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

## **D1.4 SUPER MoRRI Final Report**

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## List of Acronyms and Abbreviations

Acronyms/Abbreviations	Definition
CCN	Country Correspondent Network
AIRR	anticipation, inclusiveness, reflection and responsiveness (AIRR)
CSO	Civil society organisation
CV	Curriculum Vitae
DORA	Declaration on Research Assessment
ELSA/ELSI	Ethical, Legal and Social Aspects / Ethical, Legal and Social Implications
EU	European Union
EC	European Commission
FAIR	Findability, Accessibility, Interoperability, Reusability
FP	Framework Programme
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GERD	Gross domestic expenditure on Research and Development
GTDB	Green Tech Database
ISP	International Satellite Partner
RFO	Research Funding Organisation
RPO	Research Performing Organisation
HEI	Higher Education Institution
STS	Science and Technology Studies
SwafS	Science with and for Society
RRI	Responsible Research and Innovation
ORRI	Open and 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
SAT	Self-assessment tool
STEM	Science, Technology, Engineering, Mathematics
STI	Science, Technology and Innovation



## 1. A brief introduction to SUPER MoRRI

The SUPER MoRRI project (“Scientific understanding and provision of an enhanced and robust monitoring system for RRI”, running from January 2019 to December 2023) was conceived to develop a monitoring and evaluation framework with the aim to support the broad uptake and institutionalisation of Responsible Research and Innovation (RRI). As an integral part of this objective, SUPER MoRRI did not only develop such a framework and, by applying the framework, collect and analyse a multitude of primary and secondary data across Europe, the project also conducted an ambitious case study research programme with the aim to improve our understanding of how RRI activities generate impact on research and innovation practices and institutional structures. The research and monitoring activities were complemented by intensive networking activities with stakeholders in general, but specifically with representatives of other EU-funded projects tasked with monitoring and evaluation of their own activities. To avoid a too narrow European perspective, SUPER MoRRI engaged in regular exchanges with international partners. And with the aim to provide support for research performing organisations (RPOs) interested in reaching higher levels of responsibility, SUPER MoRRI developed an online self-assessment tool (SAT). Great care was taken to guarantee that the different streams of project activities iteratively fed back to the further refinement of the monitoring framework. To ensure a high degree of accessibility, the key outputs of SUPER MoRRI are made available on the newly established PROMISE portal (Platform for the Support of Responsibility and Openness and their Monitoring in Innovation and Science Ecosystems).<sup>1</sup>

It should be noted that the journey of SUPER MoRRI did not start in 2019. The predecessor project MoRRI (Monitoring the evolution and benefits of responsible research and innovation, 2014-2018)<sup>2</sup> conceptualised and implemented the first RRI monitoring system in Europe. SUPER MoRRI drew on this work and critically assessed, partly reformulated and further developed the indicators and metrics suggested by MoRRI.

### 1.1. SUPER MoRRI’s understanding of the challenges of responsible monitoring

RRI as an ambition for research and innovation practices seeks to foster a more just, inclusive, reflective, open, and responsive research and innovation (R&I) system. From the outset of the SUPER MoRRI journey, a key question was how to monitor and evaluate RRI in a responsible way. As is well known, the task to monitor and evaluate research and innovation and to assess its impacts is a challenging task in every field, becoming even more complex with inter- and transdisciplinary research. Methodological problems include data availability and quality, understanding of contextual dynamics of research, causality claims (attribution and contribution), impact trajectories, and the time lag between intervention and impact. It is often hard – or even impossible – to perform robust measurements of higher-level outcomes and impacts because in complex systems, with multiple

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<sup>1</sup> The portal is available at: <http://www.promise4era.eu>

<sup>2</sup> More information on and results of MoRRI (Contract RTD-B6-PP-00964-2013) are available at: <https://super-morri.eu/morri-2014-2018/>



actors, processes, and time-lags, it is theoretically not possible to make definitive attribution claims. RRI activities can be understood as interventions in such complex systems and thus face these very challenges. SUPER MoRRI's conceptual view on RRI sees the world of science, technology, and society as entangled networks that are increasingly in need of mutual collaboration and communication. To increase the consideration of relevant environmental and societal uncertainties engagement among diverse constellations of actors is considered as the key driver of enhanced responsibility in both research and innovation. Consequently, RRI and RRI-related interventions such as co-creation are seen as a way to improve collaboration across silos and promote thinking outside of the box. Multiple context dependent interventions or policies operate not necessarily in a complementary way but also through struggle, contestation, and messy co-existence.

The measurement of RRI – even independent of which exact understanding of RRI we apply – needs to be seen in complex contexts and hence the implication is that indicators are influenced by their use and the purpose for which they are developed. This is important against the backdrop that SUPER MoRRI had the ambition to generate an understanding that can serve to improve governance of research and innovation, both as self-governance (to be performed within institutions and networks conducting research and innovation) and external governance (performed by research funding organisations, regulatory authorities, and ultimately civil society).

To better understand how possible impacts and benefits of RRI and RRI-like activities could be described in the presence of complexity, SUPER MoRRI has built on two principles with the aim of making our own practice responsible:

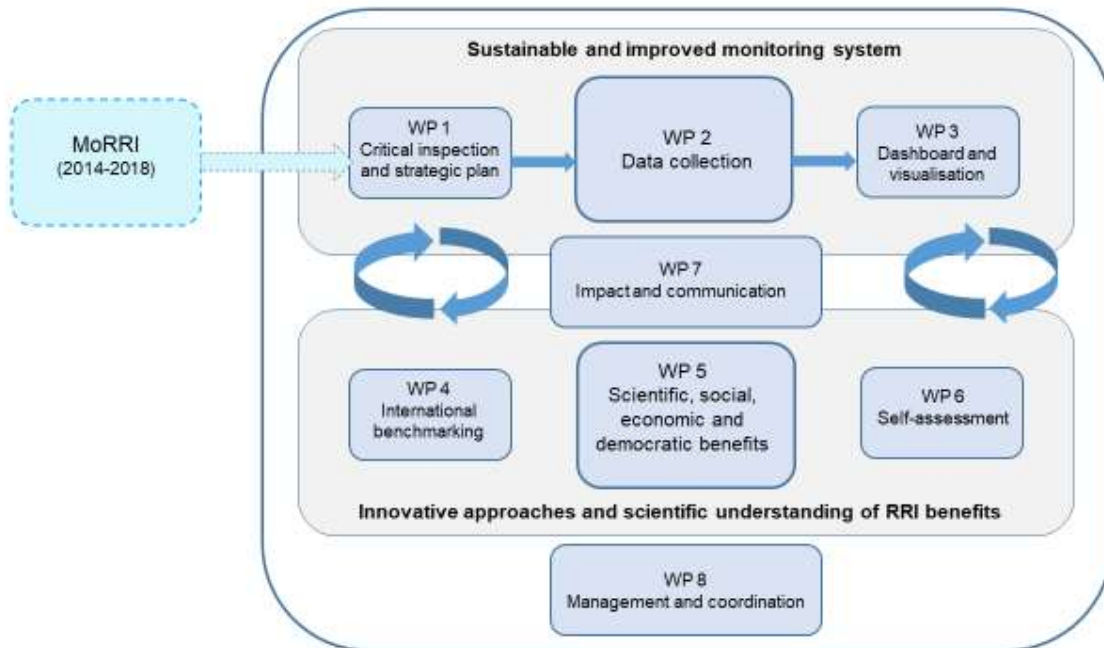
- **Credible contextualisation:** There are no universal context-free indicators; indicators should be developed in ways relevant and meaningful in specific use contexts and should pass through a co-creation phase with potential users.
- **Responsible quantification:** Data and information provided to users as a resource is prepared, presented, and made interpretable in appropriate ways.

## 1.2. Overview of SUPER MoRRI

On order to reach the project's two main objectives – namely developing an improved monitoring framework for RRI and increasing our scientific understanding of how RRI activities generate impact on research and innovation practices and institutional structures – as well as the numerous supporting and complementary tasks, the SUPER MoRRI consortium translated the foreseen research activities into a project design composed of eight highly interconnected Work Packages (see Figure 1).



Figure 1: Overview of the SUPER MoRRI Work Package Structure



The SUPER MoRRI consortium was composed of nine partner organisations based in seven European countries (Table 1).

Table 1: Partner institutions of the SUPER MoRRI consortium

Fraunhofer Institute for Systems and Innovation Research ISI, Karlsruhe, Germany
University of Bergen, Norway
Spanish National Research Council / INGENIO, Valencia, Spain
Institute for Advanced Studies (IHS), Vienna, Austria
University of Leiden, Centre for Science and Technology Studies (CWTS), The Netherlands
Aarhus University, Denmark
Technical University Delft, The Netherlands
SIMAVI, Bucharest, Romania
Universitat Pompeu Fabra, Barcelona, Spain



In total, SUPER MoRRI generated 36 deliverables, 27 of which are publically available.<sup>3</sup>

### 1.3. Structure of the report

The remainder of this final report provides summarising insights into the key research and networking activities of the project. Chapter 2 starts by sketching the policy-related and discursive contexts within which SUPER MoRRI operated. This is followed by a chapter spelling out the guiding principles SUPER MoRRI followed in its monitoring and evaluation approach. The next two chapters provide insights into the main networking activities of the project – the close interactions with other RRI projects in what SUPER MoRRI coined the “RRI eco systems” and with the network of International Satellite Partners (ISPs). Chapters 6 to 9 then turn to the main empirical, analytical and practical outputs of the project: Chapter 6 summarises SUPER MoRRI’s approach to data collection and highlights some of the key findings of the data analysed. This is followed by a chapter showing the main insights generated in the course of the case study research programme. Chapter 8 provides a brief overview of the project’s self-assessment tool (SAT). And Chapter 9 summarises the rationale and main features of the PROMISE portal. Chapter 10 closes with a list of policy-relevant recommendations for key stakeholders in research and innovation. Readers interested in diving deeper into some or all findings and results of SUPER MoRRI are invited to engage with the various project deliverables (see Table 4) and the data available on the PROMISE portal.

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<sup>3</sup> Table 4 in Annex I provides a list of all public deliverables. These and additional publications are available at: <https://super-morri.eu/findings/>. The Monitoring data additional material can be accessed via the PROMISE portal: <http://www.promise4era.eu>



## 2. SUPER MoRRI in context: Shifting policy landscapes and continued needs for responsible approaches in research and innovation

Monitoring and evaluation of research and innovation and the assessment of their scientific, economic, political and societal impacts are challenging tasks, even more so if the object of study is increasingly characterised by inter- and transdisciplinary research. The specific task of SUPER MoRRI to develop a monitoring and evaluation framework to support the transformation of current research and innovation systems to become more aligned with societal need and values is in itself quite a challenge. Yet, the project was also faced with a shifting policy landscape during which the political focus of the relevant science, technology and innovation policy (STI-policy) at the European level changed considerably between the framework programmes Horizon 2020 (2014-2020) and Horizon Europe (2021-2027), thereby redirecting and in part also significantly reducing the previously strong political commitment for RRI. In addition, the more general observation that the support for RRI was never based on a broadly shared understanding of the rationales and aims of making research and innovation more responsible further exacerbated the challenge of developing a monitoring framework for RRI. In the following, the broad developments of European STI-policy are briefly sketched and it is discussed how these changes influenced the position of RRI (2.1). The ensuing section 2.2 presents a closer look at the most relevant narratives underpinning the discourse on RRI. Together, this chapter provides a rough overview of the policy-related and discursive contexts within which SUPER MoRRI operated.

### 2.1. Overview of the development of relevant European STI-policies

Responsible Research and Innovation (RRI) has experienced quite a remarkable development over the last 20 years (Lindner and Kuhlmann 2018). Commencing with the debates on responsible nanotechnologies in the early 2000s and drawing on the work of various scientific communities and research areas working on the interfaces between science and society such as Science and Technology Studies (STS), Technology Assessment, ELSA/ELSI research, philosophy of technology etc., RRI has not only received considerable attention in selected scientific communities (Rip 2014), but also became institutionalised in parts of academia, which is reflected, for instance, in a steep rise of research projects, scientific publications, conferences and journals focusing on and dedicated to RRI. To a great extent, the emergence and initial success of RRI was driven forward by developments at the level of European science, technology and innovation (STI) policy. And, likewise, policy decisions of the European Union (EU) had a significant influence on what some have coined as the "fall of RRI" (Völker et al. 2023: 38) in recent years.

Given the importance of policy decisions, how does RRI as a concept and a policy discourse relate to the broader developments of European STI-policy, and what are the factors that supported the emergence, but also seemed to have caused the relative weakening of policy support for RRI? With



the aim of developing an improved understanding of how RRI was and is interconnected with other key STI-related policies, this section briefly sketches the main tenets and paradigmatic shifts of European STI policy over the course of the past decades. As a key objective of the SUPER MoRRI project was to monitor RRI-related developments in Europe, significant shifts in the relevant policy context are obviously of chief interest to the consortium.

Science and technology policy gradually started to become an element of European policy-making in the 1960s. The focus during the first decades of European science and technology policy was primarily on facilitating common science and technology policy efforts, improving researcher mobility and establishing joint research infrastructures (Biegelbauer and Weber 2018). A key step in firmly establishing the STI policy area at the European level was the introduction of the first European Framework Programme (FP), running from 1984-1987. Since this initial programme, the EC and the since 1993 the EU have implemented a total of nine FPs to this date, and each new FP experienced a significant budget growth compared to the previous one. This steady growth of STI policy in terms of funding reflects the rising importance of this policy field for the EU, making it the second largest Europeanised policy area already in the late 1990s (European Commission 2015). While scope, scale and thematic profiles of the successive FPs changed over time, economic objectives such as competitiveness and growth continued to be the key overarching policy rationales shaping this European policy area ever since. More precisely, as Biegelbauer and Weber (2018) argue, already the very early science and technology policies of the European Communities during the 1960s and 1970s were driven by Europe's concern of falling behind technologically and economically compared to the United States (Servan-Schreiber 1968) and later also to other international competitors. In fact, an important impetus for the creation of the first FP in the 1980s was a response to large and ambitious national policy initiatives in other countries, namely the Very Large-Scale Integration microprocessor programme in Japan and the US-American Strategic Defence Initiative (Biegelbauer and Weber; Skolnikoff 1993). As European STI-policy evolved, additional policy objectives and rationales for the FPs as well as other large European initiatives such as the launch of the European Research Area (ERA) in 2000 (European Commission 2000) or the establishment of the European Innovation Council (EIC) in 2017 (European Commission 2018) were included.

