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

D5.4 Analytical synthesis report of experimental cases

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List of Acronyms and Abbreviations

Acronyms/Abbreviations	Definition
CCN-RFO	Country Correspondent Network-Research Funding Organisations' support for open and responsible research and innovation
CCN-RPO	Country Correspondent Network-RRI in European Research Performing Organisations
CSO	Civil Society Organisation
GE	Gender Equality
ORRI	Open Responsible Research and Innovation
OS	Open Science
PE	Public Engagement
R&I	Research & Innovation
REI	Research Ethics and Integrity
RFO	Research Funding Organisations
RPO	Research Performing Organisations
RRI	Responsible Research and Innovation
SSH	Social Science and Humanities



1. Introduction

D5.4 “contains the results of Task 5.4 and includes a synthesis narrative across the full set of case studies implemented in WP 5” (European Commission 2018: 25). The previous Deliverables of WP 5 of the SUPER MoRRI project introduced the case study program (Wicher et al. 2021), the patterns report (Woolley et al. 2023) as well as the pathway report (Griessler et al. 2023). The case studies presented in these Deliverables are interesting as standalone outputs, this deliverable, however, sets out to organize a synthesis across all cases, analyses emerging cross cutting themes from pathways and patterns studies, taking on board results from WP 2 of the SUPER MoRRI project. The synthesis is mainly based on a narrative approach and informs a policy brief (D5.5) about the benefits of RRI.

This Deliverable commences by outlining the six case studies and continues with a comparative analysis of the cases, focusing on different elements of pathways to Open Responsible Research and Innovation (ORRI). The Deliverable continues with synthesizing the main findings of WP 2 (Ryan et al. 2023), which included central parts of the empirical programme of SUPER MoRRI, i.e., the researchers survey, the survey on Research Funding Organizations’ support for ORRI (CCN-RFO study), the survey on RRI in European Research Performing Organizations (CCN-RPO study).

The purpose of the survey on researchers was to “examine European researchers’ responsible research practices and their perceptions of, and attitudes towards, open and responsible research and innovation”. The survey addressed ca. 127,000 researchers in 29 European countries at 122 higher education institutions, mainly universities. For detailed information about sampling, sample and methods see Ryan et al. (2023: 11 ff.).

The CCN-RPO study had the objective “to examine in greater detail how RPOs work to support the five dimensions of open and responsible research and innovation” (Ryan et al. 2023: 31). It studied in 122 higher education institutions, mainly universities, „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” (ibid.). For detailed information about sample, sampling and methods see Ryan et al. (2022).

The CCN-RFO objectives were to examine mechanisms in place in European RFOs to enhance responsibility in research and innovation. Relevant mechanisms under study were (1) priority setting for research funding; (2) development of funding instruments and design; (3) assessment of grant proposals both for research and design. The study covered 55 RFOs¹ in 27 European countries. For detailed information about sample, sampling and methods see Ryan et al. (2023: 59 ff.).

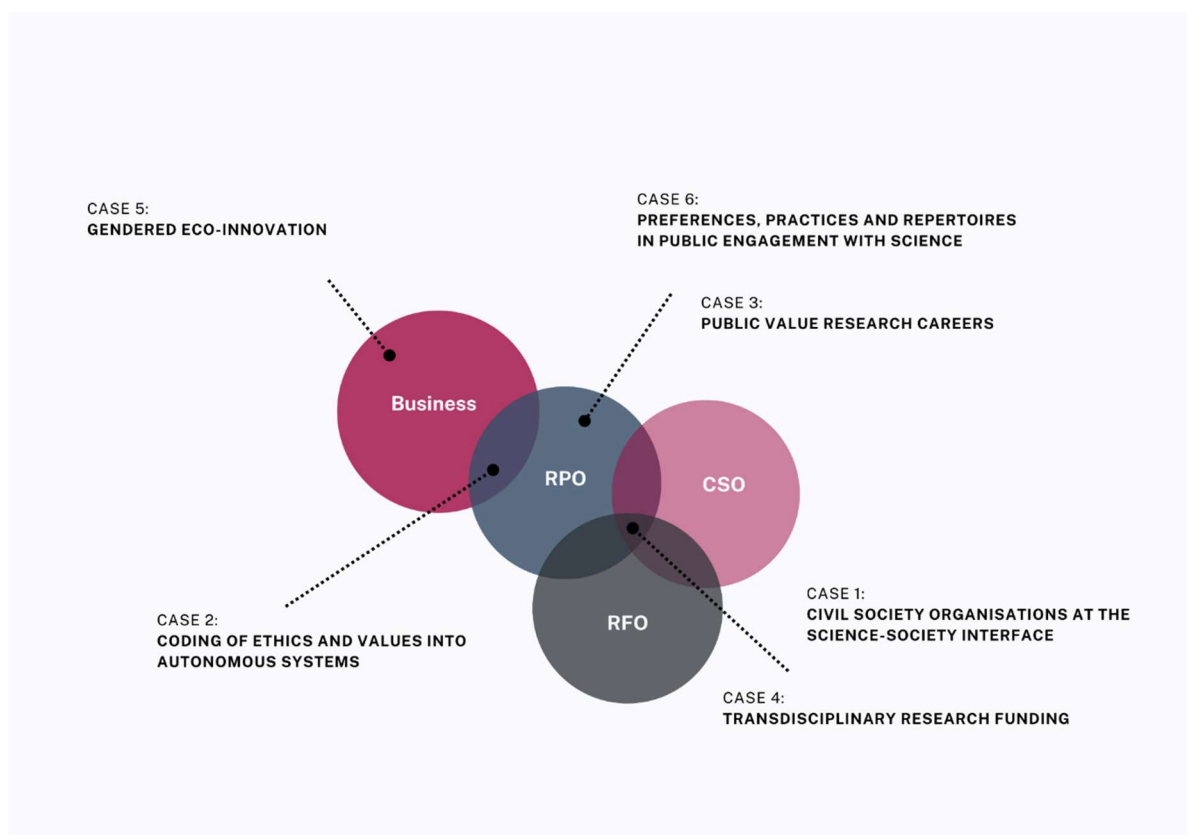
The Deliverable ends with an assessment of the potential benefits identified in the case studies.

¹ The sample included research councils, private foundations, delegated state agencies, departmental RFO, public foundations, independent delegated state agencies, innovation agencies and others (Ryan et al. 2023: 60).

2. Overview on cases

Before entering comparative analysis, this section will briefly recapitulate the six SUPER MoRRI case studies. As depicted in Figure 1, they involve different actors in the research and innovation system such as businesses, research performing organisations (RPOs), research funding organisations (RFOs), and civil society organisations (CSOs). The case studies are either situated in one of these actors or at the intersection of several actors.

Figure 1: Overview of actors involved in SUPER MoRRI cases



Source: SUPER MoRRI

As Figure 1 shows, some case studies are situated within a single kind of institution: Case 3, “Public Value Research Career”, focuses on RPOs and studies the interrelation between practices of Open and Responsible Research and Innovation (ORRI) and research careers. Case 5, “Gendered eco innovation” is located in business/industry and addresses the question of how gender equality and innovation activities correlate. Case 6, “Alignment of preferences, practices, and repertoires in public engagement with science” is situated in RPOs and asks how personal preferences and institutional support for Public Engagement activities are connected.



Case 2, “Coding of ethics and values into autonomous systems” is situated at the intersection of two kinds of actors, RPOs and business/industry. The case addresses issues of strong interdisciplinarity when ethicists and engineers try to cooperate.

Two case studies are at the intersection of three kinds of actors. Case 1, “CSOs at Science-Society interfaces” studies the effects on CSOs when they engage with RPOs in research and, therefore, also get into contact with RFOs. Case 4, “Transdisciplinary research (funding)” deals with RFOs, who want to activate RPOs to address societal needs more strongly, in this case climate change, and to engage with the public.

The following section recapitulates the individual cases and their main stories in six graphs. The graphs outline the theory of change (Vogel 2012) of each case, i.e., how ORRI practices are theorized to make a difference. The graph also indicates steps on the pathway towards this change. Finally, the graphs indicate potential societal, scientific, economic, and democratic benefits as identified in the cases.



CIVIL SOCIETY ORGANISATIONS AT THE SCIENCE-SOCIETY INTERFACE

A case based upon ethnographic observation, document analysis, and interviews to explore the experiences that CSOs have with research funding calls.

RFOs often launch calls for the broader inclusion of CSOs within the R&I system to interlink science and society more closely. In the case, the RRI value of Public Engagement with science is the focal point, where the assumption is that CSOs represent, to some extent, relevant „publics‘ within science-society relationships.

The case was carried out in The Netherlands, focusing on relatively small organisations that work on issues of sustainability, climate change, and climate justice. The results paint a complicated and tense relationship between the selected CSOs and the research and innovation system.

THEORY OF CHANGE

The input of civil society in the research process can result in the production of alternative forms of knowledge which would otherwise be unlikely to be developed

PATHWAYS

Lack of awareness of CSOs for funding opportunities	CSOs with ample resources benefit from economies of scale	Initial advantage for already existing networks	Definition of meaningful research questions is possible
Research might deter CSOs from their core mission	Conflicting cultures of CSO and RFOs	Little alignment of goals of RPOs and CSOs	Sometimes narrow or tokenist involvement of CSOs

POTENTIAL RRI BENEFITS

Potential societal benefit

- Relationships between RRI community and CSOs established

Potential democratic benefit

- Increased inclusion and recognition of citizens competencies
- Reduction of barriers to diversity (individuals and organisations) in participation



CODING OF ETHICS AND VALUES INTO AUTONOMOUS SYSTEMS

carried out by **University of Bergen**

A case based upon mapping of actors and networks, secondary data and interviews.

Consideration of issues around ethics and integrity is imperative for democratic and social values. Bolstering research and innovation with ethical practices helps to prioritize the ethical implications of research and innovation whilst technological systems are becoming increasingly 'intelligent'. As a result, society is concerned about impacts such as automation at work, social sorting, algorithmic bias, power imbalances and justice, election manipulation, and privacy issues. In response, there has been a flourishing of ethical reports, analyses, and meta-analyses of the 'ethics of AI'.

In the case, we have identified a turn towards design-based regulation that relocates the ethical issues presented by AI from government, legal and regulatory spaces to inside the technologies and infrastructures themselves. As a result, questions about rights and values become design and engineering questions and different groups answer these questions in different ways. We found five unique but sometimes overlapping and co-existing ways that ethical issues around AI being addressed in policy, governance and research communities.

THEORY OF CHANGE

Bolstering a research and innovation system with ethical practices will generate research outputs that prioritize consideration of the ethical implications of research and innovation.

PATHWAYS

ETHICS RULES	ENGINEERS IN DRIVER'S SEAT	EDUCATING ENGINEERS	EDUCATING THE STAKEHOLDERS	AI TRANSFORMATION?
Primarily normative problem should be settled outside of AI design	Remaining within usual ethical approaches	It takes years to create standards for AI	AI is hard to regulate given the ubiquitousness of data	Strong AI taking over
Problem is considered largely based on discipline	Adding ethics to AI as an additional category	Problem is largely considered based on discipline	Multitude of relevant stakeholders	Weak AI supporting humans
It is unclear, how solutions will be translated into material and technological practice.	Is the highly formalized language needed for machine readability compatible with the complexity and situatedness of "real world"?	Who is teaching ethics? "Ivory tower" ethicists or lay people trained in ethics?		

POTENTIAL RRI BENEFITS

Potential societal benefit

- R&I system adopts and conforms to ethical standards, producing products that are more in line with people's values and expectations
- Introducing moral and ethical deliberation into the very process of designing and building an artefact/technology

Potential economic benefit

- Production of an advantage for the internal market as customers will want product/solutions that are in line with fundamental values.



PUBLIC VALUE RESEARCH CAREERS

A case based upon qualitative content analysis, interviews, and survey (RESU) data.

It is based on the idea that contributions to open and responsible research practices and cultures contribute to the furthering of what Bozeman and Sarewitz (2011) called the 'public values' that are considered important in a society. From a career perspective, it is assumed that an individual researcher's capacities and opportunities to contribute to different public values will vary across the course of their career. Key responsibilities and the configuration of occupational roles sets (research, teaching, administration, third mission) vary as the succeeding stages of the research career unfold. Researchers' contributions to the institutionalisation of open and responsible research and innovation in their lab or group, scientific community, and organisation need to be viewed through the lens of this career stage perspective. Public value research careers thus refer to this intersection between the take-up of open and responsible research and innovation, researchers' career trajectories and how these practices contribute to public values. Using the RESU data this study investigated how patterns of practices and motivations associated with open and responsible research and innovation are affected by career stage.

