of female researchers by sectors of performance, Higher education sector

Metric/indicator	Share of female researchers by sectors of performance, Higher education sector [rd_p_femres]
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Source	Eurostat
Source website and metadata	https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_femres&lang=en https://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm
Source methodology	At national level R&D data are compiled by the national statistical authorities: National Statistical Offices, Research Councils and Ministries. The data are collected through sample or census surveys, from administrative registers or through a combination of sources.
Coverage	EU27, EU28 (2005-2020) & NO
Data Missing	Data missing: DK (08, 20); BE(20); EL (06, 07, 08, 09, 10, 14, 16, 18, 20); FR (15, 18, 19, 20); IE(18, 20); LU (14, 16, 18, 20); AT (05, 08, 10, 12, 14, 16, 18, 20); SE (06, 08, 10, 12, 14, 16, 18, 20); UK (06, 08, 18, 19, 20); EU28 (06, 08, 19, 20)
Flagged observations	Break in time series: DK (2007); EL (2011); FR (2014); IT (2005); PO (2008, 2013), RO (2011); SI (2011); SE (2015); HU (2018) Estimated: EU28 (2005, 2007, 2009, 2010, 2012, 2014, 2015, 2016, 2017, 2018); EU27 (2005-2010, 2012, 2014, 2015, 2016, 2018, 2019, 2020); IR (2007, 2011); FR (2010-2014); IT (2015-2020); LU (2007); PO (2006); UK (2008, 2010, 2012, 2014-2018), Other: DK (2017, 2019), FR (2017)
Data comments	Also reported in She-figures on the basis of Eurostat data
Description	The indicator provides an aggregate measure of how the labour market participation of women researchers is developing over time in the member states.
Extraction date	29.11.21
Unit	Percentage based on head count (HC)
Name in MoRRI	GE2.4
Important definitions	"Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture and society - and to devise new applications of available knowledge." (§ 2.5, Frascati Manual, OECD 2015). "Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned." (§5.35, Frascati Manual, OECD 2015)

Table 18: Share of female researchers by sectors of performance, Government sector

Metric/indicator	Share of female researchers by sectors of performance, Government sector [rd_p_femres]
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Source	Eurostat
Source website and metadata	https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_femres&lang=en https://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm
Source methodology	At national level R&D data are compiled by the national statistical authorities: National Statistical Offices, Research Councils and Ministries. The data are collected through sample or census surveys, from administrative registers or through a combination of sources.
Coverage	EU27, EU28 (2005-2020) & NO
Data Missing	Data missing: AT (05, 08, 10, 12, 14, 16, 18, 20); BE(20); DK (08, 20); EL (06-10, 12, 14, 16, 18); FR (15, 18, 19, 20); IE (16, 18, 20); LU (08, 14, 16, 18, 20); NO (06); SE (06, 08, 10, 12, 14, 16, 18, 20); UK (17, 19, 20); EU28(18, 19, 20)
Flagged observations	Break in time series: BE (2012); DK (2007); DE (2014); EL(2011); FR (2010); NL (2012); PO (2013); RO (2011); SI(2011); SE (2005, 2007, 2011, 2013); Estimated: EU28 (2005-2010, 2012, 2014-2016, 2018-2019); EU27 (2005-2010, 2012, 2014-2016, 2018, 2019); FR(2011-2014); SE (2005, 2007, 2009, 2011, 2013, 2015, 2019) Other: DK (2019), DE (2015-2019); FR (2005-2009, 2017); HR (2012-2019); NL (2005-2019); SK (2005-2014); NO (2005, 2007-2009)
Data comments	Also reported in She-figures on the basis of Eurostat data
Description	The indicator provides an aggregate measure of how the labour market participation of women researchers is developing over time in the member states.
Extraction date	29.11.21
Unit	Percentage based on head count (HC)
Name in MoRRI	GE2.3
Important definitions	"Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture and society - and to devise new applications of available knowledge." (§ 2.5, Frascati Manual, OECD 2015)."Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned." (§5.35, Frascati Manual, OECD 2015)



SUPER MoRRI

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