Yet, regardless of various modifications and extensions over time, Biegelbauer and Weber (2018) and Weber et al. (2023) convincingly show that the by far most influential policy frame for legitimising European STI-policy was and continues to be what they call the “Europe as Laggard in science and technology” frame. By actively fostering industrial, technological and scientific excellence, the EU was to be enabled to catch up with other countries and improve its international competitiveness. This “master frame” was subsequently complemented – not replaced – by three other influential policy rationales. The frame “European paradox” also builds on the interpretation that Europe is lagging behind in international comparison, but particularly stresses weaknesses in industrial innovation. The frame “European Research Area” is driven by the idea that improved cooperation in European research and innovation will result in higher levels of international competitiveness. And finally, the policy frame “Grand Challenges” argues that STI need to be mobilised in order to address the societal challenges Europe is confronted with (Biegelbauer and Weber 2018). While this most recent policy frame includes normative elements justifying STI policy that are new and deviate in key aspects from the master frame, the “Grand Challenges” frame remains at the same time partly conventional as it is based on the assumption that developing solutions for societal problems will also serve the objective of international competitiveness, thereby echoing the “master frame”.



Setting European peculiarities aside, the brief outline of the main rationales for STI policy by and large corresponds to the developments at the national level. STI-policy in the OECD countries was based on very similar policy rationales over the past decades. During the first decades after Second World War, science and technology were increasingly viewed as important drivers of economic growth. As such, both the intellectual foundations as well as the conceptualisation of the STI policies at the time were predominantly influenced by mainstream neoclassical economics and a linear understanding of innovation. Consequently, state interventions in science and technology development were mostly justified by the need to correct market failures. With the growing intensity of international competition and the end of the long post-war period of economic growth in the 1970s, pressure on STI to contribute more directly to growth and competitiveness increased, and the at the time novel systemic approaches in STI policy and evolutionary economics (e.g., Freeman 1982; Ludvall 1992; Nelson 1993) became influential. While the conceptual foundations and the policy approaches changed, the chief objectives of STI-policy remained largely the same. It was not until the 2000s that the predominantly economic justifications for state interventions in STI were explicitly complemented with societal and environmental rationales. Increasingly, at least at the strategic policy level, STI policy was now aiming to mobilise research and innovation to address pressing societal challenges such as the climate crisis and contribute to transformative change (Lindner et al. 2024; Daimer et al. 2012; Weber and Rohrer 2012; Schot and Steinmueller 2018).

In hindsight, two broad policy-relevant developments seem to have provided favourable conditions for a reform- and transformation-oriented concept such as RRI: The so-called "participatory turn" of EU governance (Saurruger 2010) in general and the "normative turn" in STI-policy pushed forward by the so-called Lund Declaration of 2009 (Swedish Presidency 2009), calling for a dedicated orientation of research and innovation towards solving pressing societal problems.

First, alongside with the progressing European integration, concerns of a possibly growing democratic deficit and a crisis of legitimacy of the EU were increasingly aired. The results of referenda in numerous member states on European treaties (particularly on the Maastricht Treaty in 1993 and the Constitutional Treaty in 2005) as well as findings of Eurobarometer surveys further intensified anxiety about low popular support for European institutions (Kies and Nanz 2013). Against this background, increased participation of citizens and civil society organisations as an approach to address low levels of legitimacy and poor responsiveness of European institutions received growing traction among European decision-makers (Lindner et al. 2016). An influential manifestation in this regard was the European Commission's White Paper on Governance (Commission of the European Communities 2001), proposing to open European decision-making processes for societal involvement. While the Treaty of Lisbon (signed in 2007 and entering into force two years later) reconfirmed that the EU is primarily based on the principles of representative democracy, it does contain a number of participatory elements:

1. "The institutions shall, by appropriate means, give citizens and representative associations the opportunity to make known and publicly exchange their views in all areas of Union action.
2. The institutions shall maintain an open, transparent and regular dialogue with representative associations and civil society.
3. The European Commission shall carry out broad consultations with parties concerned in order to ensure that the Union's actions are coherent and transparent." (Treaty of Lisbon 2007: Title II, Art. 8B TEU)



The general participatory turn in European governance also had considerable impact on the development of the EU's STI-policy. As a response to the 2001 White Paper, but also in view of more science-related public controversies such as debates on genetically modified organisms (Macq et al. 2020), the European Commission adopted the Science and Society Action Plan (European Commission 2002), which called for active participation of citizens both in science as well as in science policy. Already in 2002, this policy ambition was translated into the new funding line "Science and Society" within FP6 (running from 2003-2006). With additional political backing of the Lisbon Treaty and its references to participation, FP7 (running from 2007-2013) stepped up the ambitions to better integrate science and society by the means of the "Science in Society" funding line. The highpoint of the EU's attempts to better align science and society eventually culminated in the 8<sup>th</sup> Framework Programme Horizon 2020 (running from 2014-2020) and its "Science with and for Society SwafS" funding line (Griessler et al. 2023c). While important groundwork for RRI was conducted already in FP7 and earlier, in the context of SwafS RRI was broadly rolled out by the means of substantial project funding and institutionally by becoming a cross-cutting issue in Horizon 2020 as a whole (European Commission 2020c).

Second, as stated above, the so-called "normative turn" in STI-policy began to unfold in the 2000s. Increasingly, STI-policy shifted towards addressing societal challenges. Previously, STI-policy was predominantly focussed on improving the performance of science and innovation systems, ultimately with the aim to reach economic objectives. The active alignment of STI with societal needs was by and large left to other policy areas. A first influential step towards the reorientation of the aims of STI was the Aho Report (2006). This report urged that technology and innovation policy should be mobilized to solve societal problems in Europe. While a great deal of the Aho Report's justification to direct STI more deliberately towards societal and environmental needs was based on economic lines of reasoning such as the creation of lead markets and boosting productivity, the Lund Declaration of 2009 (Swedish Presidency 2009) positioned itself clearly within the "Grand Challenges" frame. Arguably, the Declaration itself was instrumental in firmly establishing this European policy frame. The Declaration was formulated during the Swedish Presidency of the Council of the EU, bringing together over 300 stakeholders from science, policy, industry and funding organisations to prepare FP8 (which eventually became Horizon 2020). The key demand of the declaration was to refocus European funded research on the so-called Grand Challenges:

- "European research must focus on the Grand Challenges of our time moving beyond current rigid thematic approaches. This calls for a new deal among European institutions and Member States, in which European and national instruments are well aligned and cooperation builds on transparency and trust.
- Identifying and responding to Grand Challenges should involve stakeholders from both public and private sectors in transparent processes taking into account the global dimension.
- The Lund conference has started a new phase in a process on how to respond to the Grand Challenges. It calls upon the Council and the European Parliament to take this process forward in partnership with the Commission." (Swedish Presidency 2009)

While the Declaration's shift towards societal needs is well known, the call for broad stakeholder involvement in the processes of identifying the challenges ahead and how to best take action seem to have received less attention. Although the initial intention of the Declaration was watered down due to the fallout of the financial and economic crisis of 2008/2009, which led to a renewed emphasis of



European governments on strengthening the industrial base and stimulating economic growth, its impact on Horizon 2020 was quite substantial. For the first time, funding within a FP was structured around seven societal challenges (Lindner et al. 2024). Due to the rapidly intensifying climate crisis and policy developments such as the adoption of the Sustainable Development Goals by the United Nations in 2015 and internationally agreed targets to reduce greenhouse gas emissions, pressure on STI to contribute more effectively in addressing societal challenges and supporting sustainability transitions mounted. While numerous funding strategies and programmes with strong elements of directionality aiming at societal needs have been implemented within the policy frame of "Grand Challenges", it was conceded that concrete societal impacts and effective measures to mobilise new scientific and technological knowledge for transformative change were lacking (Lindner et al. 2022). It was in this context that the so-called "new mission-orientation" in innovation policy, strongly advocated and influenced by Mariana Mazzucato (2018), became influential. Starting in 2019 under the FP Horizon 2020 and continued in the current FP Horizon Europe (running from 2021-2027), the EU adopted a mission-oriented approach in five selected areas (Weber et al. 2023). Despite the remarkable normative similarity between the Lund Declaration, mission-oriented innovation policy and RRI in terms of their societal needs orientation, and also – though less pronounced – with regard to the call for public engagement and transparency, to date the policy debates and actual policy implementation within the policy frame "Grand Challenges" seem to remain largely untouched by the ambitions of the specific discourse on responsibility in research and innovation.

This final project report is not the adequate place for an in-depth, comprehensive discussion of the reasons why RRI did not fulfil the hopes of many of its proponents and of the factors that led to a relative decline of importance in Europe's current STI-policy. Thus far, these questions have been taken up in greater detail elsewhere (e.g., Daimer et al. 2023; Griessler et al. 2023c; Novitzky et al. 2020; Owen et al. 2021; Strand and Spaapen 2021). However, already a superficial reading of the brief overview of the broad STI policy developments at the EU-level sketched out in this section suggests a few possible explanations why seemingly favourable conditions of the broader policy landscape did not entail more positive effects on the course of RRI: Firstly, the dominance of the master frame "Europe as Laggard in science and innovation" remained largely unchallenged and continued to provide the decisive normative orientation for European STI-policy, effectively crowding out competing policy rationales. Secondly and possibly related to the first explanation, potential connections and joint perspectives with the Grand Challenges frame were not actively sought and deliberately woven together by the proponents of RRI. The fact that sustainability and justice, which could have performed as potential bridges to like-minded policy frames, were not integrated in the EC's official operationalisation of RRI, most likely played an inconducive role as well.

Whatever the explanations may be, the mere fact that the policy context changed significantly during the course of SUPER MoRRI, thereby partly changing the object, or at least the terminology of our research, was challenging. Yet, as can be seen in the following chapters, the ambition of RRI remained the same, and likewise the challenge on how to monitor and evaluate research and innovation practices in such a way that they contribute to societal needs and values.



## 2.2. Competing policy narratives justifying RRI

As an integral part of the research conducted in SUPER MoRRI to develop and refine monitoring and evaluation approaches to RRI, we have worked to clarify the **needs and purposes** of monitoring and evaluation, as a function of the policy landscape into which our research aims to contribute. This line of research has in particular been pursued in WP1 and WP5. Drawing on an early output of the project, the Task 1.1 concept note, we may distinguish between three distinct, ideal-type policy narratives that ground the need for RRI in different ways. The two first can be described by train metaphors: (1) RRI as a way to regain control over the run-away train of science and technology; and (2) RRI as a means to clean the tracks and speed up the train. (3) The third narrative is nonlinear and not well described in terms of linear railways and sees RRI as a means to improve the complex interaction and alignment of science, technology and society (see table below, which reproduces content from our project web site<sup>4</sup>).

<b>RRI to control the run-away train of science and technology</b>	Modern science and technology is a two-edged sword that provides us with goods and benefits but also with Hiroshima, Silent Spring, Chernobyl, climate change, designer babies, enhanced soldiers, CRISPR, killer drones, Facebook, Cambridge Analytica and so on. By sheer luck we have survived almost a century in a civilization that knows that $E=mc^2$ . Every year science and technology deliver more opportunities to improve the human lives but also more ways to destroy and eradicate us and our fellow beings on this planet. Even worse, science and technology is a <i>run-away train</i> . There is nobody in charge, nobody in control and the speed is increasing. Market mechanisms, ethics committees and risk management procedures are too weak and lag behind. The policy problem is accordingly: <b>“How do we regain control over the runaway train of science and technology before it totally destroys our world?”</b> Some hope that RRI is a solution that can provide railway switches, redirections and possibly handbrakes. In this vision, RRI will enable society to speak back to science and help shape research agendas and ultimately research trajectories so that they will lead to outputs and outcomes that are beneficial to people and planet.
<b>RRI to speed up the train of science and technology</b>	Science and technology is the locomotive force of a knowledge economy that is <i>on tracks, going in the right direction</i> and being (our only?) promise of job creation and economic growth. The problem, as seen from this perspective, is not that the train is going too fast and out of control; rather, it is being slowed down by the insufficient participation of citizens and civil society. Distrustful and ungrateful citizens are (sometimes) protesting in the middle of railroad and more often just not being supportive and helpful. <b>From this perspective, RRI is a solution to the questions: “How do we educate, reassure and calm down the ungrateful public and make them trust us, trust science again?”</b>

<sup>4</sup> <https://super-morri.eu/3-policy-narratives-for-rri/>





<p><b>RRI to improve the complex coproduction of science, technology and society</b></p>	<p>The world of science, technology and society is a set of entangled networks that are in increasing need of mutual collaboration and communication. The decades after WWII were characterized by a period of increasing specialization of research disciplines and fields of expertise. By the end of the 20<sup>th</sup> century, the need to break down silos and engage in new forms of interaction within academia as well as between science and society, was ever more felt, not the least because of new global environmental and social problems, the so-called grand challenges. The policy problem is <b>“How do we improve collaboration across silos and promote thinking outside of the box?”</b> and RRI is then seen as one of several solutions.</p>
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It has become a commonplace in the scholarly RRI literature that there has never been a consensus on the exact definition of RRI, in spite of numerous scholarly and policy attempts to that effect. In particular, there has been the contrast between the key-based understanding of RRI that arose in and around the European Commission before and during the Horizon 2020 framework programme, and the so-called AREA or AIRR approach of anticipation, reflexivity, engagement/inclusion and action/responsiveness that originally was advocated by British research funding organisations and was later adopted by other national research policy/funding organisations. One development we have observed in and around the SwafS ecosystem of projects and activities (see Chapter 4), is that the contrast between the two may have been ever more resolved in the sense that researchers and other actors found it meaningful to combine keys as policy areas and the AREA dimensions as methodological principles and precepts.