THEORY OF CHANGE

Research organisations should be more open to Public Engagement as a means of maintaining and enriching public values such as privacy, open science practices, safety, efficiency, equality, fairness and legitimacy (and) (...) thus serve as, or contribute towards pathways towards benefits

PATHWAYS

New roles emerge in the research profession that buffer epistemically necessary work, but are not recognized in research careers

Career level is a factor in researchers' public engagement activities

Cooperation with stakeholders rise as research careers advance

There are consistently higher levels of engagement when comparing advanced stage researchers

POTENTIAL RRI BENEFITS

Potential societal benefit

- Diffusion of research results stimulates social innovation and situated problem-solving

Potential democratic benefit

- Diffusion of good practices promoting change in R&I projects and organisations

Potential scientific benefit

- Improved transparency, integrity, and reproducibility of research – scientific benefit

Potential economic benefit

- Exploitation of shared research data (OS) stimulates creativity and innovation, facilitates more efficient use of resources



TRANSDISCIPLINARY RESEARCH FUNDING

A case based upon qualitative content analysis, interviews, and a focus group.

As climate change action requires participation from multiple actors across different sectors in society, so does the research that can help drive this action. That is the main aim of the pan-European Joint Programming Initiative (JPI) "Connecting Climate Knowledge for Europe". This case studied explored how one of the program lines, SOLSTICE: Enabling Societal Transformation in the Face of Climate Change, designed and implemented a funding program targeting Social Science and Humanities (SSH) fields on the topic of climate change.

The aim was to provide opportunity for transformational research with societally relevant knowledge that is co-created with stakeholders in the project context. With close collaboration with societal stakeholders, project results are more likely to be taken up and used beyond the research community and ultimately contribute towards actionable in the face of climate change.

THEORY OF CHANGE

Participation of multiple actors in research projects should lead to transformative research outcomes regarding climate crises. European researchers engage in Public Engagement as communication and engage stakeholders in transdisciplinary project designs.

PATHWAYS



POTENTIAL RRI BENEFITS

Potential societal benefit

- Greater inclusion of stakeholders into research process will produce stronger project outputs with higher potential to link (transformative) societal outcomes
- Transformation driven research led by SSH researcher will produce innovative research with higher impact for (transformative) change, e.g., fighting climate change

Potential democratic benefit

- Closer alignment with local community members will lead to empowerment of citizens in the face of climate change



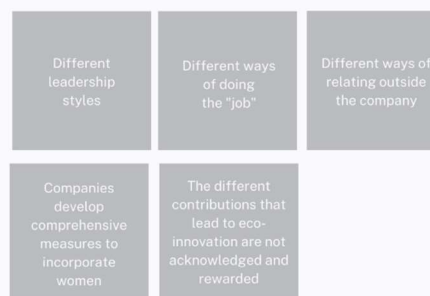
GENDERED ECO-INNOVATION

A case based upon patent data analysis; qualitative content analysis, and interviews. There are connections between eco-innovation in organizations and women's presence in diverse teams. Interviews conducted in Spain and Germany show that most participants see women making a difference in more horizontal leadership styles, for example, through environmental consciousness and greater emphasis on the value of the project beyond personal credit. In addition, women in mid-level positions, such as leading innovation departments, can lead to more eco-innovation. Generally, the presence of women is very scarce, especially in top positions. We found that little to no reward exists for differential contributions to eco-innovation. Profit drives green innovation in the Spanish firms, with no engagement with social issues as indicated by a lack of equality measures. In Germany, women in research teams have contradictory feelings about the quotas promoted by funders because they are not sure if their non-gender-related capacities are really acknowledged. However, we found promising paths for new research into how women tend to be more collaborative with external stakeholders and how being more communicative may influence their male colleagues toward this direction. We recommend that future innovation policies dedicate more effort into the gendering of top and mid-management positions and organizational cultures.

THEORY OF CHANGE

Gender diversity positively influences the emergence of eco-innovations

PATHWAYS



POTENTIAL RRI BENEFITS

Intrinsic democratic value

- Gender equality

Democratic benefit

- More representation of diverse perspectives

Scientific and economic benefit

- Inclusion of women in research design & development improves quality of scientific outputs

Societal and economic benefit

- Openness of companies towards societal needs and challenges through women leadership



PREFERENCES, PRACTICES AND REPERTOIRES IN PUBLIC ENGAGEMENT WITH SCIENCE

A case based upon Eurobarometer, RPO and researcher survey datasets. Many projects have explored how organizational changes can drive RRI principles within research institutions. However, a crucial question remains: Can organizational policies genuinely influence researchers' practices? In this study, we narrow our focus to public engagement, one of the key elements of RRI promoted by the European Commission. Public engagement seeks to involve non-experts, such as citizens, consumers, and patient groups, in research processes, fostering responsiveness and inclusivity. We investigate whether researchers are more likely to engage the public when their organizations emphasize, incentivize, and support public engagement. Our study relies on two data collection methods: a document study of 120 European research performing organizations (RPOs) and a survey of 4,108 researchers from these institutions (RESU). The document study evaluates the public engagement policies and mechanisms within RPOs, while the survey collects self-reported data on researchers' public engagement in their recent projects.

THEORY OF CHANGE

Promotion of engagement practices by institutional support from research organisations impacts on researchers' individual public engagement practices

PATHWAYS

Many European researchers engage in PE as communication

PE does often not entail deeper participation of actors outside research and innovation

Intrinsic motivation plays a crucial role whether to do PE or not

Epistemological relationship to PE and historical trends of PE differ between disciplines

Amount of PE activities do not necessarily correlate with institutional policies

POTENTIAL RRI BENEFITS

Potential democratic benefit

- Inclusion of citizens' perspective in R&I policy making
- Diffusion of good practices promoting change in R&I projects and organisations



3. Pathway towards Open and Responsible Research and Innovation (ORRI)

Instead of using the terms “implementation” and “implementation problems” this report adopts the suggestion from Völker et al. (2023: 14ff.) and applies the term “translation” when discussing the pathways and patterns of ORRI practices to understand how RRI enters and arrives in a „particular institutional-organisational setting” (ibid.: 25). The lens of “translation” offers a wider outlook on the outcomes and potential benefits of ORRI practices, in that it takes into account that such practices may lead to other outcomes than the ones originally planned or desired.

The individual cases of WP 5 focus on different aspects of ORRI, i.e., public engagement (Cases 1, 3, and 6), gender-equality (Case 5), ethics in research and innovation (Case 2) or inter- and transdisciplinary research (Case 4). In these cases, translation takes many forms. Often, translation simply starts with bringing together previously unrelated actors who were either not at all or very loosely connected before and motivating them to collaborate. This includes concepts such as inter-disciplinarity (Case 2) or transdisciplinary research (Cases 3 and 6). Attempts to motivate a change of organizational or individual practices is another form of translation that can be observed in the cases.

During these translations which happen along the pathway towards ORRI, several shared themes can be observed:

1. the significance of culture
2. the role of the organisation
3. the importance of resources and capacities
4. the challenges of interdisciplinarity
5. the additional challenge of transdisciplinarity
6. the theme of inequality

The following section will elaborate on these themes.

3.1. The significance of cultures

Existing organizational or disciplinary cultures are key to translating research practices into ORRI practices. During translation, existing organisational or disciplinary cultures might get into conflict with new collaborations, roles and requirements.

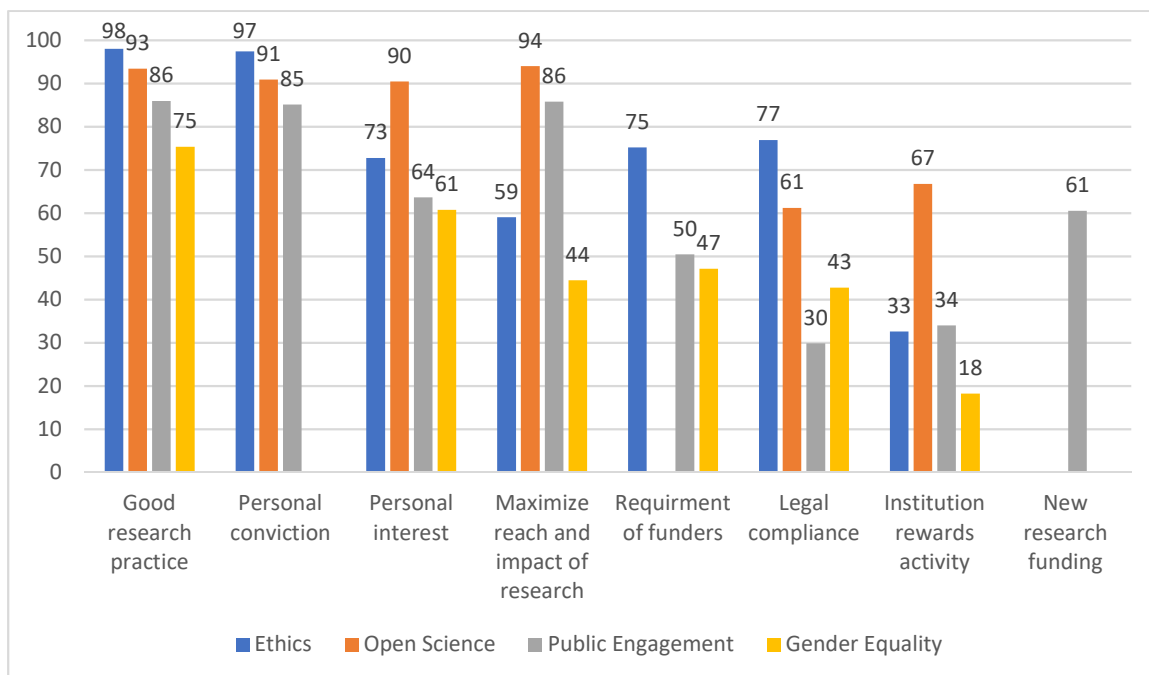
Case 1 highlights the different roles and cultures of CSOs, RPOs and RFOs. It shows that collaboration between these three different types of organizations might generate tensions within and between them which again might impede cooperation.

Case 3 shows how the new expectation and requirement that researchers should engage with the public are countered by RFOs with the creation of new roles. These, however, do not carry the same prestige as the core function of research and are delegated to other staff. In this way, researchers and RPOs shield their core function of research from work that is considered less important.

In Case 4 culture is expressed as differences in leadership styles, ways of “doing the job” and “relating outside the company”. Female researchers and engineers interviewed, differ from their male colleagues in how they deal with these issues, however, these differences are not recognized and credited within the organization.

In Case 6 culture appears as the way how researchers perceive public engagement as part of their job. The case shows that intrinsic motivation, which is embedded in organizational and disciplinary cultures, makes a difference in whether and to what extent researchers engage with the public. Many European researchers engage with the public in science communication. However, often public engagement does not entail deeper participation of actors outside research and innovation. In the researchers’ survey (Ryan et al. 2023) the notion of culture emerges as argument for why researchers adopted certain RRI related practices (Figure 2).

Figure 2: Researchers’ motivation to adopt RRI practices.



Source: Ryan et al. 2023, own compilation

Figure 2 shows that 98% of the responding researchers agreed either “strongly” or “rather” to adopt ethical research practices because they see it as part of good research practice. This share was 93% in Open Science and 86% for public engagement. The argument that gender equality is part of good research practices is used by three quarters of the respondents.



3.2. The role of organization

The case studies show the importance of existing arrangements, core missions and routines of organizations for the adoption of ORRI. New ORRI practices might affect and will be affected by these existing elements of organizations. They might be hard to change and might further or impede ORRI practices. Organizational structures, practices and norms might get decoupled from ORRI practices of individuals.

In Case 1, transdisciplinary cooperation is hindered when CSOs feel that their involvement in research projects takes them away from their core mission. In this case study, interviewees from CSOs report that funding requirements and processes are too tedious and distract them from their actual work. For RFOs, on the other hand, it might be hard to cooperate with CSOs and leave behind routines of research funding they had developed for a long time for RPOs and to accommodate them to the structures, capacities and needs of CSOs. RFOs funding activities often involve only RPOs, a type of organization which in recent years has had to adjust to accountability requirements. CSOs, in contrast, are often not set up, and do not have the financial and/or staff-resources as well as the know-how to comply with the accountability requirements of RFOs and public management. The question of organization is relevant when it comes to the importance of established routines. RFOs have existing funding programmes with set eligibility criteria as well as routines of how to create and organize calls, carry out evaluation processes, and define reporting requirements and timelines. RFOs might find it difficult, as the case shows, to change these routines for CSOs and inter- and transdisciplinary research.