Still, however, one should have in mind that the question of “how” to perform, monitor and evaluate RRI cannot be decoupled from the questions of “why” – namely, why RRI (the policy narratives) but also the question of why monitor and evaluate, that is, what theory of science and technology governance that informs the purpose of monitoring and evaluation. In SUPER MoRRI this latter issue was pursued in WP5<sup>5</sup> (see Chapter 7). It was seen how especially the third policy narrative, of facilitating coproduction, is at odds with strong ambitions of top-down governance through conventional intervention logics. In short, there is a tension between the arguably most balanced and plausible policy narrative for RRI with governance cultures that focus strongly on e.g. SMART. This observation was already made by the EC Expert Group on Monitoring and Evaluation of RRI (Strand et al. 2015) and EU-funded projects such as SIAMPI (Spaapen and van Drooge 2011), prior to the MoRRI project. The tension has bearings on the use of the results of projects such as SUPER MoRRI – perhaps a lesson post-Horizon 2020 and post-SwafS is that the national, regional and local use of monitoring and evaluation frameworks may be equally if not more important than the potential use at the highly aggregated European level. This lesson is reflected in several of our project outputs, including the PROMISE portal, in the sense that we have placed great emphasis on facilitating local use to promote RRI by endeavours of network governance.

Finally, it should be noted that the term RRI itself has had life of its own. Currently, it may be less frequent in EU R&I policy discourse – and also to some degree replaced by adding the dimension of

<sup>5</sup> See e.g. <https://super-morri.eu/download/153/findings-and-deliverables/5424/t5-3-and-t5-4-impacts-pathways-and-benefits-of-rri-discussion-paper.pdf> and the combined H2020 SUPER MoRRI and TRANSFORM output <https://doi.org/10.4324/9781003371229>.



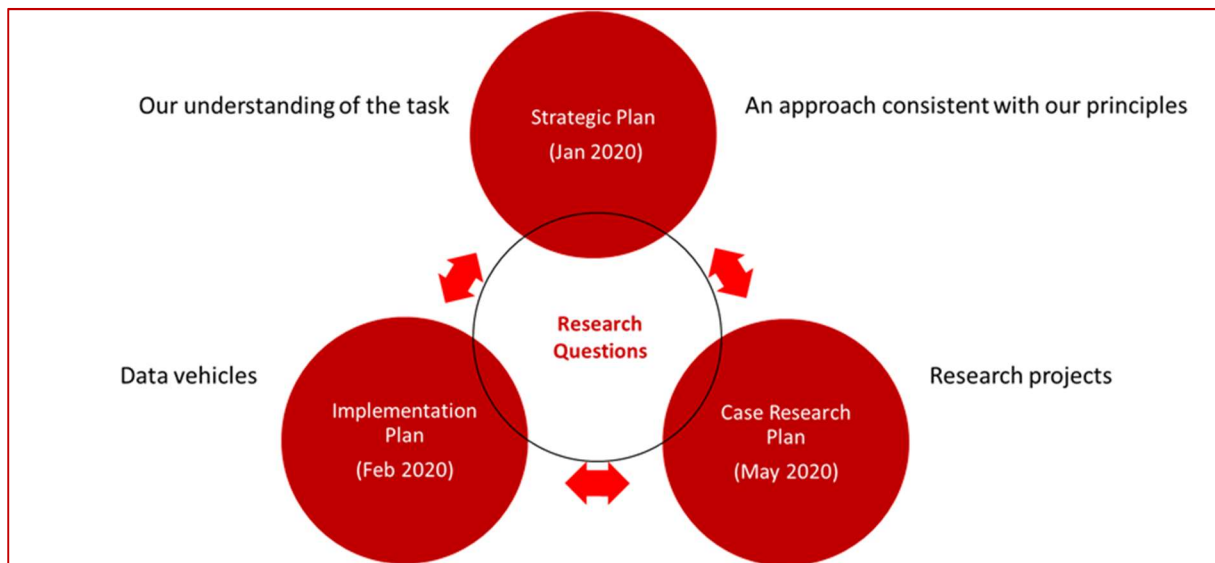
openness into ORRI – while it appears to be more present and salient at national level and in a number of ERA-Nets. From our perspective, however, what is more important than the specific name and acronym, is that the issues themselves – of how to align science and society, how to ensure inclusion and reflexivity, et cetera – do of course not go away even if they arise with other labels, such as the individual “keys”, or openness, or also labels such as social robustness and transdisciplinarity. In particular, the latter has gained more traction at the EU and OECD level. We note, however, that the underlying issues are largely overlapping. This means that the domain of relevance for SUPER MoRRI results has widened and transcended “pure RRI” across the life-time of the project.



### 3. Fundamentals: Principles of and for responsible monitoring

The SUPER MoRRI project was structured by three interrelated strategic pillars, which were consolidated in three Deliverables: the Strategic Plan (D1.2), the Implementation Plan (D2.1) and the Case Research Methodological Plan (D5.1).

Figure 2: SUPER MoRRI project design



These three Deliverables set out the strategic vision and empirical approach of the project. The Strategic Plan anchored the project in a conceptual approach, and overall empirical research approach, and described the principles of the understanding of responsible metrics to be operationalized. The Implementation plan described in detail an empirical programme utilizing secondary data and generating primary data at different levels of analysis, including organizations and researchers. The Case Research plan described a set of case studies to be undertaken with a focus on process and the examination of pathways to benefits from open and responsible research and innovation.

The remainder of this section describes the principles of responsible metrics guiding the project, drawing on wider scholarly and policy debates about how to monitor open and responsible research. A considerable body of prior policy development work was fundamental to the SUPER MoRRI understanding of responsible metrics and the approach eventually adopted. The Strategic Plan built on important prior work by the Expert Group on Policy Indicators for Responsible Research and Innovation (Strand et al. 2015). While this report was focused on indicators specifically to support policy development, it contained important principles of broad relevance. First, attention to monitoring the qualities of processes was highlighted as an essential counterbalance to focus on final outputs or products. Second, monitoring activity should be primarily designed to support and nurture



desired practices and processes - monitoring for as much as monitoring of open and responsible research and innovation. Third, thinking should shift from thinking instrumentally in terms of 'key areas', such as Gender Equality or Public Engagement, to also thinking thematically in terms of critical challenges such as sustainability.

Further policy-focused work was also provided key lines of thinking for the development of the SUPER MoRRI approach to responsible metrics. This work included reports emanating from the Expert Group on Altmetrics (Wilsdon et al. 2017), the Open Science Policy Platform (Hormia-Poutanen et al. 2017), and the Expert Group on Indicators for Researchers' Engagement with Open Science (Wouters et al. 2019). The SUPER MoRRI project also inherited the explicit legacy of the prior MoRRI project (Mejlgaard et al. 2018; Peter et al. 2018), which produced a set of 36 indicators of responsible research and innovation (RRI) key areas. These RRI indicators were subsequently included as potential monitoring elements for use by some projects funded under the final Science with and for Society (SwafS) Work Programme under Horizon 2020.

As was described in section 2.1, important policy shifts occurred in the course of the life of the project. Of particular significance for the strategic direction of SUPER MoRRI was the launch of the new European Research (ERA) (European Commission 2020b; EUCO 2021), which was accompanied by a shift toward further enhancing openness and citizen participation in R&I. The prior attention to the RRI key areas had diminished with this new focus. While many elements of the data and information produced by SUPER MoRRI do bear the imprint of the policy context in which the project was launched, the outputs are not limited to this initial framing. The project consortium had anticipated the need for flexibility in adopting an expansive definition of how 'responsibility' should be understood in developing the monitoring framework, as was reflected in the strategic plan.

Alongside this process of policy evolution in monitoring for open and responsible research and innovation, scholarly impetus for more responsible design and use of metrics also gathered momentum in the years leading up to the commencement of SUPER MoRRI. Of particular significance here were the Leiden Manifesto (Hicks et al. 2015), Responsible Metrics for Open Science (Wilsdon et al. 2017), and the San Francisco Declaration on Responsible Assessment (DORA).

During the span of SUPER MoRRI further development of the principles for responsible assessment practices and metrics has occurred. Several important initiatives emerged that will contribute to advancing and supporting open and responsible research and innovation and their monitoring. The strategic vision of SUPER MoRRI is consistent with important positions adopted in these initiatives. For example, the Agreement of the Coalition for the Advancement of Research Assessment (CoARA) rejects the use of assessment to rank research organisations. Data that is provided through the PROMISE portal on research performing organisations and research funding organisations also adopts this approach. Organisational level comparisons are only available for selected data and at intermediate levels of aggregation of those organisations – for example by broad region or organisation type. The intention is to provide relevant contours of the efforts underway to advance open and responsible research and innovation, rather than setting up opportunities for potentially counterproductive and inappropriate comparisons of individual entities.

The DORA initiative [Tools to Advance Research Assessment \(TARA\)](#) is developing a data-driven approach to making transparent the criteria for hiring, promotion, and tenure decisions in universities worldwide. UNESCO is working in a concerted fashion to implement its [Recommendation on Open Science](#), including through a Working Group on Open Science Monitoring Framework. The [Coki Open](#)



[Access Dashboard](#) compiles public information on the openness of scientific publications worldwide, including by academic publishers. These initiatives cover important aspects of monitoring to support open and responsible research and innovation and others can be expected to emerge-

Innovation in metric design will also continue. Debates about how to optimize the responsible use of metrics, both old and new, for monitoring research and innovation (R&I) will also, of course, continue. In its own moment of seeking to capture the essence of responsible metrics approaches, SUPER MoRRI adopted some simple principles based on our assessment of the different currents of these debates and our vision of what experiments in data gathering and representation would contribute directly to supporting policy development for open and responsible research and innovation.

These guiding principles can be summarised as follows:

- The primary purpose of monitoring should be to advance learning about transformation processes to inform ongoing policy designs and practical responses by different interested actors;
- The primary function of monitoring should be to gather valid information that can be considered by interested parties and decision-makers at all levels (Kleibrink et al. 2016);
- Monitoring should take a multi-level approach, expanding from the country level focus adopted by the MoRRI project, to place a greater emphasis on the policies and processes of key R&I organisations, including universities and research funders;
- Monitoring should utilize a variety of quantitative and qualitative data sources and methods to generate data and information to open up a diversity of perspectives on openness and responsibility in R&I;
- Monitoring should advance the ‘credible contextualization’ of the data quantifications used in the PROMISE portal, to assist in appropriate interpretations of what these quantifications ‘indicate’; and
- Monitoring should engage in a continuous fashion the community of practice of projects engaged in efforts to monitor open and responsible research and innovation, in contexts including institutional change processes and regional development; and
- Overall, the monitoring framework should generate, provide, and present data and information in such a way as to support the continuing development of openness and responsibility in R&I.

In summary, SUPER MoRRI has developed a final output, the online PROMISE portal where users can engage with a diverse range of data and information. These diverse elements reflect the development of a ‘monitoring framework’ rather than a ‘monitoring system’. These elements range across levels of analysis from countries, to organisations, and individual researchers. The objective was not to create a set of ‘scoreboards’ but to open perspectives on the furthering of open and responsible research and innovation from different perspectives. These perspectives allow interested users to understand the emerging contours of responsible cultures and practices in R&I and observe some of the opportunities to further multi-level institutional change in the future.



## 4. Ecosystems for mutual learning

### 4.1. The RRI environment: creating a SwafS ecosystem

RRI permeated Research & Innovation globally. This broad uptake is reflected in policy documents, funding schemes, and a list of Horizon 2020 Science with and for Society (SWAFS) funded projects that expanded until the last funding round in 2021.

The many actors working in this environment generated a wealth of information and tacit knowledge. From the start of SUPER MoRRI these actors benefitted from a platform for sharing and communication. In recognition of the benefits and opportunities that this space would provide, SUPER MoRRI has been actively co-creating and operating the so-called SwafS ecosystem.

### 4.2. The need for developing a community

Despite the diverse set of themes, focus and areas of application that consortia funded under the SwafS programme operate within, there is a common denominator that aligns the apparently most juxtaposed projects. That is, all of the consortia are asked to reflect on MoRRI indicators to make measurable and evaluate specific impacts that their effort may elicit. The MoRRI indicators, developed in SUPER MoRRI's predecessor (the MoRRI project), not only provide the vocabulary necessary, but also a format in which the RRI impacts are understood under the banner of bringing Society closer to Science and vice versa. Simultaneously, there is a complexity to the employment of a policy such as RRI and its presumed indicators. Although it provides a sense of stability and presumed intercomparability and standardisation, it cannot be taken as a given, as project-internal understandings and conceptions of any of RRI's assets and practices differ drastically from one another. They do not necessarily reflect the national-level executed MoRRI indicators, thereby confirming the need for credible contextualization as was introduced in SUPER MoRRI's strategic plan.

Another need that emerged soon after the start of SUPER MoRRI was the changing European policy landscape in preparation of Horizon Europe. This is described elsewhere in this report (cf. 2.1) in more detail. But in short it refers to the mainstreaming of RRI dimensions, such as gender equality, ethics and integrity, public engagement and open access. It was replaced by the new policy paradigm of Open and Responsible R&I practices, ORRI, with a specific focus on Open science and Citizen science. This was equally relevant for all SwafS RRI projects, in order to understand the consequences for the implementation of the RRI-projects, working on an 'policy obsolete' concept.

### 4.3. Who has been participating in the ecosystem?

In the table below, the SwafS funded projects per call are displayed. Not all of them participated during the whole running time of the Ecosystem. Some started and stopped earlier, and others started late.



The SUPER MoRRI project time of 5 years however, covered all of them. In red the projects that participated in ecosystem, survey or both, occasionally or regularly.