In Case 4 on gender equality and innovation, decoupling between individual and organizational rules and practices can be observed. The case indicates that although routines to promote gender equality exist within companies, the firms do not reward the contributions of women that lead to eco-innovation.

Inertia and decoupling of institutional routines and supporting structure and of what happens in an organization also shows in case 6. The case indicates that institutional policies towards public engagement activities do not necessarily correlate with the actual amount of public engagement activities of researchers.

3.3. The importance of capacities

The notion of capacity means whether organizations have the capabilities and knowledge necessary for ORRI. Capacities play a decisive role in several case studies: In case 1 the question of capacities includes the trivia of whether CSOs know about opportunities to get research funding. In case 5 capacities are important because it shows that some RPOs who received funding for engaging the public in their research did not exactly know how public engagement could be implemented in practice. For RFOs, lack of capabilities meant that they had difficulties changing their funding requirements and practices that were mainly geared towards the support of natural and engineering sciences. However, the funder was unfamiliar with SSH, climate change-, and transdisciplinary research and how to fund these topics.



3.4. The challenges of interdisciplinarity

Interdisciplinarity along with public engagement appears to be one of the panaceas of ORRI in several case studies. However, the cases show that interdisciplinary research in practice is not that straightforward at all and is not easily achieved, a finding that is well supported in also in previous research (Rommetveit et al. 2019).

In Case 2 the cooperation between engineers and ethicists is “the” solution proposed to achieve “ethical AI”. However, the case indicates that the challenges of collaboration between different disciplines often remain unresolved. As a consequence, partners stay in the realms of their individual disciplines and cannot reap the potential fruits of cooperation. This problem surfaces in the “Ethics and AI” case in the question of who leads the cooperation (“ethics rules” versus “engineers in the driver seat”) or the disciplinary and theoretical orientation when addressing a problem. Another example of difficulties in cooperation from case 2 is the question, of who is going to train stakeholders and engineers - “Ivory tower” ethicists or lay people trained in ethics. The dominance of one discipline might solve the problem during the research project, but the problems might again surface when it comes to the application of AI in “the real world”. In the case of the dominance of ethicists, it is unclear how the solution might be translated into material and technological practice. In the case of domination of engineers, the question remains how is a highly formalized language that is needed for machine readability compatible with the complexity and situatedness of the “real world”. Challenges of interdisciplinarity also exist in the “Transdisciplinary research (funding)” case where interdisciplinary research has fallen short of expectations and research in most cases remained “soft interdisciplinarity” as collaboration within but not beyond the domain of SSH.

3.5. The additional challenge of transdisciplinarity

Adding stakeholders, CSOs and/or publics to research adds another level of complexity. Transdisciplinarity is not only about whether researchers from different disciplines can develop a shared research question, understanding, language, and method – tasks, which as we have seen, are not so easy. Now stakeholders enter the field who have different training and interests than researchers. On a positive note, Case 1 shows that transdisciplinary teams can define meaningful research questions, but the risk of little alignment between the goals of RPOs and of CSOs remains, the latter also having an explicit political goal. Like interdisciplinary research, transdisciplinarity runs the risk of remaining tokenistic if there is little involvement of CSOs in actual research. The difficulties of transdisciplinary research in terms of decoupling the worlds of research, stakeholders and the public(s) are also shown in Case 5 when researchers have difficulties imagining and defining the societal impact of their work because this is not in line with their self-perception as researchers.



3.6. Inequality

Existing resources, both in terms of finances, staff, know-how, and the lack of them are critical factors on the pathway towards ORRI. Inequality between and within different actors emerges in many cases. They concern capacities, resources, know how, networks and network access, but also who is going to take on roles necessary in ORRI (e.g., in public engagement) at what career stage. Case 1 indicates strong path-dependency in which attempts towards ORRI favour big, well-established and -connected CSOs over newcomers when it comes to responding to transdisciplinary calls, getting funding and cooperating with RFOs. In addition, larger CSOs with ample resources benefit from economies of scale.

3.1. Analytical validation from the Ecosystem

Beyond the case studies, SUPER MoRRI planned to engage with partners working in RRI as well, the so-called Science with and for Society (SWaFS)–Ecosystem (Holtrop et al. 2024)). The many actors who were working in this SwafS-funded RRI environment generated a wealth of information and tacit knowledge (meaning the many contexts that cannot be made visible) related to co-creation, responsibility, (citizen) engagement, and all other RRI keys as conceptualized by the European Commission such as gender equality, ethics, open science, and science education.

It is eye-opening to learn how complex the evaluation of the SwafS-projects turns out to be in practice when trying to assess pilot experimentations conducted within a project! An important lesson is to consider the nuances of co-creation, stakeholder participation or transnational learning. One size doesn't fit all, and diversity cannot be grasped solely by focusing on long and complex surveys, or short and sweet open questions, checking boxes, using alternate responses, or scaling the feedback (Völker et al. 2023).

Further discussions elaborated further on differences (in viewpoints, capabilities, or objectives) between stakeholders. Without difference, there would be no benefit of including new participants, and limited opportunity to learn from each other, or benefit from each other's ways. In this respect, differences should be celebrated and actively searched for. On the other hand, differences can also make it more difficult to learn from each other, e.g., in the case of cognitive and language differences. In the case of quadruple helix stakeholder encounters, cultural differences across the actors' social worlds are crucial to acknowledge and discuss. Translational work is therefore essential in engagements with diverse stakeholders.

The lessons from the Ecosystem feed directly into the six themes discussed in this chapter and in their way validate and confirm the themes critical for translation.

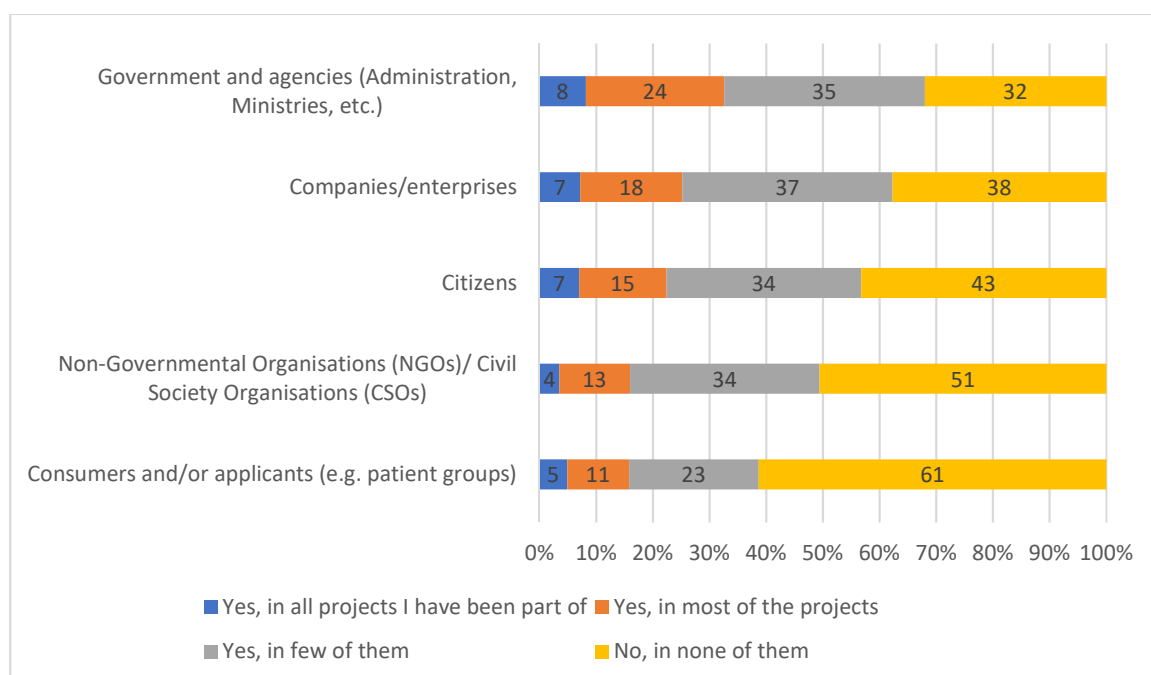


4. Patterns of ORRI

4.1. Public Engagement

In the researcher survey, researchers from universities across Europe were asked about RRI activities during the last three years (Ryan et al. 2023). Figure 3 shows how often researchers stated that they involved different actors from outside academia in their research during this period.

Figure 3: Researchers activities regarding public engagement in the last three years



Source: Ryan et al. 2023: 14

The survey shows that **researchers involved non-academic actors in their research to some extent**. A third of researchers interacted “in at least a few of their projects with each of the different types of non-academic actors” (Ryan et al. 2023: 14). The number of academics who interacted in “most” or “all of their projects” with non-academic actors, however, was smaller.

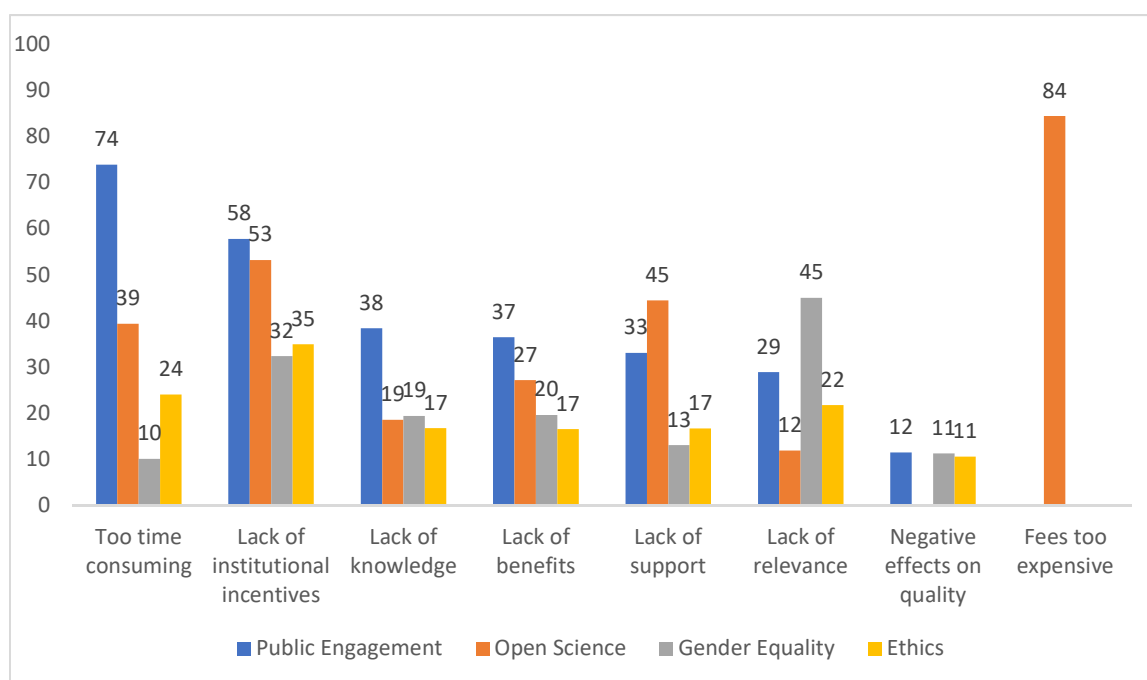
In the researcher survey, researchers from universities across Europe were asked about RRI activities during the last three years (Ryan et al. 2023). Figure 3 shows how often researchers stated that they involved different actors from outside academia in their research during this period.

Figure 3 reveals that the participation of non-academic actors in research is unequally distributed and that **some actor groups are more frequently involved than others**. While **government/agencies and**

companies/enterprises were mentioned as involved in research most often, NGOs/CSOs and consumers were mentioned less frequently.

Researchers were also asked about the barriers they perceived for RRI practices (cf. Figure 4). **Barriers** to public engagement, respondents mentioned most often **included** that **public engagement would be too time consuming** (74%), there would be a **lack of institutional incentives** (58%), that they were **not sure how to do it** (38%), that there would be **too few benefits** (37%). Relatively few respondents perceived a lack of relevance (29%) and negative effects on quality (12%) as barriers for public engagement.

Figure 4: Researchers' perception of barriers for RRI practices in %



Source: Ryan et al. 2023, own compilation

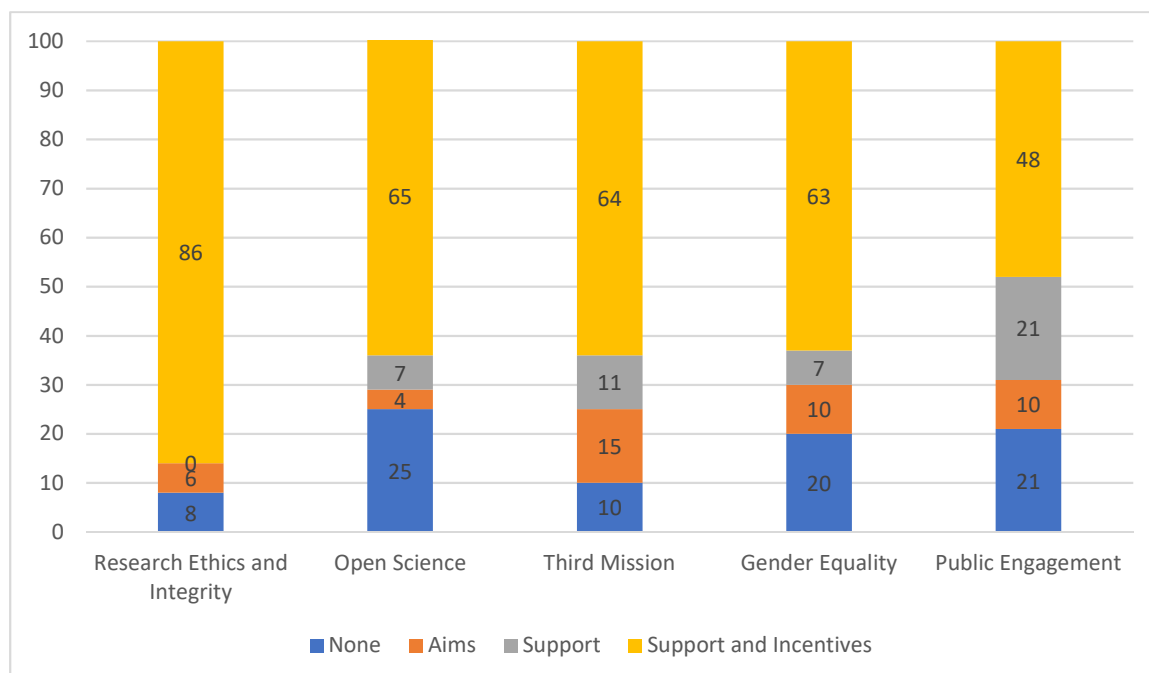
Analysis of qualitative data gained in the CCN-RPO study categorized RRI policies of RPOs into three categories, encompassing (1) “aims”, (2) “support”, (2) “support and incentives”.²

- RPOs in the category “aims” (...) “have a RRI repertoire focused on aims and communication”,
- RPOs in the category “support category” (...) “have an RRI repertoire focused on ‘soft’ support structures.”
- RPOs in the category “support % incentives” (...) “have a RRI repertoire focused on concrete incentives and support structures, which will often be the consequence of a more tangible policy” (Ryan et al. 2023: 32).

Figure 5 depicts how these categories were distributed among the 122 RPOs studied.

² For an explanation of categorise and categorizing procedure see Ryan et al. 2023, p. 32.

Figure 5: RRI in European Research Performing Organizations overview



Source: Ryan et al. 2023: 33, N=122

Figure 5 reveals **differences in ORRI policy development across different areas.**

- **“Support and incentives” policies are most frequently developed in “Research Ethics and Integrity”.** 86% of the covered RPOs developed such policies.
- The share of **“support and incentives” policies was smaller in Open Science, Third mission and Gender Equality, but still above 60%.**
- **Public engagement was the area of ORRI in which deeply developed policies were least often developed (48%).**

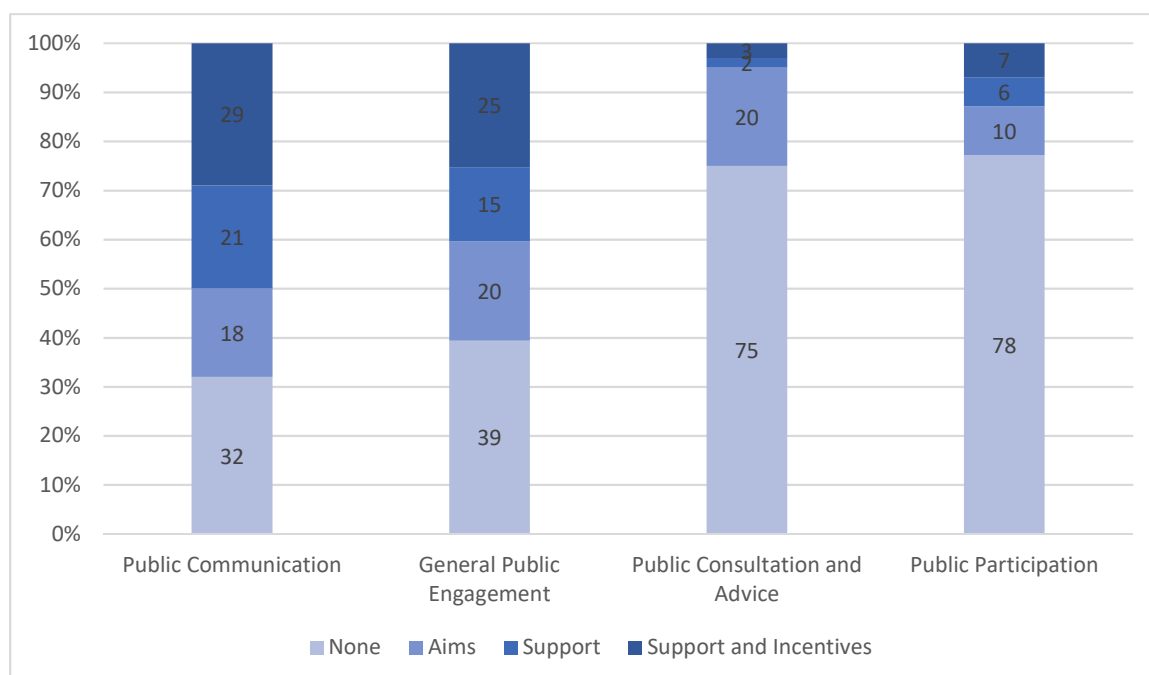
10% of RPOs had public engagement policies in the category “aims”, 21% in “support” and 48 % in “support and incentives”. One fifth of the surveyed universities had no policies towards public engagement. This was the highest share of “no policies” in comparison with other ORRI areas.

Further qualitative analysis developed several sub-areas of public engagement activities to get a more detailed picture of public engagement policies in RPOs. These included “public communication”, “general public engagement”, “public consultation and advice” and “public participation”, (Figure 6).³

³ For further explanation of the categories see Ryan et al. (2023, p. 46).



Figure 6: Focus and Implementation of Public Engagement by sub-area

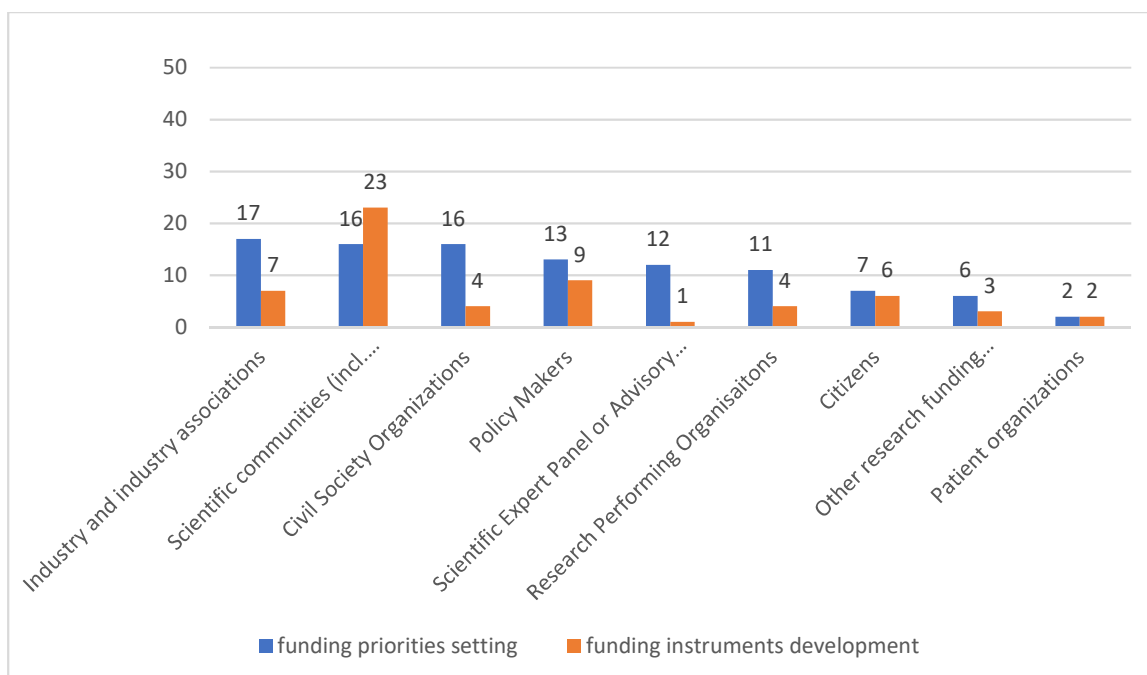


Source: Ryan et al. 2023: 45, N=122

Figure 6 shows that the **concreteness of RPOs' policy development in public engagement declines with growing intensity of participation**. Whereas 29% of surveyed RPOs had "support and incentive" policies for public engagement, this share was 3% and 7% for "public consultation and advice" and "public participation", respectively. Conversely, 32% of the surveyed RPOs had no policy in "public communication". This share was 75% and 78% in "public consultation and advice" and "public participation".

The CCN-RFO study looked at RRI activities of research funding organizations (RFOs) across Europe at the level of setting funding priorities, funding instruments and grant assessment (Ryan et al. 2023). Figure 7 shows to what extent the surveyed RFOs involved different stakeholder groups in setting of funding priorities and funding instrument development.

Figure 7: Number of RFOs that involve external stakeholders in funding instrument development and funding instrument development by type of stakeholder



Source: Ryan et al. 2023: 63ff., N=55

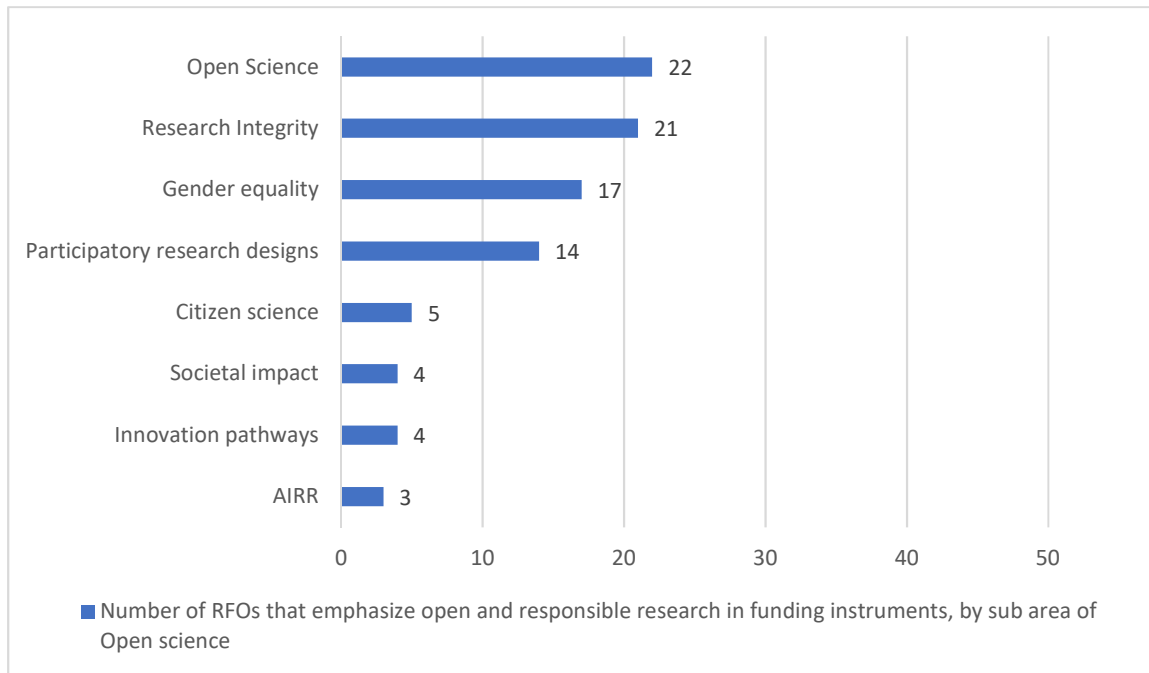
Figure 7 shows that **involving other actors in the setting of funding priorities and funding instrument development is not widespread in the surveyed RFOs**. Fifteen RFOs reported that do not involve any of these stakeholders in priority setting. The survey also shows a **broad range of involved stakeholders being involved**. Finally, in correspondence with results from the researchers survey, the survey indicates an **imbalance with regard to the types of stakeholders involved**. Again, stakeholders from industry, the scientific community, CSOs and policymakers are more frequently involved in priority setting than citizens, patient organizations or other funding organizations (Ryan et al. 2023: 63).