Table 2: Overview of SwafS calls

SwafS Call	Call theme	Consortia
SwafS-5-2017	New constellations of changing organisations and actors	Multi-Act, RiConfigure
SwafS-5-2018-2020	Grounding RRI in research-performing and research-funding organisations	Co-Change, Ethna System, Grace, GRRIP, RESBIOS
SwafS-9-2016	Moving from constraints to openings, from red lines to new frames in Horizon2020	NewHoRRlizon
SwafS-13-2017	Integrating society in science and innovation – an approach to co-creation	Siscode
SwafS-14-2017	A linked-up global world of RRI	RRING
SwafS-14-2018-2019-2020	Supporting the development of territorial responsible research and innovation	CHERRIES, DigiTeRRI, RIPEET, RRI-LEADERS, RRI2SCALE, SeeRRI, TeRRIFICA, TeRRitoria, TetRRIS, TRANSFORM, WBC-RRI.NET
SwafS-15-2018-2019	Exploring and supporting citizen science	ACTION, CitiS-Health, CoAct, CROWDS4SDG, CSI-COP, Envirocitizen, EU-Citizen.Science, MICS, REINFORCE, WeCount
SwafS-19-2018-2019-2020	Taking stock and re-examining the role of science communication	NEWSERA
SwafS-20-2018-2019	Building the SwafS knowledge base	On-MERRIT, C4S, ALLINTERACT, B2-InF, FEDORA
SwafS-22-2018	Mobilising research excellence in Europe’s outermost regions	FORWARD
SwafS-23-2020	Grounding RRI in society with a focus on citizen science	INCENTIVE, JoinUs4Health, TIME4CS
SwafS-27-2020	Hands-on citizen science and frugal innovation	COESO, FRANCIS, STEP CHANGE, YOUCOUNT
SwafS-31-2020	Bottom-up approach to build the SwafS knowledge base	RRIstart, SEEDS, Critical Making, PandeVITA, MOSAIC

In the calls of the Ecosystem funded projects, consortia should choose a basket of indicators to measure the impact of their work. In particular, consortia are expected to contribute *to one or more of the MoRRI indicators*. This is a general reference to the MoRRI project, in specific calls there is reference to particular indicators such as: PE1-PE10; SLSE1 and 4; GE1; OA6; E1-3; GOV1-3. Whilst in SUPER MoRRI these specific indicators have been abandoned because they aimed at national level, they have permeated the SwafS projects.

#### 4.4. How has the ecosystem been operating?

Based on the need to engage with the SwafS-projects on a regular basis during the lifetime of the project, the SUPER MoRRI SwafS ecosystem hosted virtual meetings every months to discuss topics related to responsible research and innovation (RRI) and SwafS. This meeting space has been running from October 2019 till December 2022 and has generated lively discussion. Representatives of projects funded under several consecutive SwafS-calls (see Table) get together in bimonthly calls to discuss a wide range of topics related to RRI, including open science, monitoring, evaluation, stakeholders, citizen science, equality, diversity and inclusion, transformative change, self-



assessment, and engagement to mention a few. The alternating months the SwafS-ecosystem got together on the topic of territorial RRI and how to monitor and evaluate territorial aspects in addition to RRI. This is what was called the SwafS14 M&E-group. In 2020 and 2021, when almost all projects were active, ecosystem meetings regularly had 35-40 participants, including EC representatives.

In addition to the virtual discussions, the Ecosystem generated two particular outcomes and learnings:

## 4.5. Multistabilities of RRI

Two key questions that emerged among the SwafS projects revolve around: How is ‘responsibility’ operationalised, and how are desirable impacts made measurable across the projects within the Science with and for Society programme? To this end, a questionnaire was co-created with the ecosystem participants. Questions were developed to understand the ways in which these projects reflect notions of RRI in their own words and logics; they tried to illuminate three key themes: (1) how the projects conceive of RRI, (2) how the projects made ‘their’ RRI actionable / translated RRI into practice and (3) how their notions of RRI are carried beyond the boundaries of the ‘project’. In total, 29 projects participated with a total of 36 respondents out of 110 inquiries (see Meijer and Amanatidis 2022).

One of the objectives was to identify, if any, ‘indicators in the wild’ through understanding how different SwafS projects ‘do’ responsibility. We call the ways in which RRI (or responsible practices) occurs ‘multistabilities’. Inspired from works in Philosophy of Technology (cf. Rosenberger, 2017), this work highlights a certain temporality and fluidity of the concept, paying respect to the multiple understandings and ways of ‘doing RRI’ that the respondents of the questionnaire have described so thoroughly. This compound word thus emphasises through its prefix ‘multi’ that there is more than one RRI that occurs in these projects at any time. The word ‘stability’ indicates that it is a delicate, temporal process in which actors are engaged and hold stable through their involvement, creating a common RRI for the consortium’s work that may be inspired and based on (very) stabilised operationalisations of responsibility, e.g. the 6 RRI keys from the European Commission, but nonetheless differ in their empirical context.

The results from the questionnaire carved out three main understandings:

- Science with and **for** Society: *facilitating practices of responsibility*. Here the operationalisation of responsibility is characterised by a strong directionality of the research and innovation efforts towards the groups that the projects try to mobilise, this ‘stability’ revolves around focusing on the issues and desires of a specific community or network of actors, empowering them in negotiating, establishing and transforming issues into what for them is responsible. The role of the consortium here is supportive, where resources (knowledge, network, funding etc.) are offered in driving these transformations.
- Science **with** and for Society: *democratising research and innovation*. Here the operationalisation of responsibility surfaces in the attempt to fully democratise the research and innovation process by involving diverse sets of actors into not only the research and innovation project, but also its design. Responsibility is ensured through two key mechanisms: (1) the creation of common views across all actors and (2) holding each actor equally accountable for decisions and actions taken





throughout the R&I process and its outcomes. In effect, these two mechanisms ensure that each actor not only fully engages in, but also has the prerequisite knowledge and understanding necessary to contribute to the development of the project.

- Science **with and for** Society: *mobilising actors around RRI conceptualisations*. Here the operationalisation of responsibility concerns the implementation of already-existing principles or thinking of what is responsible. As opposed to the previous two stabilities, which require a proactive involvement to first declare what responsibility means in any given context, this stability provides certain normative anchor points or methodologies that, when followed, are thought to produce responsible outcomes. Here, the strategy the projects follow is one of implementing these already-operationalised models into a specific context. The form this act of implementation takes can be understood as a ‘formalisation’ of RRI.

## 4.6. Diversity and translational issues

Building upon the multistabilities, the Swafs14 M&E subgroup collectively explored the differences between the projects further. First, the SUPER MoRRI team compared a number of available evaluation plans for their purposes and justification of M&E; the approaches to M&E; and the tools and instruments applied. Next, the Swafs14 M&E group organized four *focused conversations* around each of the issues that emerged from the M&E plan comparison.

1) The RRI frameworks that projects drew on: the diversity of approaches to RRI became immediately clear. Each project had a different focus, selection of stakeholders, ambition, each working with a different territory. Some had a strong focus on systemic institutional or organizational change. Others focused on citizen engagement as crucial condition for grounding RRI. And some argued that certain keys, such as governance, permeated all aspects of regional RRI.

2) The diversity of stakeholders and how to engage them: General opinion is that engaging stakeholders effectively is not straightforward. There is a need to map the stakes of all these stakeholders and discuss how to be clear about expectations and levels of involvement. Whilst finding and enrolling stakeholders is a complicated process, keeping them committed for a longer period is even more so. Building trust, understanding and the drive to contribute to change and innovation ideally comes from the stakeholders, but this is not always the case. Commitment needs a lot of maintenance and care, communicating the benefits of RRI and projects protocols to stakeholders and translating between stakeholders’ different needs and languages.

3) The evaluation logics and practices adopted by the projects and: It remained a struggle to explain the benefits to stakeholders of RRI and the need for regular assessments. Further, the difficulty of accounting for regional differences persisted. Many regional RRI projects weave together various interventions or forms of collective experimentation in different regions. Comparing these is difficult. Lastly, evaluations have several formal and informal goals and effects. On the one hand for accountability and governance purposes, but informally it is a way of raising awareness around RRI, and a means of learning about and solving issues that are occurring in the project.

4) The indicators, what they mean and how to use them. Apart from the issue with the MoRRI indicators, play different roles in different stages of the RRI and evaluation process. During the project



they can orient partners to what might be important or needs to be addressed in the project. After the project, indicators can be used for evaluating the project or communicating project outcomes. Moreover, indicators are useful in terms of accountability and the conceptualization of new projects and funding applications.

Lessons learned from these focused conversations are three fold. A) The diversity of approaches to RRI that our projects work with is enormous. Doing justice to the complex ambitions, bureaucratic requirements and diversity of needs and concerns of stakeholders involved was a key topic of the RRI ecosystem. The ambition to do more careful translations requires revisiting our methods and evaluative approach. If the diversity that our projects encounter requires careful translation and engagement to achieve representation and ownership, we need flexibility, adaptiveness, and what we started to call “evaluative conversations” between project and territorial partners: within a project specific framework without a one-size-fits-all monitoring and evaluation plan.



## 5. Responsibility in research and innovation – the global perspective

### 5.1. The International Satellite Partners network

The WP4 was entirely devoted to the international dimension, aiming to foster global responsibility in research and innovation. It facilitates mutual learning about Responsible Research and Innovation (RRI) and RRI-like activities in diverse countries and regions.

The SUPER MoRRI project's internationalization efforts commenced with the formal establishment of a network comprising ten International Satellite Partners (ISP) from various countries and regions outside of Europe. In mid-2020, one network member chose to discontinue their participation (See Table 2 for ISP network composition). This network serves as a global sounding board for SUPER MoRRI, offering vital non-European perspectives.

Comprising key individuals from organizations beyond Europe, the ISP network provides valuable insights into responsibility in research and innovation. In June 2019, UPF, along with other WP leaders, nominated diverse individuals, ensuring geographical, stakeholder, gender, and RRI profile diversity for the network's formal constitution.

Table 3: International satellite partners of the SUPER MoRRI project

Name	Institution	Country
Peta Ashworth	University of Queensland	Australia
Nelius Boshoff	Stellenbosch University	South Africa
Marcela Lozano-Borda	Pontificia Universidad Javeriana	Colombia
Ali Meleki	Sharif University of Technology	Iran
Luisa Massarani	Comunicacao Publica da Ciencia e Tecnologia	Brazil
Mu Rongping	Chinese Academy of Sciences	China
Gunilla Öberg	University of British Columbia	Canada
Asako Okamura	National Graduate Institute for Policy Studies	Japan
Carmelo Polino	Consejo Nacional de Investigaciones Científicas y Técnicas	Argentina
Michael Bernstein	Arizona State University	USA



## 5.2. Insights and Recommendations: A Global Perspective on Responsibility

In this section, we articulate the primary insights gained from our interactions with the ISP network over the course of the project.

### 5.2.1. RRI and benefits beyond Europe

In late 2019, ISPs were actively involved in assessing the relevance of the RRI monitoring system beyond Europe. The key outcomes of these consultations were summarized in D4.1. ISPs from Australia, Brazil, China, and the USA actively contributed to data collection for WP2, employing standardized procedures aligned with the respective network in WP2. This harmonization facilitates comparisons and partial benchmarking of RRI practices between European and non-European contexts, with the principal findings outlined in deliverable D4.2 (Llorente and Revuelta 2023). In this section, we offer an overview of the key insights derived from these two deliverables.

The exploration brings attention to the global rise and acceptance of RRI outside Europe, stressing its transformative influence on research and innovation practices. Within the SUPER MoRRI project, there is a deliberate focus on expanding internationally, evident in the establishment of an ISP network designed to capture varied perspectives.

Various terms such as "social progress" and "inclusive innovation" are used to express RRI concepts beyond Europe, reflecting the challenges faced in translation. The SUPER MoRRI project seeks a deeper understanding of RRI integration in Research Performing Organizations (RPOs) and Research Funding Organizations (RFOs) across the globe, with international benchmarking showcasing advanced RRI practices in Higher Educational Institutions (HEIs) situated in Australia and the USA.

The ISP network stresses the importance of policy changes, secure funding, responsible research initiatives, and the integration of RRI into PhD training. Embedding RRI principles in HEIs is viewed as critical in molding a globally responsible and inclusive research community. RFOs assume a vital role by shaping RRI adoption through funding calls and policies.

Comparisons with international RFOs spotlight inventive approaches, including unconscious bias training and the involvement of community assessors, contributing to fairness and inclusivity. Recognition of the necessity for further research is articulated to gain a comprehensive understanding of RRI implementation on a global scale.

In conclusion, this underscores the adaptability of RRI concepts across diverse contexts, recognizes both potential benefits and challenges, and emphasizes the crucial role played by indicators. Despite originating in Europe, the fundamental aspects of responsible research and innovation are recognized and embraced on a global scale.



## 5.2.2. Insights from the regional webinars

In 2021, SUPER MoRRI's second annual event, influenced by the global partners, adapted to a virtual format due to the COVID pandemic. Instead of a full-day seminar, four webinars spanned different continents, exploring responsible research evaluation globally. The first three webinars focused on the Americas, Asia/Pacific, and Africa/Middle East, featuring country-based panel statements and inspiring discussions in breakout sessions. The fourth webinar brought together ideas globally, with contributions from DORA, ENRESSH, OECD, and UNESCO representatives. A total of 30 countries participated in the seminars on responsible evaluation practices. In this section, we reflect on the main topics released during these events.

Diverse contexts shape distinct characteristics in science systems, with global discussions on responsible evaluation emphasizing moving beyond metrics and recognizing the cost of change. Key issues in research evaluation include indicator limitations, the value of peer review for regional problems, and challenges from prioritizing quantity over quality. Ongoing efforts to shift perspectives acknowledge varying maturity levels in science systems.

Implementing responsible research evaluation requires significant investments, especially in training high-level evaluators globally. The effectiveness of evidence-based policy depends on qualified individuals and entails substantial time and financial commitments. A shared imperative is to intensify efforts for responsible evaluation in education globally, establishing new criteria and a harmonized conceptualization of "responsibility."

Reflecting on the transition in science systems and evaluation practices questions whether it should be evolutionary or revolutionary. European framework programs have long supported connecting science with the values of European citizens. While creating impact is a policy goal, it's often seen as an additional requirement, unintentionally fostering a science-society divide. RRI transforms science systems through stakeholder engagement, with participants in the SUPER MoRRI event agreeing that changing policy isn't particularly challenging, but the real hurdle lies in changing the culture. Legislation must align with people's motivations for responsibility, necessitating an incremental transition.

## 5.2.3. Global recommendations

The ISPs participated in collaborative discussions aimed at formulating recommendations centered on the relevance and feasibility of RRI and monitoring RRI benefits. Special attention was given to non-European perspectives. The outcome of this collaborative effort is encapsulated in a policy brief, as detailed in D4.3 (Llorente et al. 2023). This collaborative and iterative process among the ISP highlighted their joint efforts, ultimately yielding a set of recommendations for the advancement of RRI practices:

1. Promote global dialogue by linking European RRI concepts with international principles such as open science, sustainability, and frameworks like the SDGs.
2. Involve stakeholders in crafting region-specific indicators, adjusting explanations and engagement strategies to suit their diverse comprehension levels.



3. Highlight the need to contextualize metrics across various levels (regional, national, organizational, individual), and advocate for indicators tailored to these distinctions.
4. Execute proactive data collection, address gaps transparently, and acknowledge missing data to ensure a reliable dataset for evaluations.
5. Highlight the importance of specifying indicators, and recognizing limitations to avoid overlooking vital aspects of responsible research and innovation.
6. Advocate for ongoing learning and adaptation in indicator use, refining them based on feedback, experience, and emerging knowledge.
7. Utilize indicators for evidence-based policymaking to develop stable policies supporting responsible research and innovation practices.
8. Encourage funding programs that integrate RRI concepts into evaluation criteria, incentivizing responsible research practices in the community.
9. Back the integration of RRI concepts in PhD training to equip future researchers with responsible research knowledge.



## 6. Monitoring responsibility responsibly – selected monitoring data

This chapter delves into the noteworthy findings from the SUPER MoRRI project's monitoring efforts, showcasing key insights into Responsible Research and Innovation (RRI). The methodological approach, guided by principles of contextualization and responsibility, is briefly outlined, as detailed in the strategic plan D1.1 (Woolley and Otero-Hermida 2019) and the implementation plan D1.2 (Woolley et al. 2020). The sections place a spotlight on selected results, emphasizing practices and perceptions of RRI among European researchers (RESU), RRI implementation in Research Performing Organisations (RPOs), and the support provided by Research Funding Organisations (RFOs). The chapter also features Eurobarometer indicators and highlights from secondary data sources, offering a compelling snapshot of the project's findings and their implications for advancing responsible research practices across diverse contexts.

### 6.1. Methodological approach to monitoring

SUPER MoRRI project adopted a monitoring and indicator development approach guided by principles of contextualization and responsibility. The methodology for monitoring was formulated in the beginning of the SUPER MoRRI project and is documented in both the strategic plan (D1.1) and the implementation plan (D1.2).

The primary objective described in D1.2 and D1.1 was to gather data from diverse organizational contexts and at various levels to enable triangulation and provide indicators for RRI at different levels of aggregation. Consequently, each data collection method is either directly connected to another method or indirectly linked through the concepts being studied.

Additionally, continuous efforts were made to identify and update secondary data as it became available throughout the monitoring process.



Figure 3: Revised timing of main data collection vehicles

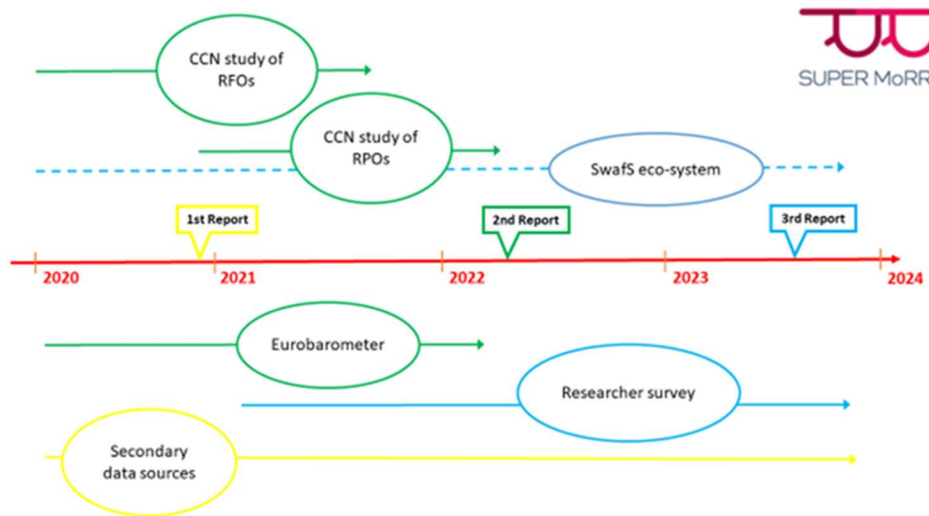


Figure 3's color-coded representation illustrates the stepwise integration of data from the empirical components of the Implementation Plan into successive monitoring reports.

The 1<sup>st</sup> RRI Monitoring Report (MR1) focused on country-level secondary data for the EU27, Norway, and the UK (see D2.2, Losinno et al 2020). The 2<sup>nd</sup> RRI Monitoring Report (MR2) (D2.3, Ryan et al. 2022) builds upon MR1 by incorporating findings from two completed large-scale studies on research funding organizations (RFOs) and research performing organizations (RPOs). Additionally, preliminary results from a study on gendered eco-innovations are included. MR2 updates metrics from MR1 and introduces results from a new Eurobarometer on public perceptions of research and innovation conducted in spring 2021.

The 3<sup>rd</sup> RRI Monitoring Report (MR3) further augmented secondary indicators with available data points (D2.5, Ryan et al. 2023b). It extended the CCN-RFO and CCN-RPO studies by introducing organizational RRI indicators. New insights from the SUPER MoRRI study on gendered eco-innovations are added, and the report includes results from a large-scale survey (RESU) on European researchers' practices and perceptions of RRI.

## 6.2. Selected findings

The presentation below of selected findings from the monitoring of RRI provides an overview of the results and should serve as inspiration for further readings of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> monitoring reports.





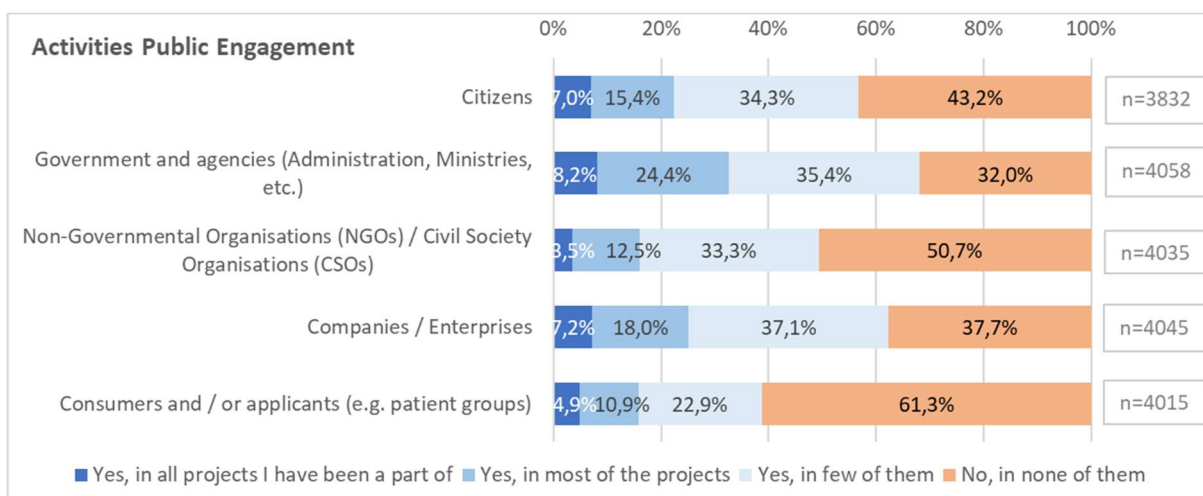
### 6.2.1. Practices and perceptions of RRI among European researchers (RESU)

The overall aim of the SUPER MoRRI Researcher Survey (RESU) was to empirically examine European researchers' responsible research practices and their perceptions of, and attitudes towards, open and responsible research and innovation.

The RESU focused 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 (D2.5, Ryan et al. 2023b). A net sample of 4.180 researchers from 45 different countries and 277 different research performing organisations participated in the survey. See Ryan et al. (2023b) for the full sample characteristics.

Public Engagement will in this Final Report serve as an example of the results of the RESU. Respondents were asked about their cooperation with a variety of non-academic actors in the last three years.

Figure 4: Activities regarding Public Engagement

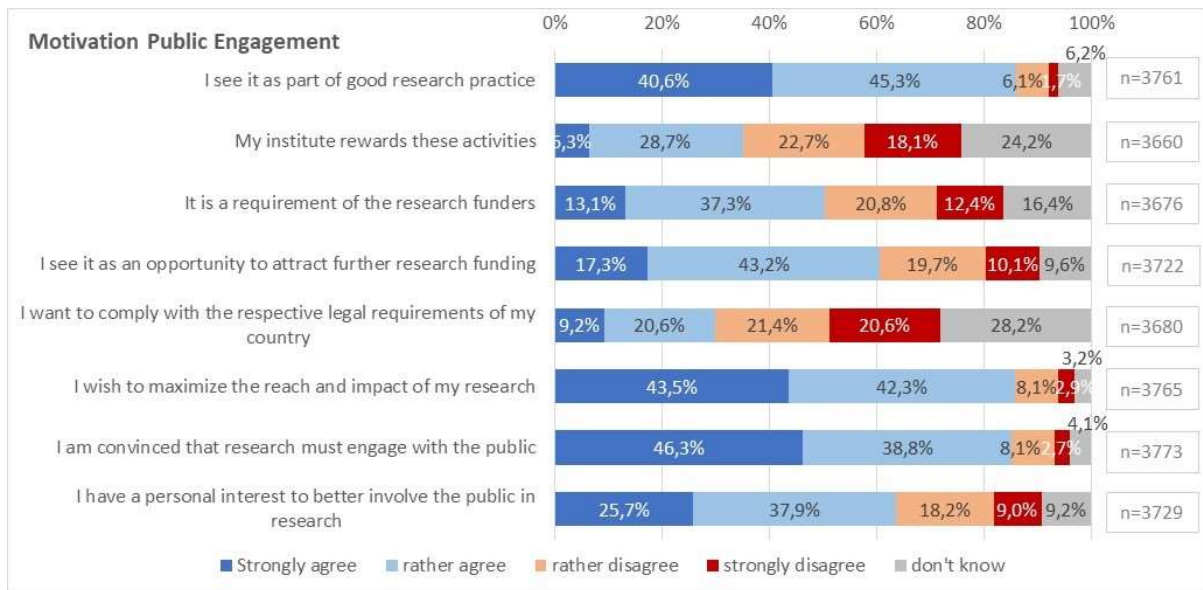


Note: Figure originally presented in the 3<sup>rd</sup> Monitoring Report as Figure 4 (Ref., p. 14). N = 122.

Furthermore, respondents were asked about their motivation to engage in Public Engagement activities.



Figure 5: Motivations for Public Engagement



Note: Figure originally presented in the 3<sup>rd</sup> Monitoring Report as Figure 5 (Ref., p. 15). N = 122.

The figures show that a stable base of two thirds of researchers have interacted with each of the different types of non-academic actors in at least a few of their projects. It also shows an overall positive attitude towards Public Engagement across different motivations.

The data in RESU lends itself well to combination studies with the other data vehicles from the SUPER MoRRI project. Project participants have already conducted pattern studies for monitoring contributions of open and responsible research and innovation to societal impacts and benefits, where the combination of the RESU with data from the RPO study provides a great possibility to assess the degree to which policy emphasis on public engagement in research organisations relates to researchers’ own practices (D5.2, Woolley et al. 2023b; D5.3, Griessler et al. 2023a).

### 6.2.2. RRI in European Research Performing Organisations (RPO)

The objective of the RPO study was to examine how European Research Performing Organisations (RPO’s) work with and support the five dimensions of open and responsible research and innovation; 1) Gender Equality (GE); 2) Open Science (OS); 3) Public Engagement (PE); 4) Research Ethics and Integrity (REI); and 5) Third Mission (TM). In the 2<sup>nd</sup> Monitoring Report, metrics, and quantitative contextualisation of the European RPOs work with open and responsible research and innovation, was presented. The 3<sup>rd</sup> Monitoring Report contained a more detailed analysis of the RPO’s policies and strategies.