Scientific communities are more often involved in funding instrument development than in funding priority setting. In the sample, they **are the actor group most often involved in the development of funding instruments**. Other societal stakeholders are less involved. It is noteworthy that 18 RFOs in the sample did not involve any societal stakeholders in the instrument development (Ryan et al. 2023: 68).

What elements of ORRI are mentioned in RPO-documents? Figure 8 shows that open science, research integrity and gender equality are the areas of open science that are most often mentioned in RFOs documents. Citizen science, societal impact, innovation pathways and AIRR were mentioned less. In general, in several surveyed RFOs individual elements of open science were not mentioned and fifteen of them "did not include any of these elements in the text of their main funding instruments" (Ryan et al. 2023: 65).



Figure 8: Open and responsible research in funding instruments

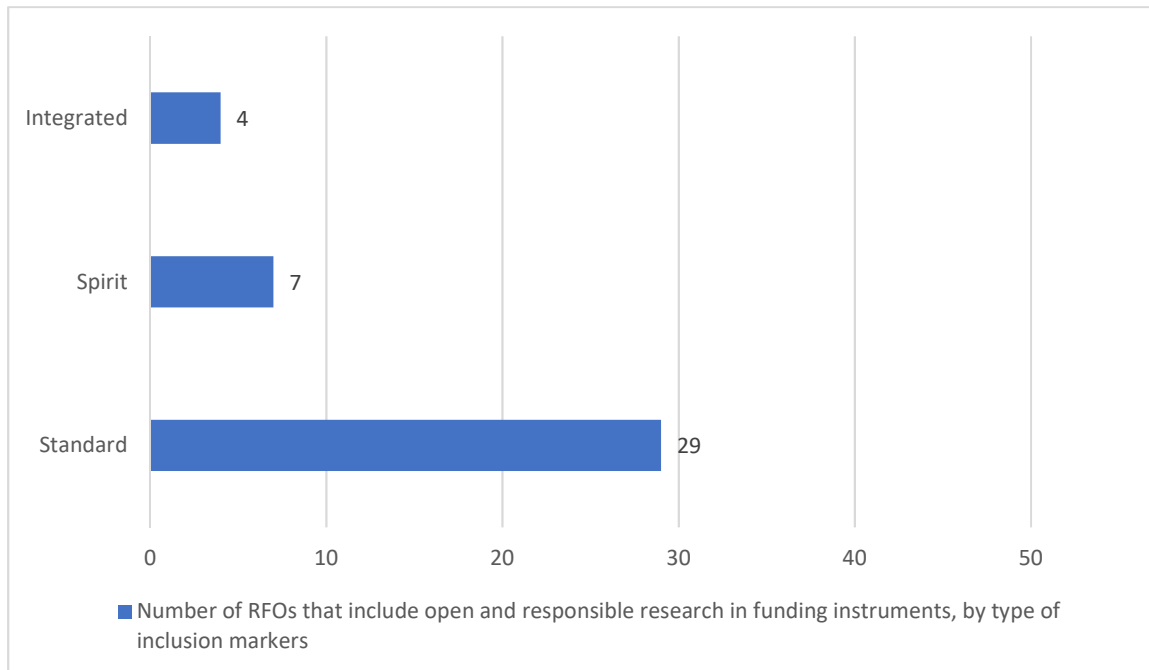


Source: Ryan et al. 2023: 65, N=55

Detailed analysis of RFO policies towards Open science led to classification in “standard”, “spirited” and “integrated” funding instruments. Standard policies were defined as a “mix of preferred and required approaches or actions”; spirited policies were defined as “mainly preferred approaches or actions” and integrated policies meant “mainly required approaches or actions” (Ryan et al. 2023: 66). Figure 9 shows, that 29 of the 55 covered RFOs had standard policies, seven had spirited policies and four integrated policies.



Figure 9: Number of RFOs that include open and responsible research in funding instruments, by type of inclusion marker

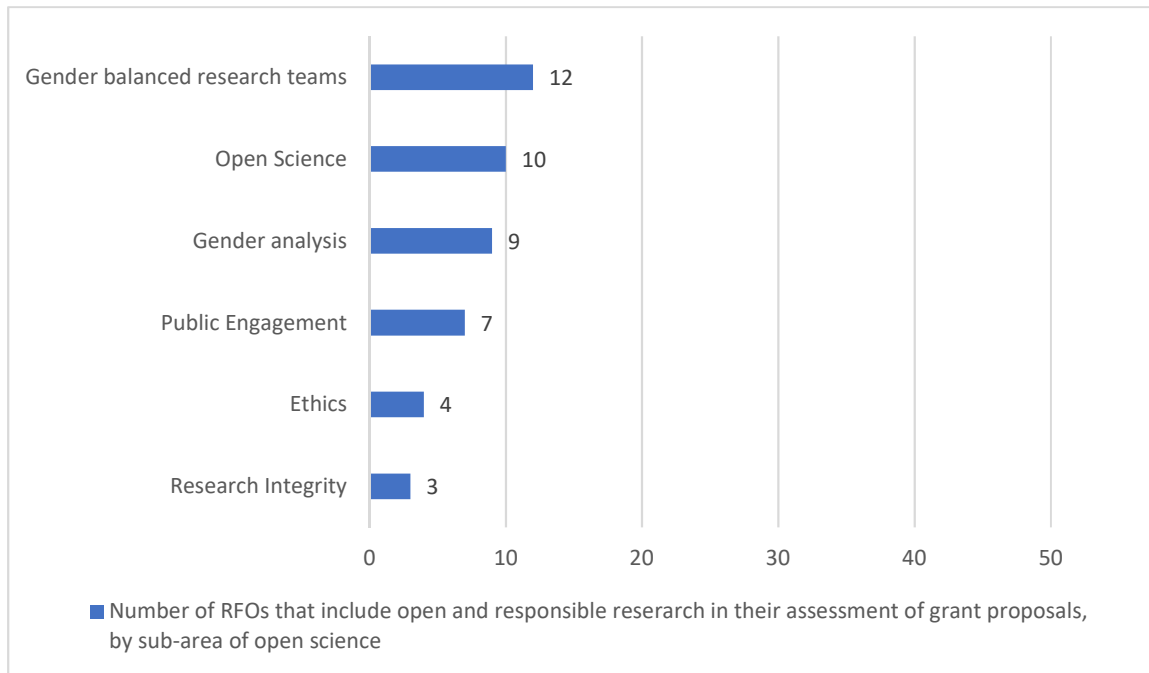


Source: Ryan et al. 2023: 67, N=55

To what extent are elements of ORRI integrated in the assessment of researchers and research? Figure 10 shows that two-thirds of the funders did not include any of these elements in research assessment. Gender balance in research teams and open science elements are “most likely taken into consideration in the assessment of grant proposals” (Ryan et al. 2023: 69). However, Ryan et al. caution to interpret these numbers carefully, because “research integrity and ethics are often fundamental criteria for eligibility” (ibid.).



Figure 10: Number of RFOs that include open and responsible research in grant proposals



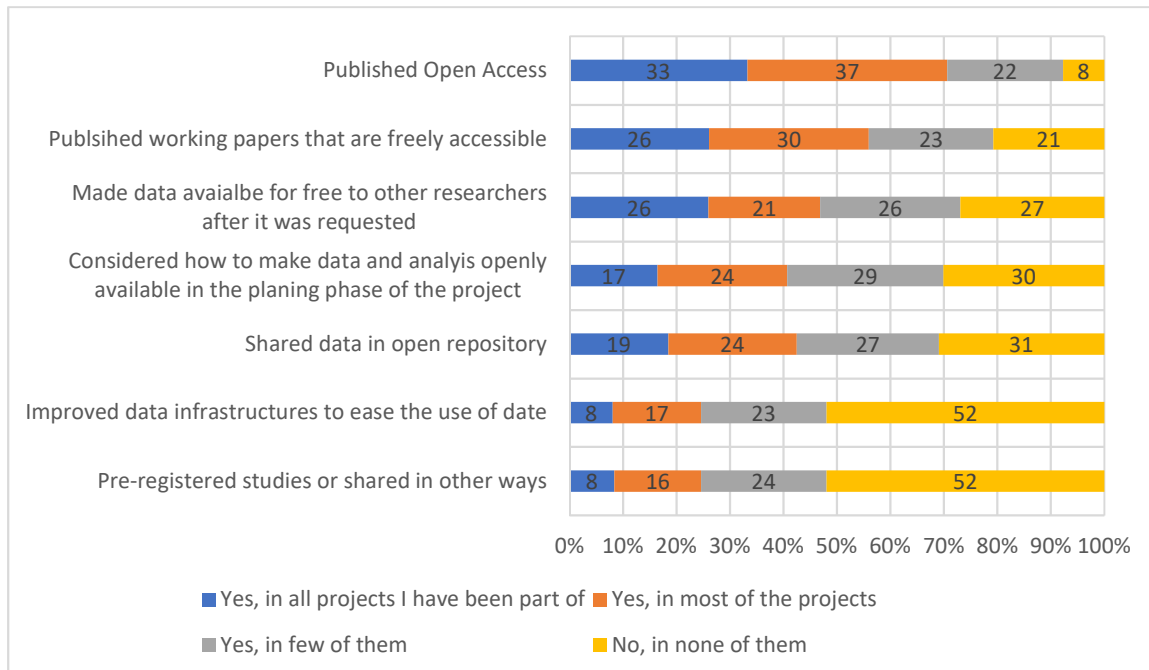
Source: Ryan et al. 2023: 69

4.2. Open Science

The researchers survey shows that researchers strongly engage in open access (cf. Figure 11). A vast majority of respondents are engaged in open publication, either as article or working papers. Almost all respondents (92%) published at least “a few times” in the last three years in open access journals. One third published open access in all their projects and 37% in most of the projects. Almost three quarters of respondents made data available upon request; about two thirds thought about making data available or shared data in a repository. Almost a half of respondents improved data sharing infrastructure or participated in pre-registered studies or shared data in other ways.



Figure 11: Researchers' Activities Open Science



Source: Ryan et al. 2023: 18

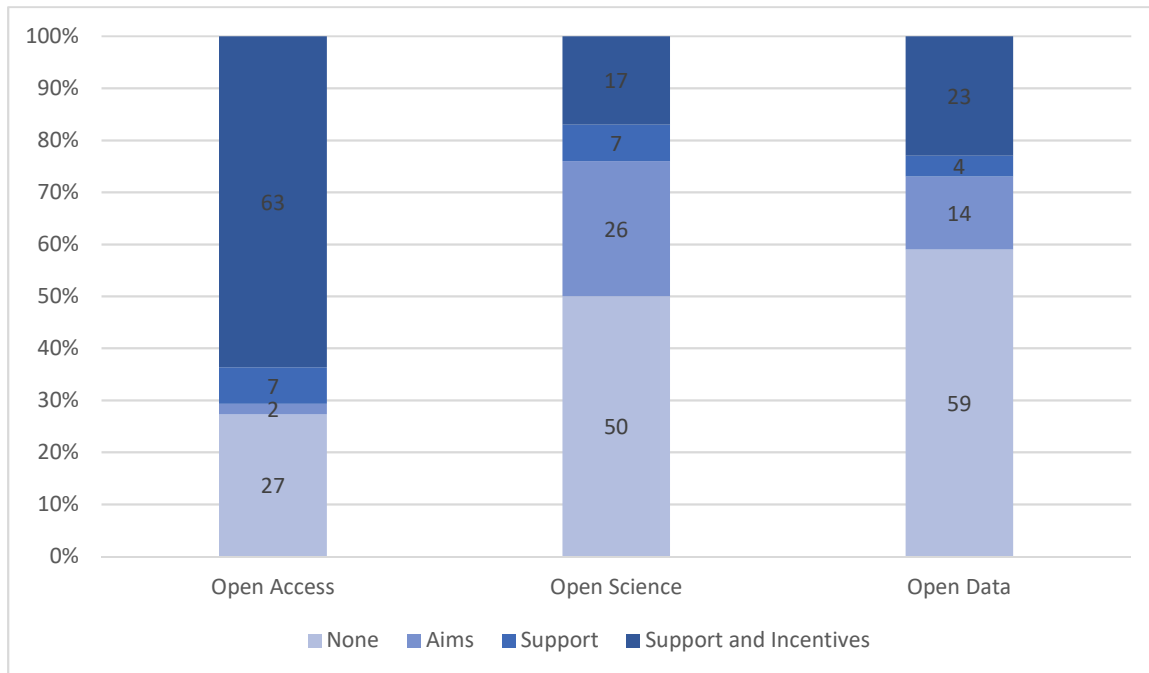
Barriers for open science researchers mentioned were **too high publication fees** (84%), **lack of institutional incentives** (53%) and **lack of support** (44%) as well as **that it would be a time-consuming activity** (39%) (cf. Figure 4).

Turning again to the CCN-RPO survey, Figure 5 shows that **75%** of the 122 European universities covered in the survey **had open science policies in place**. 65% of RPOs covered had Open Science policies that can be categorized as “support and incentives”, 4% had a “aims”, and 7% a “support” policy. Roughly a quarter of the surveyed universities mentioned no policy towards open science in the surveyed documents.

Further categorization of open access policies in “open access”, “open data” and “open science” shows that **RPO policies were most frequent and most strongly developed in open access** (cf. Figure 12). Whereas 27% of the surveyed RPOs did not have a policy in “open access”, this share was 50% in “open science” and 59% for “open data”. Alas, 63% of the surveyed RPOs had policies in place for open access.



Figure 12: Focus and Implementation of Open Science by sub-area

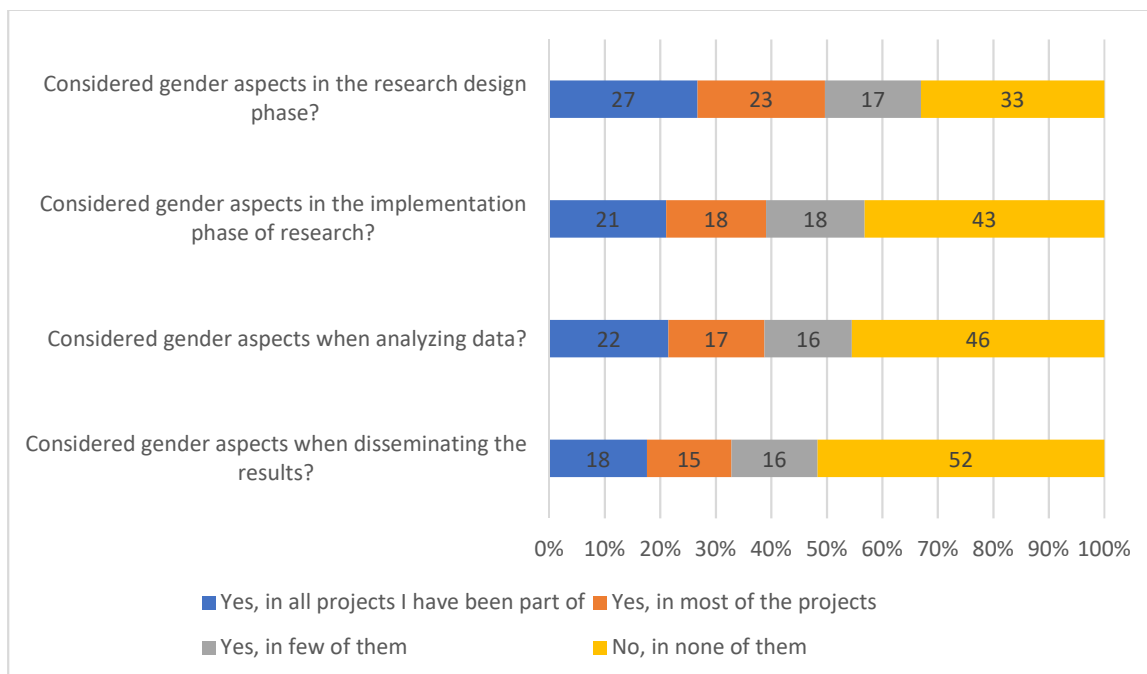


Source: Ryan et al. 2023: 41, N=122

4.3. Gender Equality

Figure 13 shows that on average **a fifth of respondents from the researcher survey considered gender aspects in each research phase of each of their projects** in the last three years. However, **this share decreases as research projects proceed from design to dissemination**. The same development can be perceived in the share of respondents that consider gender aspects in “most” and in “a few of their projects”. In all phases of research, the **share of respondents who do not consider gender aspects is highest and their share also increases as research projects progress**.

Figure 13: Researchers' practices Gender Equality



Source: Ryan et al. 2023: 22

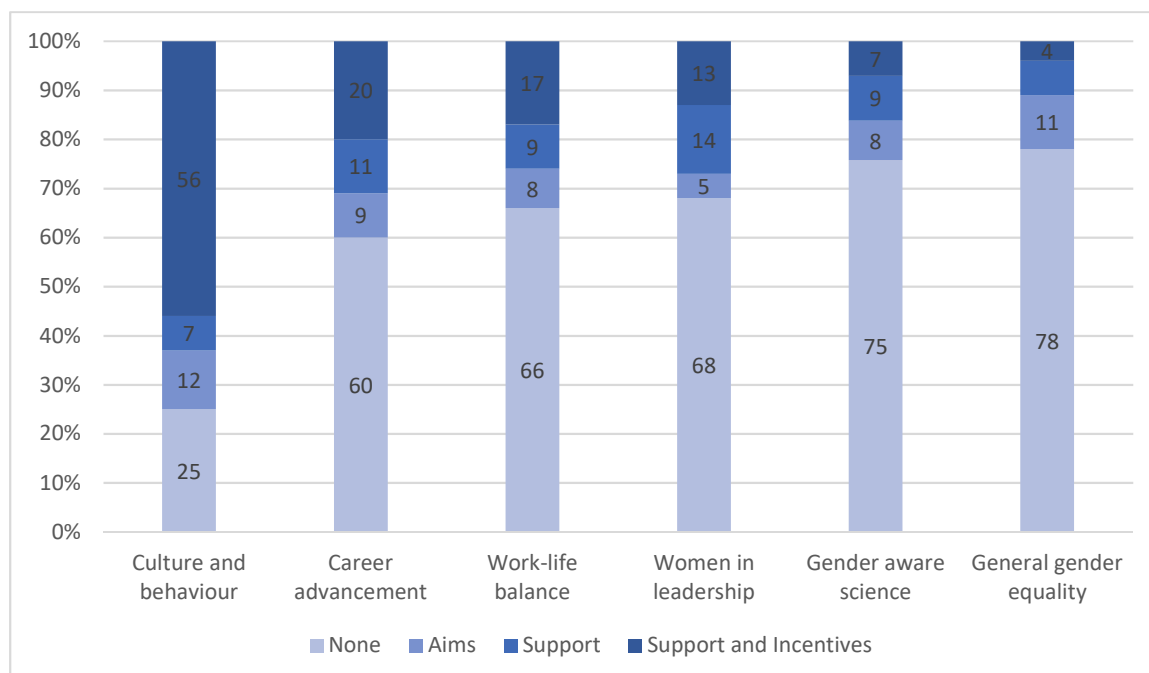
Respondents **mention gender equality barriers less frequently** than in the areas of public engagement and open access (cf. Figure 4). Obstacles most often mentioned **include lack of relevance (45%), lack of institutional incentives (32%), lack of knowledge (19%) and lack of benefits (19%)**.

The CCN-RPO study (cf. Figure 5) shows that **four fifths of the surveyed European RPOs had in place gender equality policies**. 10% of these policies can be categorized as “aims”, 7% as “support” and the largest group of 63% as “support and incentives”. One fifth of the surveyed RPOs had no gender equality policies in place.

Further categorization of gender equality policies shows that while **policies in the sub-area of “culture and behaviour” were most often developed**, policies in other areas were less so (cf. Figure 14). This is followed by the sub-areas “career advancement”, “work-life balance”, “women in leadership” and “gender aware science”.



Figure 14: Focus and implementation of Gender Equality by sub-area



Source: Ryan et al. 2023: 36, N=122

4.4. Research Ethics and Integrity

According to responses in the researcher surveys, most researchers consider ethical issues in their research. A vast majority of 71% of all respondents state that during the last three years they considered ethical issues in all their research projects (cf., Figure 15). Additional 13% of the respondents stated that they considered ethical aspects in most research projects and 7 % in a few. Only a minority of 8% stated they did not consider ethical issues in their projects in this period. Respondents were less involved in **other practices to uphold and define ethics standards such as submitting research to ethical review or active participation in training and ethics review.**



Figure 15: Researchers' Activities Ethics



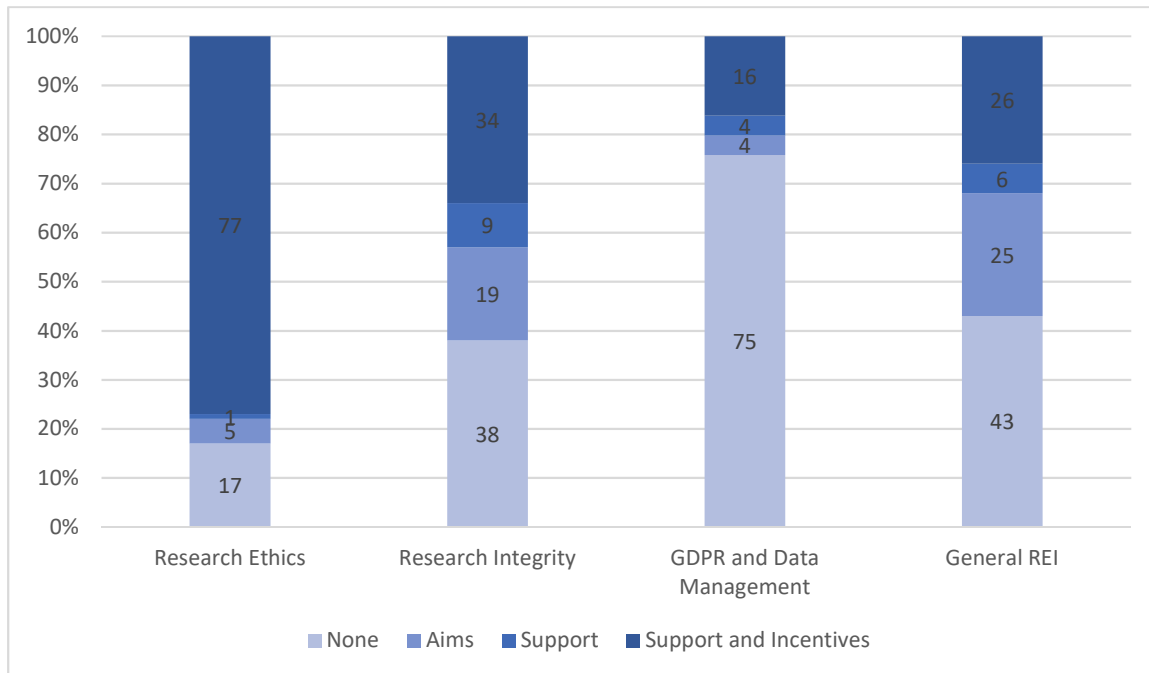
Source: Ryan et al. 2023: 26

Barriers to ethics were mentioned less frequently than in the areas of public engagement and open science (Figure 4). Those most often mentioned were lack of institutional incentives (35%), lack of time (24%), lack of relevance (22%) and lack of knowledge (17%).

A huge majority of 86% of RPOs surveyed in the CCN-RPO study had support and incentives policies in place for ethics and integrity, 6% had an aims policy and only 8% had no policy in this area (Figure 5). Taking a closer look, these policies address the sub-areas “research ethics”, “research integrity”, “GDPR and data management” and “General REI”. Figure 16 shows that policies were most defined in the sub-area of research ethics, followed by research integrity and general REI.



Figure 16: Focus and implementation of Research ethics and Integrity by sub-area



Source: Ryan et al. 2023: 50, N=122



5. Benefits

The notion of benefit adds normativity to impacts (Wicher et al. 2022).⁴ The basic rationale for defining and measuring the benefits and impacts of science is that, in our contemporary Western understanding, research should improve society and the environment. In its final report, SUPER MoRRI's predecessor project, MoRRI, prepared the ground to study "RRI benefits", and remarked:

"the concept of RRI benefits cannot be simply read off this intervention logic as an inevitable extension of the impacts of RRI. Although RRI benefits may indeed be partly or, in some contexts, largely based on an accumulation of positive impacts of RRI, this conceptualisation is not sufficient to capture what is meant by RRI benefits" and that "RRI benefits cannot be sensibly interpreted, or systematically monitored, in the absence of a framework that guides expectations about the (expected) qualities and (desirable) directions of change", (MoRRI final report, Peter et al. 2018: 30).