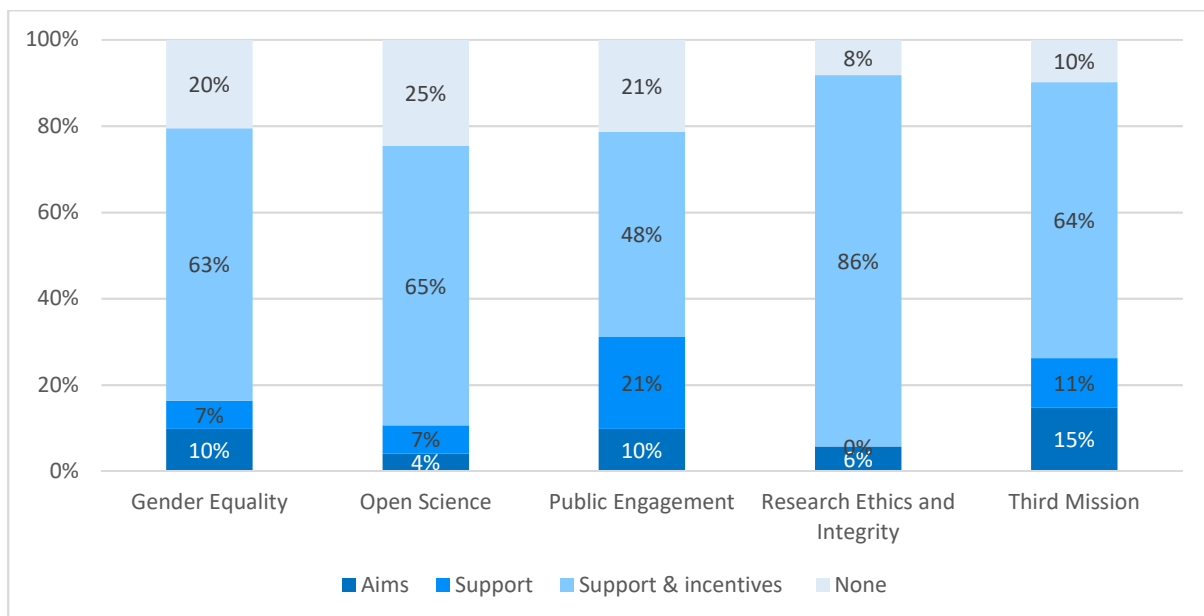
The indicators report on the proportion of RPOs that include these five dimensions in their policies and strategic documents, and whether the respective areas are covered through broad-based strategic aims (‘Aims’), various ‘soft’ support structures (‘Support’), or through ‘hard’ support structures and incentives within the overall and sub-policy areas (‘Support & incentives’). The



definition and instrumentation of the three categories are covered in the 3<sup>rd</sup> Monitoring Report and the Annotated Methodological procedures report (D2.4, Ryan et al. 2023a; D2.5, Ryan et al. 2023b).

Figure X below provides a cursory overview of the work with RRI in European Research Performing Organisations. The figure shows that most RPO's works with Research Ethics and Integrity, while the least works with Open Science. Research Ethics and Integrity is also the area within which the most RPO's work through 'hard' support structures and incentives, e.g. through rules on ethical approval of research or training of researchers in ethical research practices.

Figure 6: RRI in European Research Performing Organisations



Note: Figure originally presented in the 3<sup>rd</sup> Monitoring Report as Figure 20 (Ref., p. 33). N = 122.

In the 3<sup>rd</sup> Monitoring Report, each RRI area is explored in greater detail and each RRI area is subdivided into sub areas. Public Engagement is e.g. subdivided into Public Communication, Public Consultation and Advice, and Public Communication. The data lends itself to detailed analysis of RPOs RRI support profiles and support work.

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 (D2.5, Ryan et al. 2023b: 32).



### 6.2.3. Research Funding Organisations' support for open and responsible research and innovation (RFO)

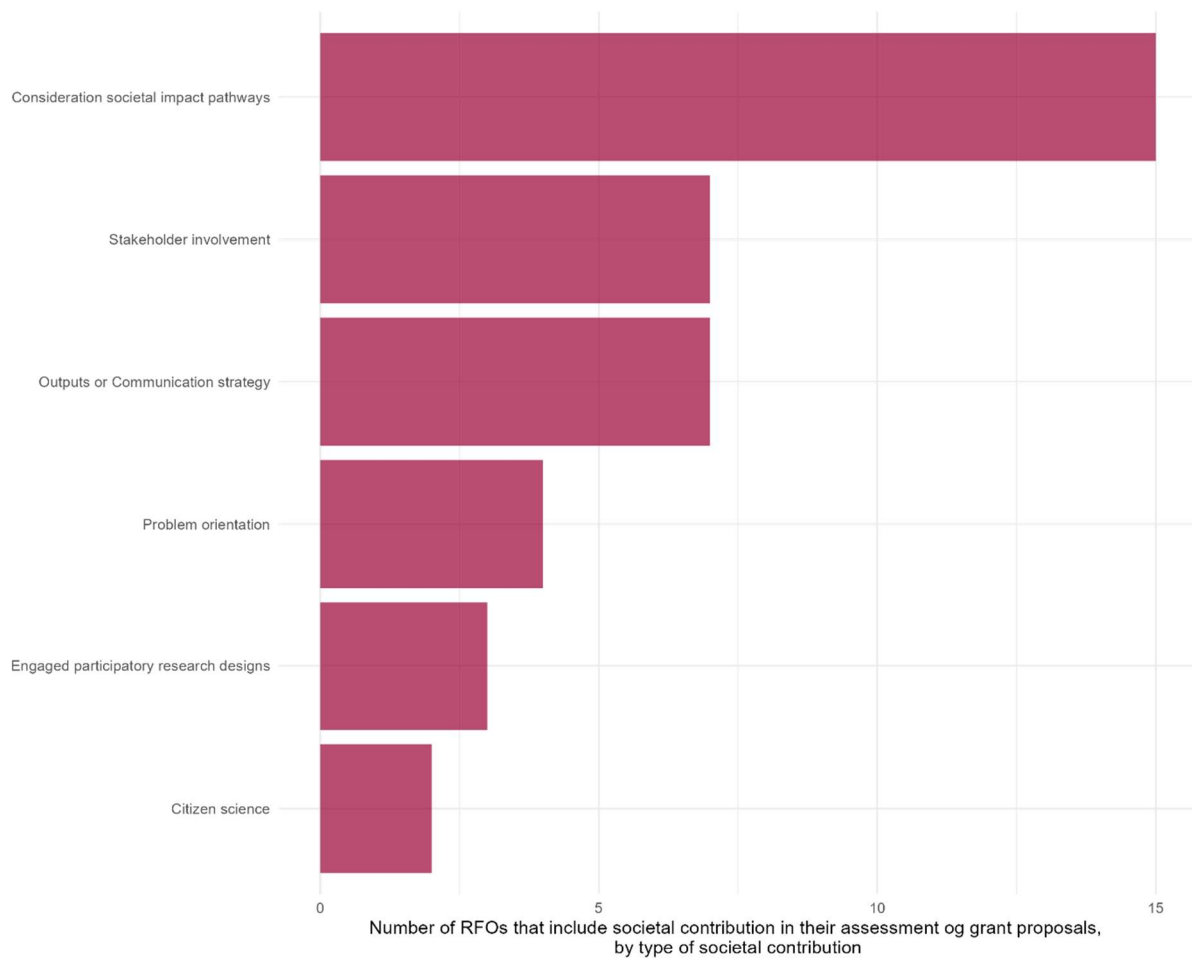
The research funding organisation data collection (CCN-RFO) focused on monitoring how RFOs apply 'pressure' for increased openness and responsibility in the conduct of the research that they fund. While RFOs have differing degrees of autonomy for setting agendas regarding aspects such as open science, gender equality or societal impact, funders also interact with each other through organisations such as Science Europe and the European Foundation Centre and share learning and practices among themselves. Overall, in many respects research funders can be considered active participants in efforts to reform and improve research culture and practices.

Data collection for monitoring the advancement of openness and responsibility by research funders considered their overall policy settings regarding themes such as gender equality, open science, and research integrity. Further attention was then given to how funders apply these principles in their work. The development of monitoring targeted the inclusion of societal stakeholders in RFOs processes for developing funding priorities, funding instruments, and research assessments.

For example, in terms of strategic priority setting, monitoring focused on whether societal stakeholders had a 'voice' with the RFO, typically through being included on an Advisory Board (see D2.5, Ryan et al. 2023b: 62-65). In relation to funding instruments, attention centred on whether criteria or preferences for funding included elements such as a societal impact statements or public dissemination plans, as shown in the figure below. With regard to research assessments, monitoring looked at the inclusion of societal actors as reviewers or evaluators and whether training or guidance was provided to grant evaluators on topics such as eliminating gender bias.



Figure 7: Assessment of societal contributions in grant proposals (n = 55).



#### 6.2.4. Eurobarometer indicators

Among the secondary data sources included, there are a few time series items from Eurobarometer surveys on public perceptions and engagement with science. These indicate aggregated trajectories of citizen interest, efficacy, knowledge, trust, and engagement with science. As such indicators were not developed with RRI as the driving concept, their interpretation must be complemented with primary data collected in this project. The Eurobarometer indicators presented serve the purpose of monitoring RRI across diverse waves of data collection, according to when each item considered was included in the questionnaire.

Interest, efficacy, and knowledge show similar time trends. Interest in scientific discoveries has overall maintained stable across time and has recently increased, which might be an effect of COVID-19 pandemic. Science efficacy, that is the extent to which citizens feel informed, follows a similar trend together with science knowledge which shows a slow increasing trend over time, although seemingly stable from 2005.

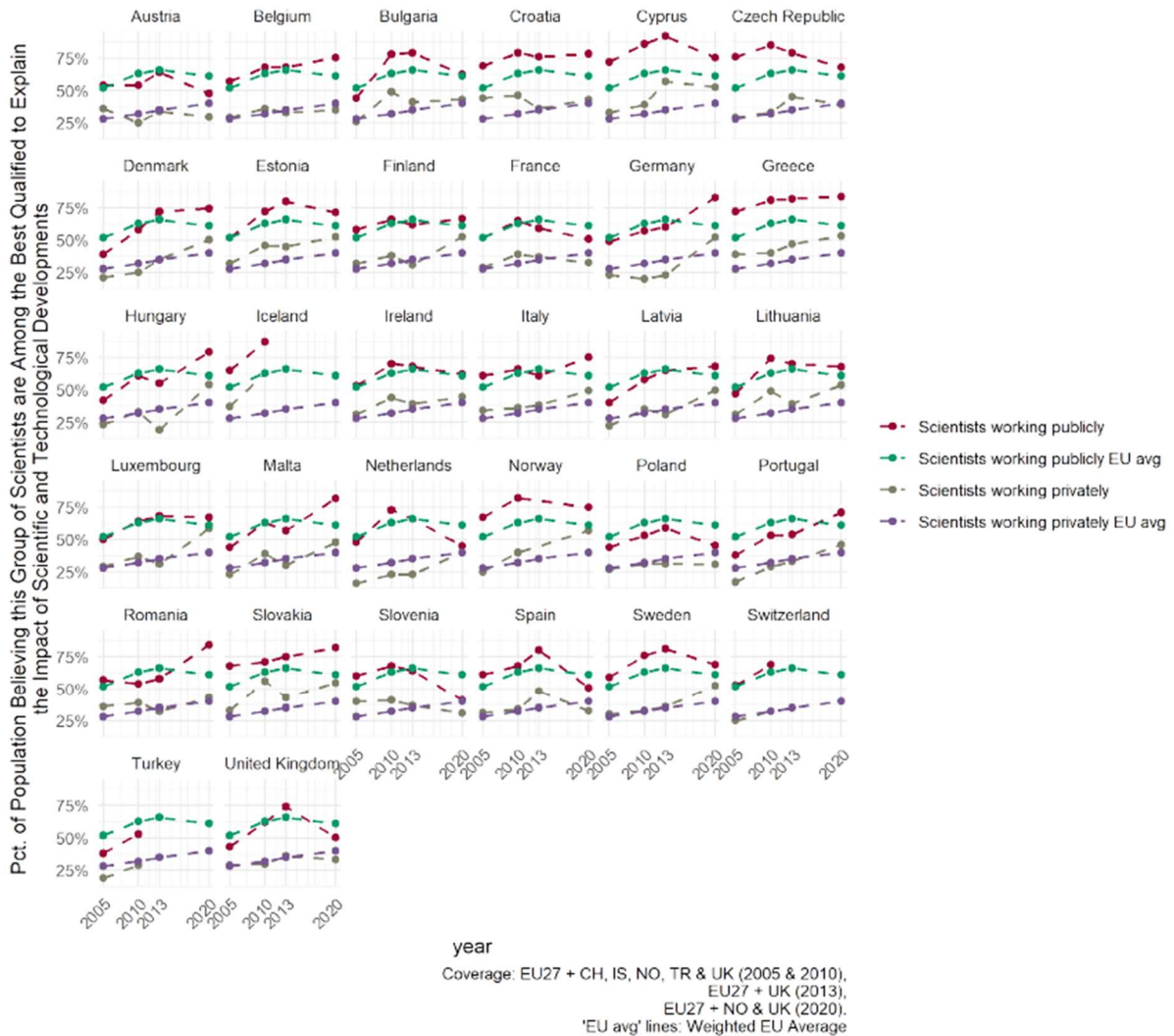


When it comes to trust in scientists as the best qualified to explain the impact of scientific and technological developments, two observations can be made. Between publicly and privately funded scientists, overall, privately employed scientists remain less trusted, although with a positive trend over time. Publicly employed scientists, however, might have been negatively affected by the media exposure during the COVID-19 pandemic and the prior rising trajectory of the EU average for this indicator reversed in 2020. Figure 8 below depicts these observations.

Lastly, when it comes to frequency of engagement and co-creation, EU citizens show a similar increasing trend. Although the percentage of citizens attending public meetings and debates or signing petitions and joining demonstrations remains rather low in 2020, around 13% and 19%, these numbers show a significant increase from the previous point in time. These values might be related to the public dissemination of information that took place during the COVID-19 pandemic, although the variation across countries of these indicators suggests that other local factors might have had a role.



Figure 8: Percentage of the EU-public that believes that scientists are among the best qualified to explain the impact of scientific and technological developments.



Note: Figure originally presented in the 2<sup>nd</sup> Monitoring Report as Figure 19. The metrics reported include country estimates and weighted EU averages including the Member States of the EU at each time of data collection. Complete details for each indicator are included in Table 29 of SUPER MoRRI D2.3 2<sup>nd</sup> RRI Monitoring Report.

Overall, these results show an uplifting image of the European public's perceptions and engagement with science over time. Except for public perception of publicly funded scientists, the other indicators considered show stable or positive trends.



## 6.2.5. Selected findings from secondary data

The sixth data vehicle in the responsible monitoring of responsibility consists of secondary indicators. The aim of this data vehicle is to provide information of national contexts of research and innovation and provide indicators of responsible research and innovation across the countries covered by the SUPER MoRRI monitoring framework (D2.1, Mejlgaard et al. 2019: 11).