In other words, the identification of benefits is inextricably linked to normative questions about desirable states and desirable directions of change. Different expectations and notions of "responsibility" might emerge, depending on the person, the organisation –possibly the broader context and system (Ashworth et al. 2019).

In that sense, with respect to benefits, to some degree "Beauty is in the eye of the beholder". In what follows, we report benefits from the various case studies as they were perceived by the actors involved in the ORRI practices themselves. This does not exhaust the question of benefits, as it is possible and even likely in some cases that other actors and observers, with other policy agendas, could identify other benefits (Wicher et al. 2022).

With these caveats, the case studies showed several potential benefits of different areas of ORRI. The potential societal, democratic, economic and scientific benefits are listed in Figure 17, Figure 18, Figure 19 and Figure 20.

Figure 17: Potential societal benefits within case studies

Case	Potential benefit
CSO	Establishing relationships between RRI community and CSOs.
Ethics in AI	R&I system adopts and conforms to ethical standards, producing products that are more in line with people's values and expectations.
Ethics in AI	Introducing moral and ethical deliberation into the very process of designing and building an artefact/technology.
PVRC	Diffusion of research results stimulates social innovation and situated problem-solving.

⁴ The introduction to section 5 Benefits follow closely the exposition and wording in a previous SUPER MoRRI discussion paper (Wicher et al. 2022), which should be consulted for more details on this topic.



Case	Potential benefit
Gendered Eco-Innovation	Openness of companies towards societal needs and challenges through women leadership

Source: SUPER MoRRI, own compilation

Figure 18: Potential economic benefit within the case studies

Case	Potential benefit
Ethics in AI	Production of an advantage for the international market, as customers will want products/solutions that are in line with fundamental values – Economic benefit
Gendered Eco-Innovation	Inclusion of women in research design & development improves quality of scientific outputs
PVRC	Diffusion of research results stimulates social innovation and situated problem-solving
PVRC	Exploitation of shared research data (OS) stimulates creativity and innovation, facilitates more efficient use of resources

Source: SUPER MoRRI, own compilation

Figure 19: Potential democratic benefit within the case studies

Case	Potential benefit
CSO	Reduction of barriers to diversity (individuals and organisations) in participation
CSO	Increased inclusion and recognition of citizens competencies
PVRC	Diffusion of good practices promoting change in R&I projects and organisations
Gendered Eco-Innovation	Gender equality – Intrinsic democratic value
Gendered Eco-Innovation	More representation of diverse perspectives
PE Repertoire	Inclusion of citizens' perspective in R&I policymaking

Source: SUPER MoRRI, own compilation

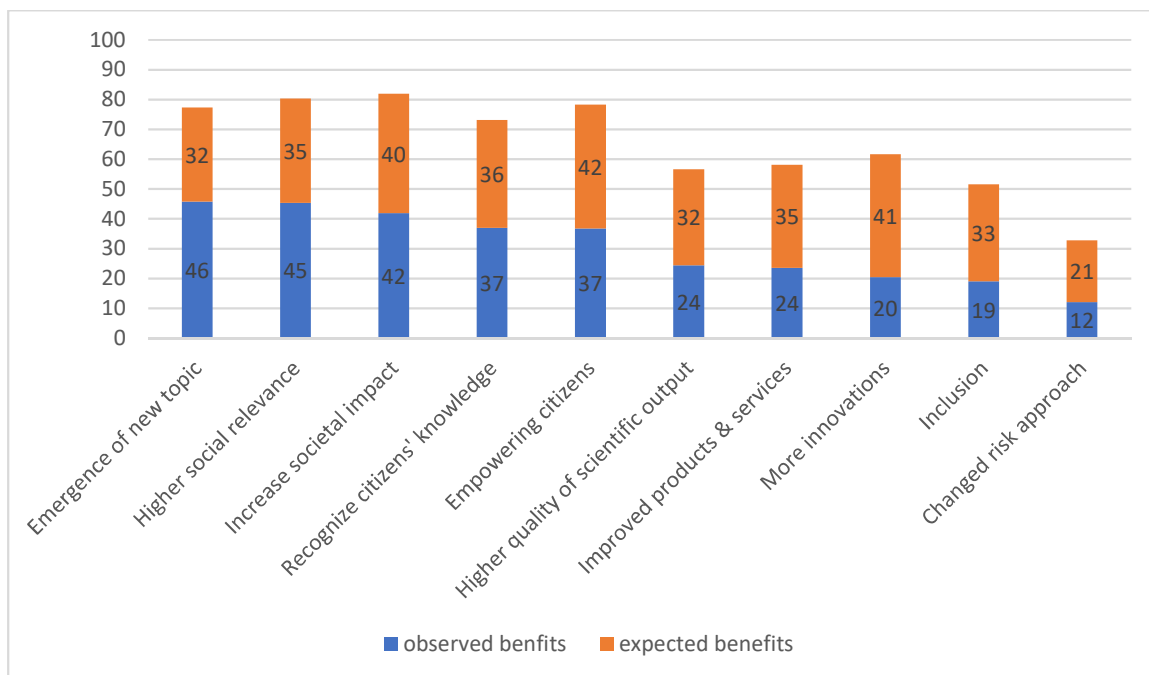
Figure 20: Potential scientific benefit within the case studies

Case	Potential benefit
PVRC	Improved transparency, integrity, and reproducibility of research
Gendered Eco-Innovation	Inclusion of women in research design & development improves quality of scientific outputs

Source: SUPER MoRRI, own compilation

The researcher study shows that many responding researchers experienced or expect benefits from ORRI practices. Many responding researchers perceive **benefits of public engagement activities particularly in the areas of societal benefits** (higher social relevance, increase societal impact) and **democratic benefits** (recognize citizens' knowledge, empowering citizen) (cf. Figure 21). However, there they **also perceive scientific benefits** (emergence of new topic, higher quality of scientific output) and **economic benefits** (improved products and services, more innovation).

Figure 21: Public Engagement Benefits



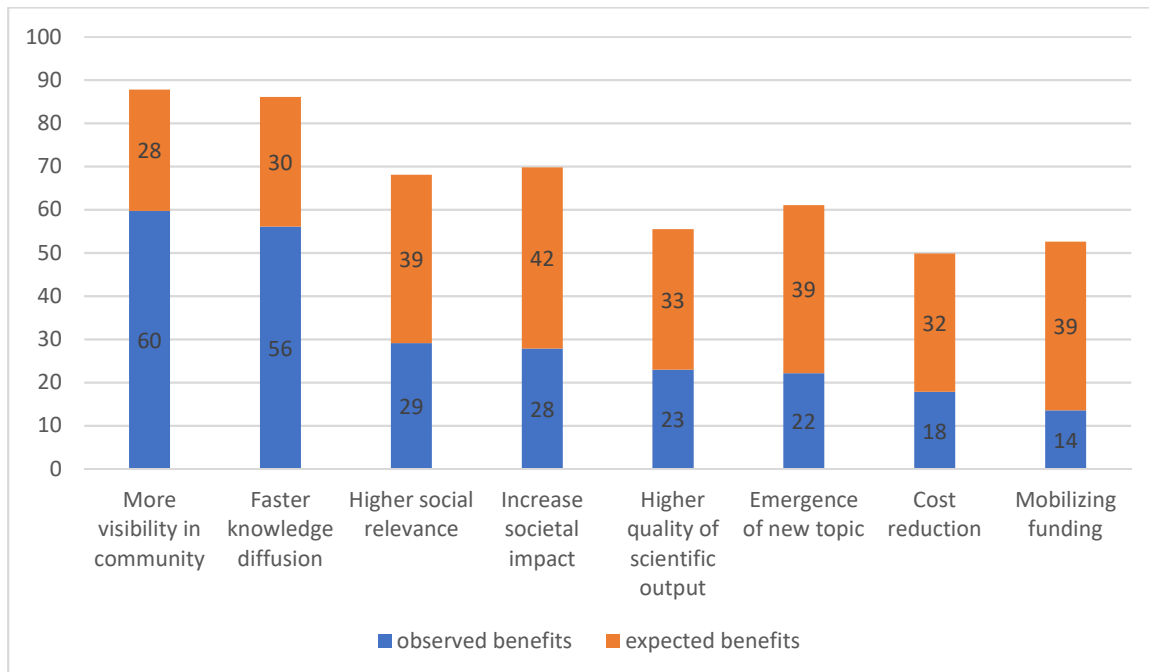
Source: Ryan et al. 2023, own compilation

The two benefits **most often observed** and expected by researchers are connected to **scientific benefits** and concern increased visibility in the research community (60% observed, 28% expected) and faster knowledge diffusion (56% observed, 30% expected). 22% of responding researchers observed the emergence of new research topics (39% expected). 23% observed higher quality of scientific output (33% expected). Researchers **also mentioned** the **societal benefits** of Open Science.



29% observed higher social relevance of research (39% expected) and 28% increased societal impact (42%) (cf. Figure 22).

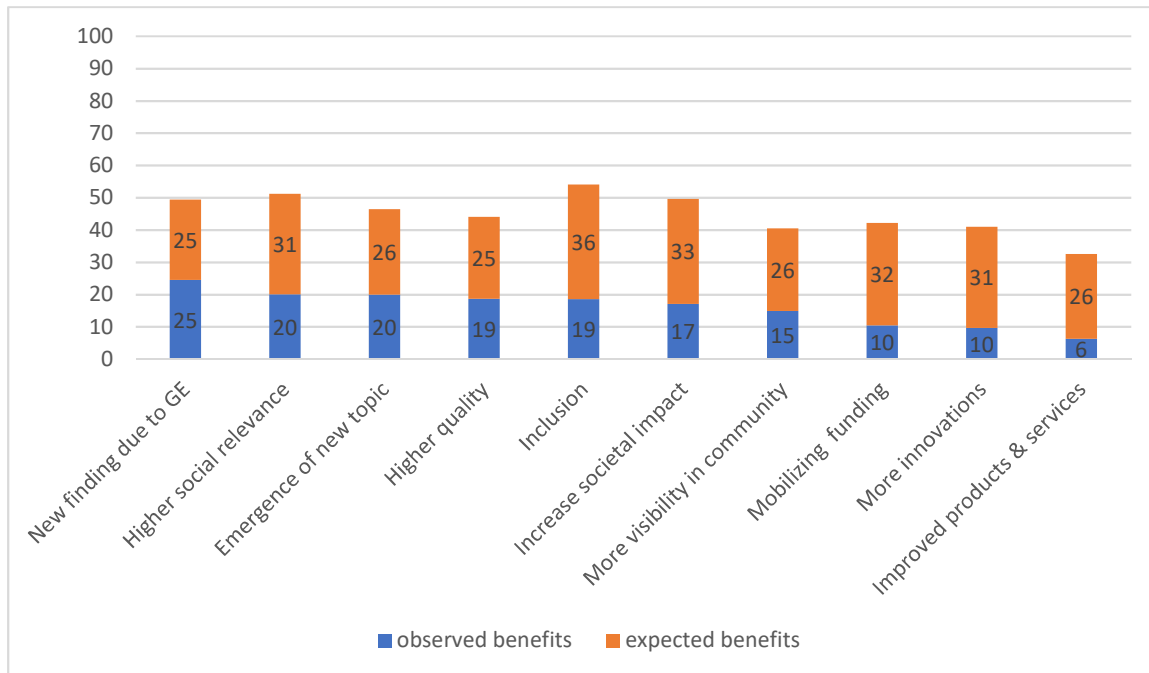
Figure 22: Open Science Benefits



Source: Ryan et al. 2023, own compilation

Benefits experienced and expected from Gender Equality in research are in general lower than in Public Engagement and Open Science (cf. Figure 23). The highest observed and expected benefits are **scientific benefits**, with 34% having observed or 31% expecting higher quality. A little more than half of respondents observed or expected **societal benefits** in terms of higher social relevance and increased societal impact.