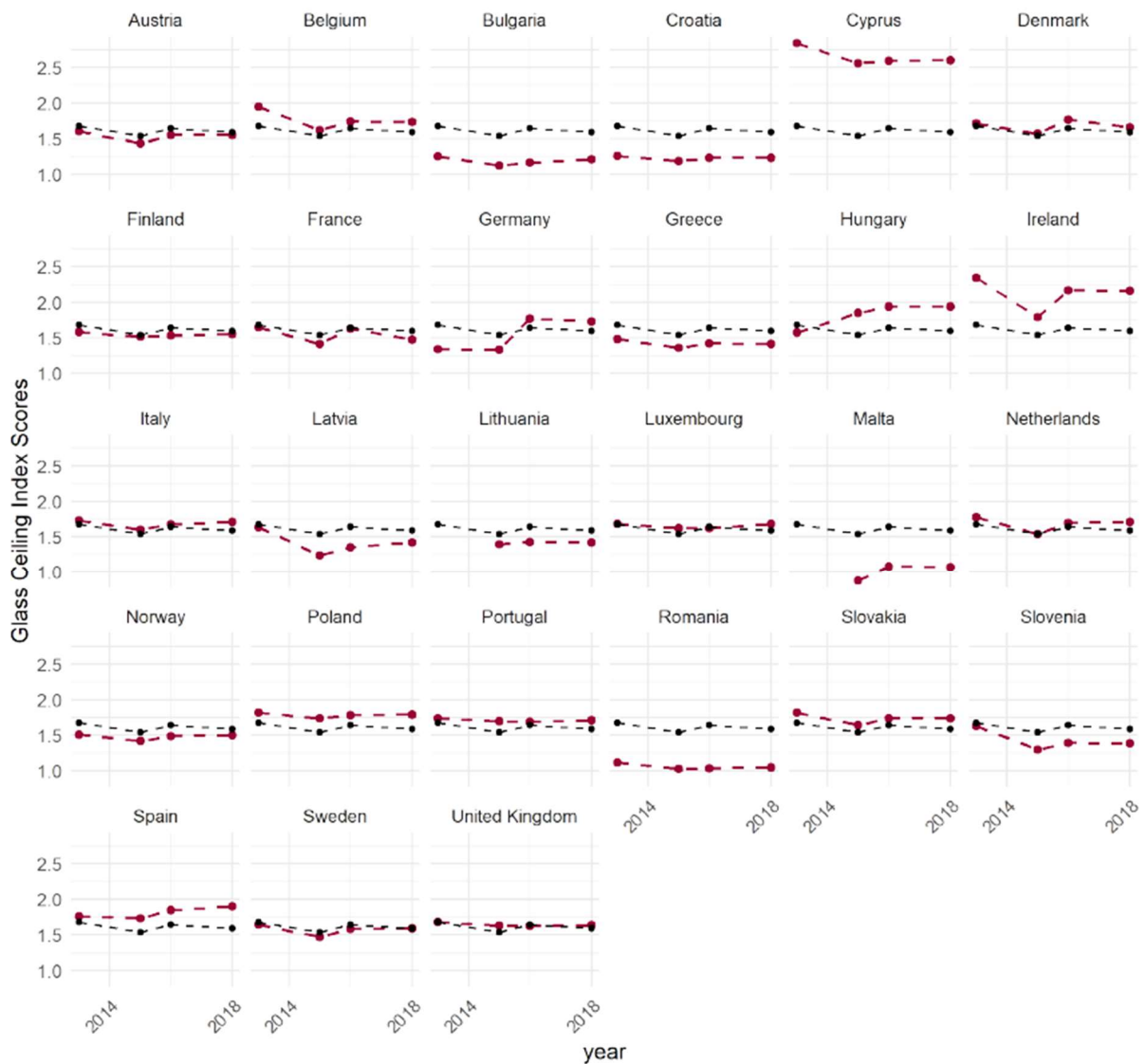
The main sources of secondary data were identified in D2.1, and since then have been updated in the consecutive monitoring reports. These include OECD science and technology indicators, Eurostat science, technology, and innovation indicators, and She Figures. Furthermore, the European Tertiary Education Register (ETER) database provides indicators at the organisational level for a large sample of European research organisations. Finally, bibliometric databases such as Web of Science provide the possibility to design indicators of responsible research and innovation, including those developed in the context of the MoRRI project.

The full presentation of the secondary data is done in the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> Monitoring Reports. Included as an example of the country specific analysis conducted using the secondary data, is the Glass Ceiling Index.





Figure 9: Glass Ceiling Index scores for 2013, 2015, 2016 & 2018



Coverage: EU27 + NO & UK (2013, 2015, 2016 & 2018).  
 Data missing: 2013 (CZ, EE, LT, MT); 2015 (CZ, EE); 2016 (CZ, EE); 2018 (CZ, EE).  
 Black dashed line: Weighted average (EU28).

Note: Figure originally presented in the 2<sup>nd</sup> Monitoring Report as Figure 9. The metrics reported include country estimates and weighted EU averages including the Member States of the EU at each time of data collection. Complete details for each indicator are included in Table 22 of SUPER MoRRI D2.3 2<sup>nd</sup> RRI Monitoring Report.

The Glass Ceiling Index shows the proportion of women at the top level compared with the proportion of women in academia in general. A score of 1,0 thus represents elimination of the glass ceiling on hiring women into top academic positions. Current results confirm that the proportion of women in top academic positions in Europe remains significantly lower than the proportion of women in academia (D2.3, Ryan et al. 2022: 28).



### 6.3. Future monitoring

Looking ahead to Future Monitoring, SUPER MoRRI's extensive data collection efforts not only offer a nuanced understanding of the current Responsible Research and Innovation (RRI) landscape but also lay the foundation for shaping the future framework of RRI. The diverse datasets provide valuable insights into RRI's performance, implementation, perceptions, and practices. Elements of the monitoring framework, especially the country correspondent methodology, hold significant potential for future repetition and refinement. This iterative process allows us to identify areas requiring attention and support while evaluating the impact of policies on research practices in the European Union. The Sustainability Plan D7.5 provides detailed guidance for the future, and our commitment extends to facilitating an easy repetition of exercises through a set of meticulously described methodologies. The PROMISE portal enhances the utility of our data collection, enabling interactive exploration. In our dedication to leaving a lasting impact on the European research landscape, we've initiated collaboration with the Horizon Europe-funded project REINFORCING. This partnership explores opportunities for curating and reusing SUPER MoRRI data, opening exciting possibilities for the next generation of European projects. The presented and discussed potential uses pave the way for continued advancements in responsible and innovative research practices in the years to come.



## 7. Diving deeper: Understanding patterns and pathways of responsibility in R&I

### 7.1. Aim

The aim of WP5 within SUPER MoRRI was to design and develop a research programme of empirical studies that could provide new insights regarding how to monitor RRI and produce new data suitable for indicator development. In particular, the main objectives of WP5 are:

- To specify and to systematize the scientific, democratic, societal and economic benefits of the six RRI keys;
- To clarify pathways from RRI practices and policies to benefits, and their interrelation between different keys;
- To investigate and identify patterns of RRI and its benefits using large scale data sets;
- To synthesize the results and identify sources of replicable data from which indicators for monitoring the benefit of RRI could be developed.

### 7.2. Method

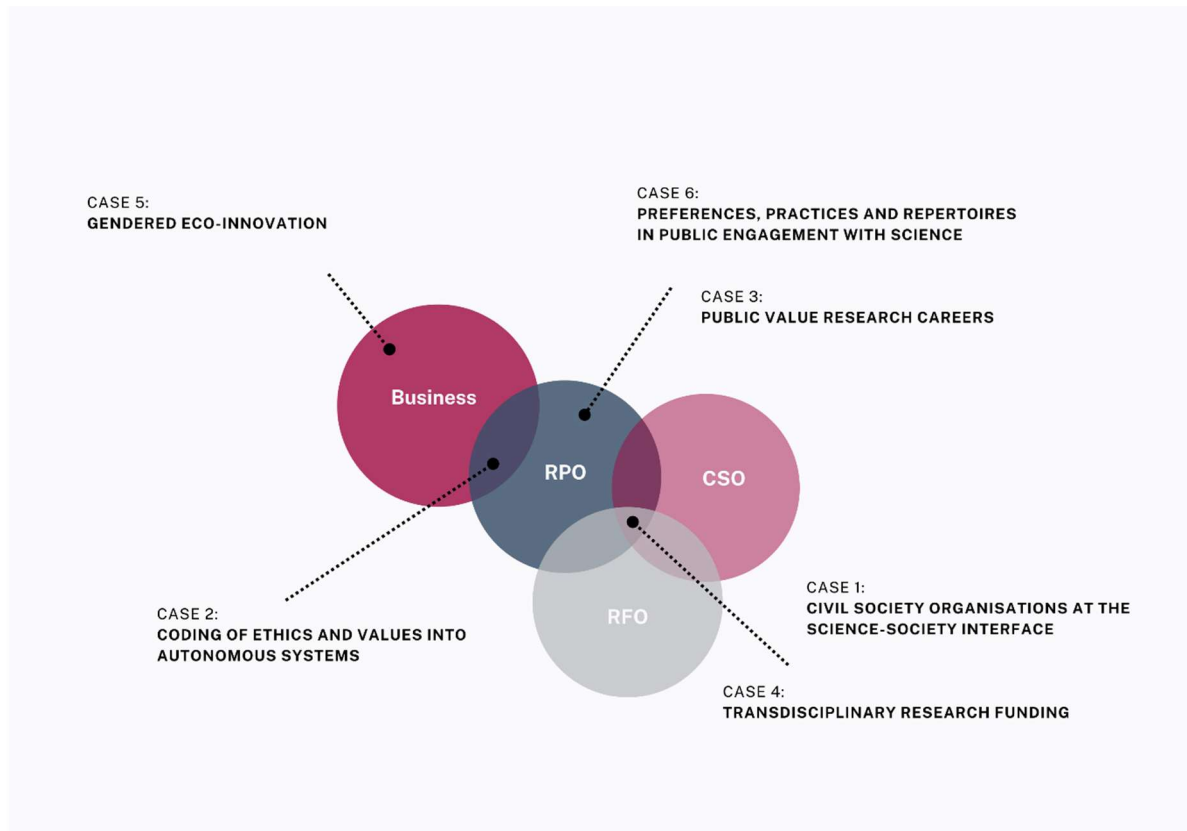
To reach the abovementioned aims, the SUPER MoRRI consortium conducted among its members an Open Call for research projects, developed a set of criteria to ensure studies were aligned with the overall needs of the project and the development of the RRI Monitoring Framework, assessed available resources and proposed project needs, and then selected six projects of SUPER MoRRI case research projects.<sup>6</sup>

Following the SUPER MoRRI Description of Work, the process also considered the desirability of addressing different RRI keys, pathways to different types of benefits (scientific, democratic, societal and economic), levels of analysis (macro – meso – micro), actor groups and countries. The consortium aimed for a variety of cases that address a wide range of RRI aspects and focus on RRI pathways from diverse perspectives. A diverse mixture of methods and sources were be utilised in the studies undertaken, with the aim of creating novel sources of data and information and potential new indicators for monitoring RRI.

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<sup>6</sup> For more information about this process see D5.1, Wicher et al. (2020: 10 ff.)

Figure 10 Relation of Actors within cases



Overall, the distribution of research projects along dimensions of interest was quite comprehensive. In terms of the project development process, it is apparent that:

- The studies illuminate both patterns of RRI implementation – which are a prerequisite for the generation of RRI benefits – and the subtle pathways from responsible practices to the emergence of different kinds of impacts and benefits of RRI. A key task of the case studies was to identify valid data sources that could serve as replicable, responsible and sensible indicators for monitoring RRI.
- Pathways toward the societal, democratic, economic and scientific benefits were addressed to a variable extent.
- The project selection covered diverse actor groups: Research Performing Organisations (RPO), Research Funding Organisations (RFO), industry, Civil Society Organisations (CSOs) and policy makers.
- Almost all key dimensions of RRI were covered to a differing degree. The SESL (Science Education Science Literacy) key dimension was the one least addressed the WP5 studies.
- Projects have a focus on the meso-level, but also cover the macro and micro level.
- Most studies were implemented in countries that are connected to the consortium members (Austria, Denmark, Germany, Netherlands, Norway and Spain). Some studies extended their scope more broadly in designing their study protocol, whilst others also involved the European level (SWAFs, CCN – Country Correspondents Network).