Figure 23: Gender Equality Benefits

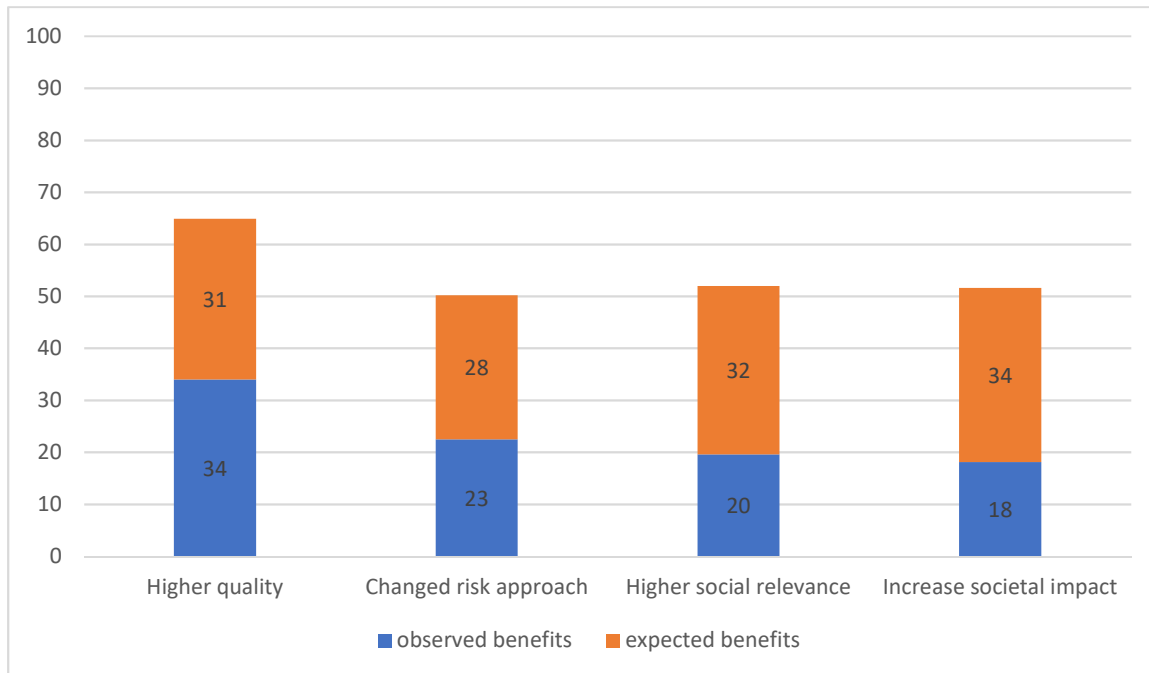


Source: Ryan et al. 2023, own compilation

Experiences and expectations from responding researchers of benefits of ethics practices relate to **scientific benefits and societal benefits**. Almost two-thirds of the respondents either observed or expected higher quality of their research; a little more than 50% either observed or expected higher social relevance or societal impact of their research because of ethics practices.



Figure 24: Ethics in research benefits



Source: Ryan et al. 2023, own compilation

In general, the fact that many respondents still expect benefits from ORRI practices underlines that the generation of benefits is a long-term process, which is difficult to foresee, plan and measure.



6. Summary and conclusion

6.1. Patterns

Public Engagement

SUPER MoRRI survey data shows that many researchers involve non-academic actors such as government/agencies, companies/enterprises, citizens, NGOs/CSOs and consumers/patients-groups in their research.

However, chances for being involved in research are unevenly distributed among actor groups. Whereas ca. two-thirds of researchers involved government/agencies (67%) and companies/enterprises (62%) at least a few times in their research in the last three years this share was smaller with citizens (56%), NGOs/CSOs (51%) and consumer/patient groups (39%).

Barriers to public engagement perceived by researchers include that public engagement is too time-consuming (74%), there is a lack of institutional incentives (58%), researchers were not sure how to do it (38%) and there would be too few benefits (37%).

To practice ORRI, researchers need support from RPOs. The SUPER MoRRI CCN-RPO survey shows that European RPOs largely developed policies to support ORRI. However, they developed such policies which were not equally as stringent across all areas of ORRI. In the area of Ethics and Research Integrity stringent “support and incentives” policies exist in 86% of the surveyed RPOs. Stringent policies also exist largely in the areas of Open Science (65% of the surveyed RPOs), Third Mission (64%) and Gender Equality (63%). In the area of Public Engagement deeply developed ORRI policies are least frequent in the surveyed RPOs (48%). One-fifth of the surveyed RPOs have no public engagement policies, 10% have less developed “aims” policies and 21% were in the middle range of “support” policies. Further analysis of RPOs’ public engagement policies showed that the number of stringent policies decreases as participation becomes more encompassing.

Open Access

The researcher survey shows that researchers strongly engage in open access. Open publication - either as an open access article or working paper - is an activity adopted by a huge majority of responding researchers.

Barriers to open science mentioned by researchers were publication fees being too expensive (84%), lack of institutional incentives (53%) and lack of support (44%) as well as being too time consuming (39%).

75% of the RPOs had open science policies in place. These policies were quite developed, 65% of policies towards Open Science can be categorized as “support and incentives”, 4% had “aims”, and 7% a “support” policy. Amongst open science policies, RPO policies were most frequent and strong in open access.



Gender equality

The researcher survey shows that on average a fifth of respondents consider gender aspects in each research phase of each of their projects in the last three years. However, this share decreases continuously as research projects proceed from design to dissemination. The same development can be perceived in the share of respondents that consider gender aspects in “most” and in “a few of their projects”. In all phases of research, the share of respondents who do not consider gender aspects is highest and their share also increases as research projects progress.

Responding researchers mentioned barriers to gender equality less frequently than they did in the areas of public engagement and open access. The barriers mentioned included lack of relevance (45%), lack of institutional incentives (32%), lack of knowledge (19%) and lack of benefits (19%).

The CCN-RPO study shows that almost two-thirds (63%) of the surveyed European RPOs had gender equality policies in place. These policies can be categorized as “support and incentives”, 7% as “support” and 10% as “aims”. One-fifth of the surveyed RPOs had no gender equality policies in place. While policies in the sub-area of “culture and behaviour” were the ones most developed in our sample, policies in other areas were less developed.

Ethics

Most researchers (92%) responding to the researcher survey consider ethical issues in their research. However, other ethics practices such as submitting research to ethical review (55%) or active participation in training (35%) and reviewing (21%) are less frequent.

Respondents mentioned barriers to ethics less frequently than in areas of public engagement and open science. The barriers most often mentioned were lack of institutional incentives (35%), lack of time (24%), relevance (22%) and knowledge (17%).

A huge majority of 86% of RPOs surveyed in the CCN-RPO study had support and incentives policies for ethics and integrity in place, 6% had an aims policy and only 8% had no policy in this area.

RFO policies

Practising ORRI also needs support from RFOs. The CCN-RFO study shows that open science, research integrity and gender equality are those areas of open science that are most often mentioned in RFO documents. Citizen science, societal impact, innovation pathways and AIRR were mentioned less. In general, several surveyed RFOs did not mention individual elements of open science and fifteen of them did not mention any of these elements in the text of their main funding instruments.

Detailed analysis towards the depth and stringency of RFOs’ funding instruments showed that 29 of the 55 European RFOs covered in the survey had “standard” policies, seven had “spirited” policies and four integrated “policies”.

The CCN-RFO study shows that that two-thirds of RPOs did not include any ORRI elements in research assessment. Gender balance in research teams and open science elements are the ones who are most likely considered in research assessment. However, often research integrity and ethics are fundamental criteria for eligibility.



The RFO study also shows that involving other actors in the setting of funding priorities and funding instrument development is not a widespread practice in the surveyed RFOs. Fifteen RFOs reported that they do not involve any of these stakeholders in priority setting. In addition, the range of involved stakeholders is wide. Finally, there is again an imbalance of stakeholders involved. Stakeholders from industry, the scientific community, civil society organisations and policymakers are more frequently involved in funding priority setting than citizens, patient organizations or other funding organizations.

6.2. Pathways

Analysis of the six case studies performed in WP 5 of the SUPER MoRRI project brought to the fore several common themes.

First, cultures in RFOs, RPOs CSOs, business and research disciplines matter for ORRI because they can promote but also impede ORRI. Thus, existing cultures must be recognized in attempts to promote ORRI.

Second, the translation of ORRI must consider existing routines in RFOs, RPOs, CSOs and business and how they might hinder, neglect, or support ORRI.

Third, successful translation of ORRI depends on informed actors with the necessary knowledge and networks.

Fourth, interdisciplinarity is one of the main avenues towards ORRI. The “devil” of “interdisciplinarity”, however, lies in the details. Without proper cooperation of researchers from different disciplines, interdisciplinarity runs the risk that researchers remain in the comfort zone of their different disciplines without actually cooperating.

Fifth, transdisciplinarity has its potential, but it is even more complex than interdisciplinarity and runs the risk of remaining tokenistic when the world of research, stakeholders and publics stay apart, and the self-perceptions and goals of different actors are not properly recognized.

Translations towards ORRI must consider existing inequalities that impede ORRI and take into account whether new inequalities might be generated.

6.3. Benefits

The case studies indicate several potential societal, democratic, scientific, and economic benefits. The case studies also show a number of pathways themes which impact on the realization of the benefits. Responding researchers from the researcher survey mention a number of benefits which they either already observed or expect. These benefits are different in scale and kind in different areas of ORRI.

Many responding researchers perceive the benefits of public engagement activities particularly in the areas of societal benefits (higher social relevance, increased societal impact) and democratic benefits (recognising citizens’ knowledge, empowering citizens). However, there they also perceive scientific



benefits (emergence of new topics, higher quality of scientific output) and economic benefits (improved products and services, more innovation) Researchers observe and expect scientific benefits, particularly in the area of Open Science.

Benefits experienced and expected from Gender Equality in research are in general lower than in Public Engagement and Open Science.

Experiences and expectations from responding researchers of benefits of ethics practices relate to scientific benefits and societal benefits. Almost two-thirds of the respondents either observed or expected higher quality of their research; a little more than 50% either observed or expected higher social relevance or societal impact of their research because of ethics practices.

In general, the fact that many respondents still expect benefits from ORRI practices underlines that the generation of benefits is a long-term process which is difficult to foresee, plan and measure.



6.4. Recommendations

For RPOs and RFOs

- **RPOs and RFOs should support researchers in public engagement.** This includes:
 - increasing **support** and **institutional incentives** that reward these activities,
 - **training researchers** in their **understanding** and **skills** of public engagement,
 - providing **additional staff** for **public engagement activities**, which researchers perceive as time consuming,
 - **exploring** and **showing** the **benefits** of public engagement for research.
- RPOs **without public engagement policies should develop them.** Those RPOs who have only policy in the areas of “aims” and “support”, should **step up their efforts** and define more concrete public engagement policies. RPOs should develop concrete Public Engagement policies, particularly in the sub-areas of “public consultation” and “advice and public participation”.
- RFOs should **open their research priority setting** to scientific and societal **stakeholders**, particularly to those who are currently least involved.
- RFOs should **integrate ORRI** elements more strongly in the **assessment** of researchers and research.
- RPOs should **explore** together with researchers the relevance of **gender equality** for research and researchers and work to **expand** and **develop** stringent **policies**, also in areas currently less developed such as “**career advancement**”, “**work-life balance**”, “**women in leadership**” and “**gender aware science**”.
- **Interdisciplinarity cannot be taken for granted but must be taken seriously.** RPOs and RFOs must encourage, promote, and fund information, training, exchange of good practice and support cooperation amongst researchers from different disciplines. Similar efforts should be made to support **transdisciplinarity** and be aware that transdisciplinarity **remains tokenistic** when researchers, stakeholders and publics stay apart, and the self-perceptions and goals of different actors are not properly recognized and addressed.

For individual researchers

- Researchers should **step up their efforts to involve non-academic actors** in their research. They also should **involve NGOs and consumers** who currently are less involved in research.



- Researchers should **integrate aspects of gender equality** along the **whole research process** from research design, to data collection, -analysis and dissemination.
- Researchers should not only reflect on the ethical impact of their research by themselves but should also **engage in other practices of “doing” ethics** and integrity in research such as **contributing to the development of standards, participating in training and reviewing**.

For policy makers

- **Cultures** in RFOs, RPOs CSOs, business and research disciplines **matter** for ORRI because they can **promote but also impede** ORRI. Thus, existing cultures **must be recognized** in attempts to promote ORRI. The translation of ORRI must consider existing routines in RFOs, RPOs, CSOs and business and how they might hinder, neglect, or support ORRI.
- **Successful translation** of ORRI depends on **informed actors** with the necessary **knowledge** and **networks**. Thus, **training** about ORRI and **networking** amongst relevant actors must be **promoted**.
- **Translations** towards ORRI **must consider existing inequalities** that impede ORRI and **consider** whether **new inequalities might be generated**. Measures must be taken to overcome such inequalities.



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