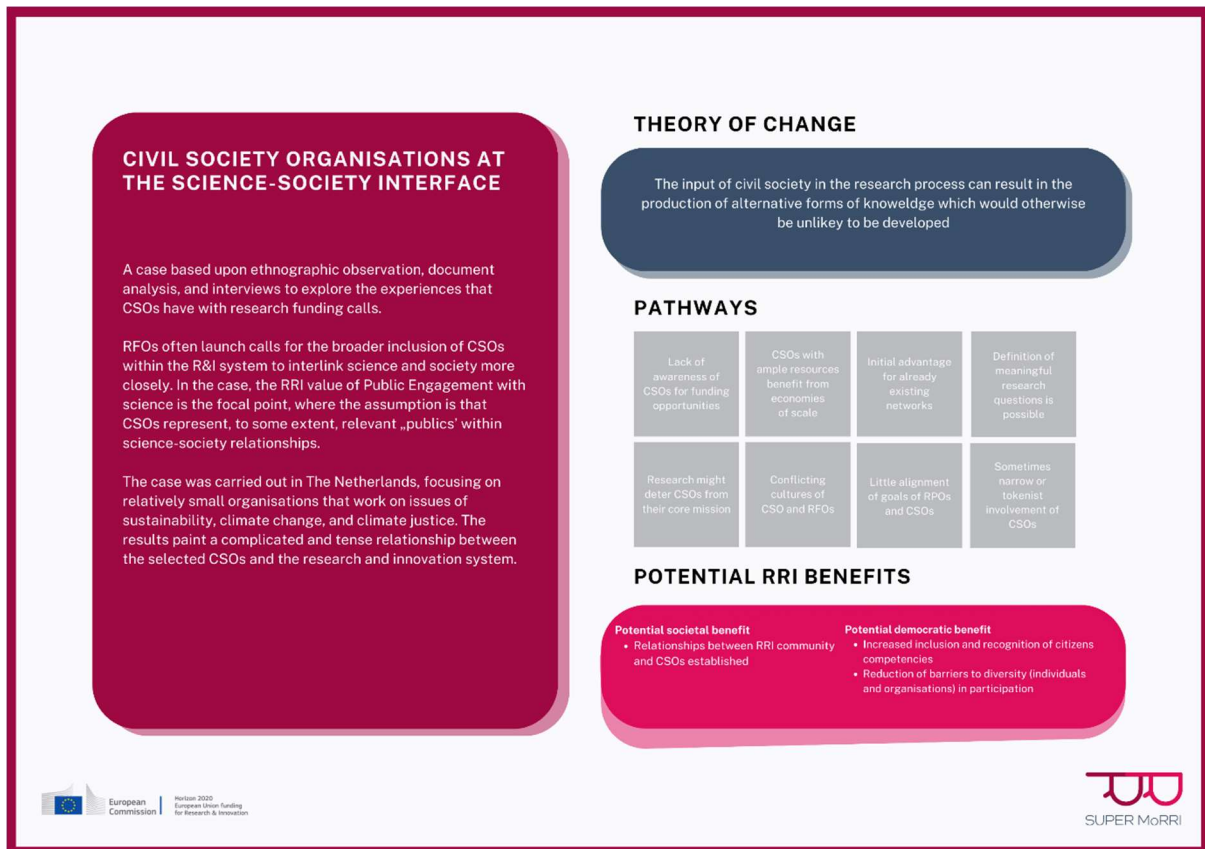


### 7.3. Cases

#### 7.3.1. Civil society organizations at the science-society interface

This study identified epistemological, political and institutional barriers that critical CSOs at the science-society interface experience when they engage with RRI related projects. It analysed the barriers that occur when these actors seek to collaborate and engage with RPOs on RRI / SwafS related projects. The case study took the problem into focus that CSOs often face a crisis of legitimation when they seek funding for research projects. This case study will provide detailed information on how CSOs are or are not included in RRI projects and RRI related work.

Figure 11 Pathways and benefits in Case 1





### 7.3.2. Coding of ethics and values in autonomous systems

The study focused on RPOs and will investigate efforts (in governance and research laboratories) to build ethics and values into autonomous (digital) systems. It focused on how ethics in design is being implemented in practice, where and by whom. The study assessed assess benefits and problems of ethics in design.

Figure 12 Pathways and benefits in Case 2

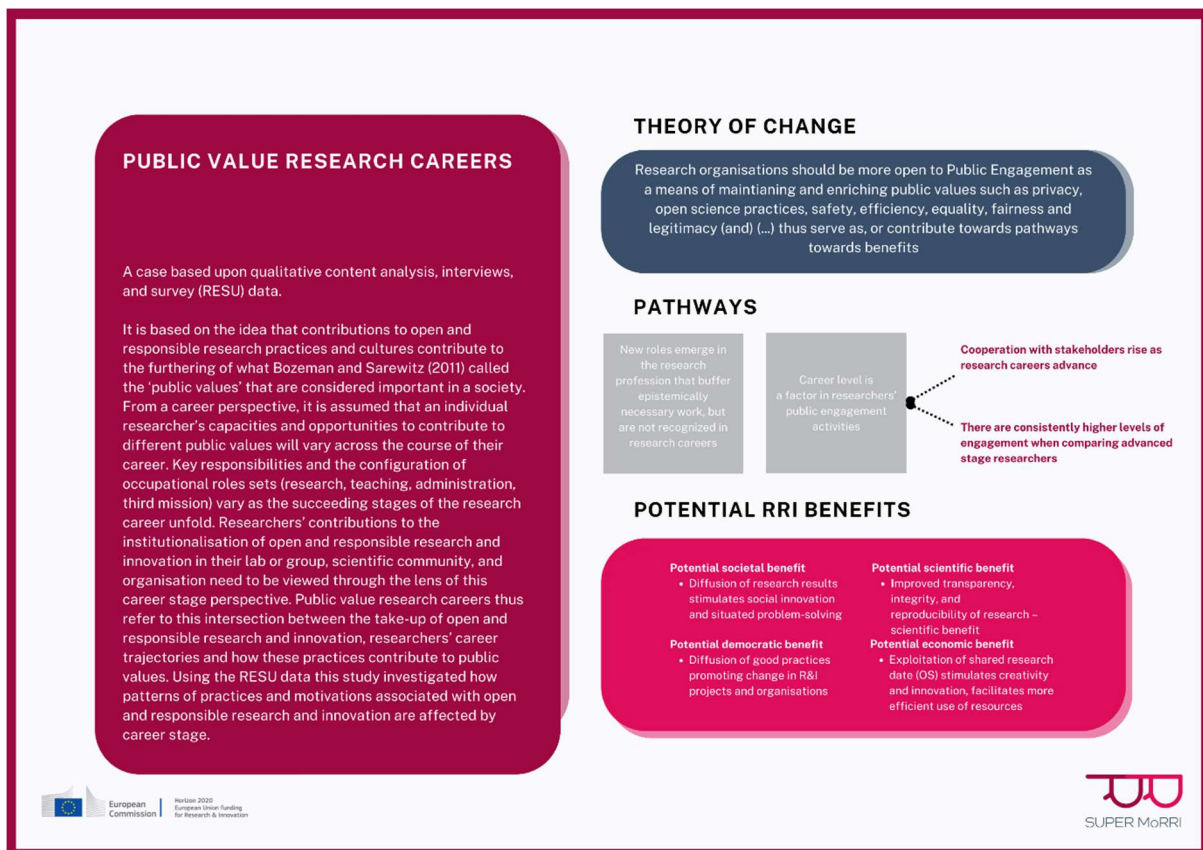




### 7.3.3. Public value research career

The project focused on the governance of research careers through the incentives and rewards institutionalised principally within RPOs and RFOs and investigated how organisations can value responsible practices and researchers to better institutionalise “public value research careers”. The goal was to understand the institutional variables and processes that provide opportunities – and present barriers - to re-configuring the ‘script’ of publicly funded research careers. The concept of a public value research career was specified conceptually and empirically, building from the understanding that the research career is a mediating structure that links knowledge production to social structure.

Figure 13 Pathways and benefits in Case 3

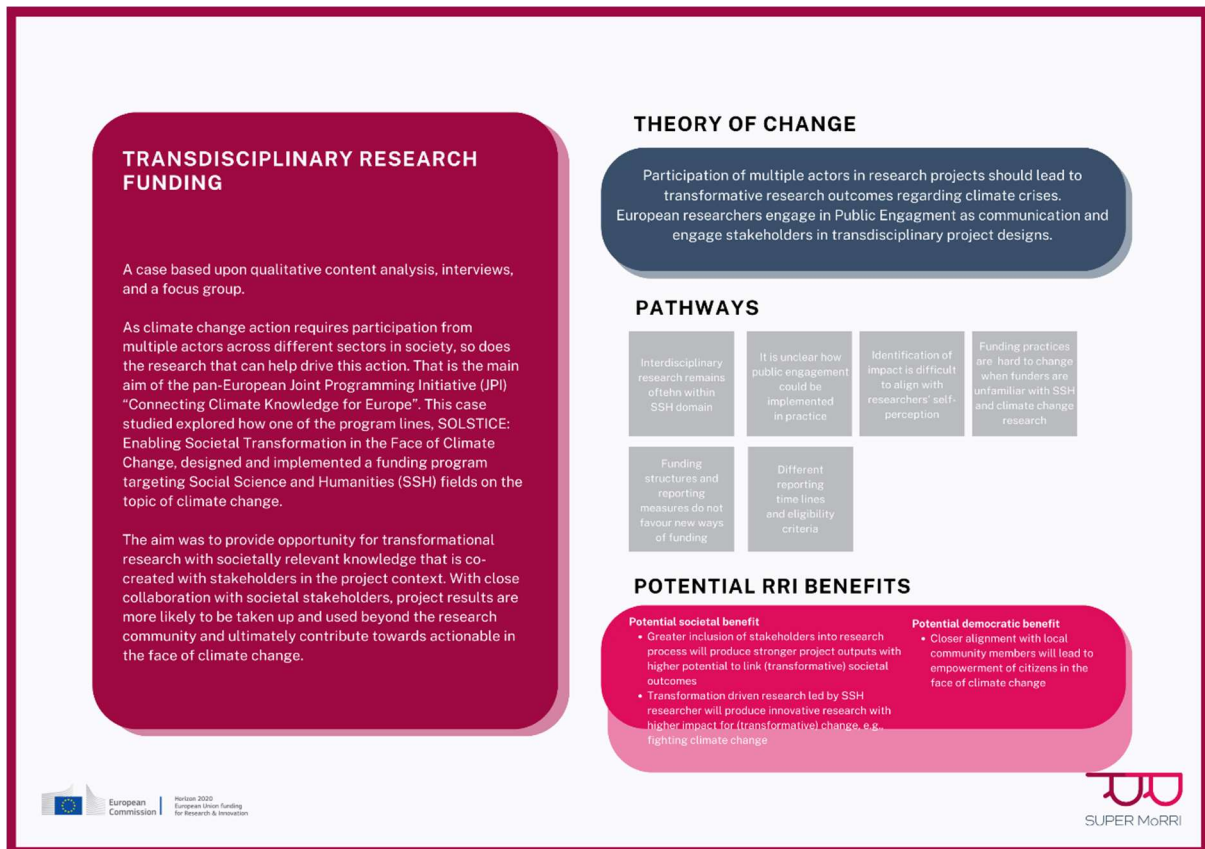




### 7.3.4. Transdisciplinary research funding

The case tried to find an answer to the question if a transnational and transdisciplinary research call on societal transformation to mitigate climate change can lead to change in research and funding practices of RFOs and RPOs towards RRI. The project wanted to investigate what these changes are and receive insights into societal, economic, democratic and scientific impact of these changes. There was a focus on differences and similarities in different participating countries and different contexts. Including RFOs, RPOs and policy makers, the project addressed pathways that are downstream the implementation of RRI. In focus are the factors that lead to a transformation in research programmes (and thus funders), research project implementation (and thus consortia) and society through an integration of SSH and public participation in the whole process of knowledge production.

Figure 14 Pathways and benefits in Case 4



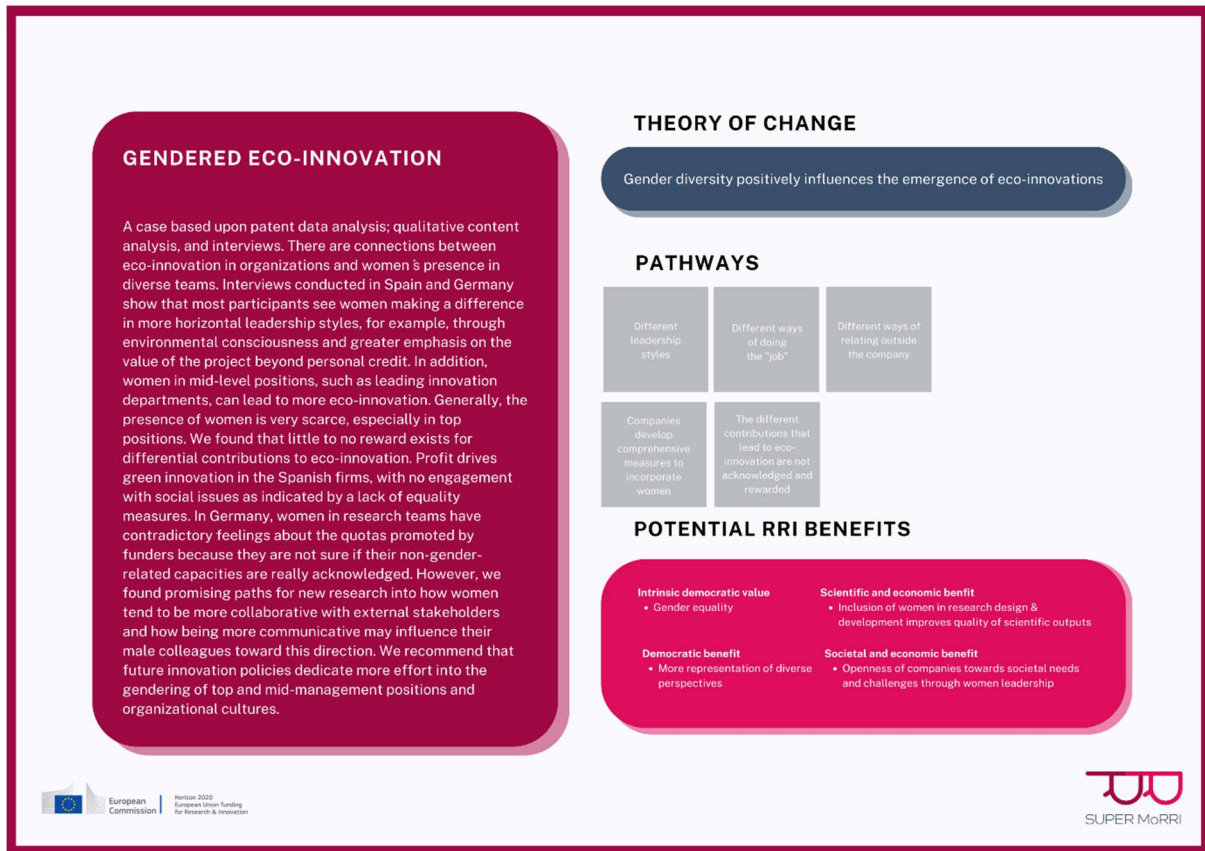




### 7.3.5. Gendered eco innovation

The case project focused on the business sector and the key of Gender Equality (GE), because this key is still one of the top priorities of the EU (European Commission 2020a). It elaborated on the question of whether there is a link between gender equality and eco-innovations and if so, what the underlying mechanisms for this link are. There is descriptive evidence that gender diversity positively affects eco-innovations (Horbach and Jacob 2018) but the underlying mechanisms are not yet clear.

Figure 15 Pathways and benefits in Case 5

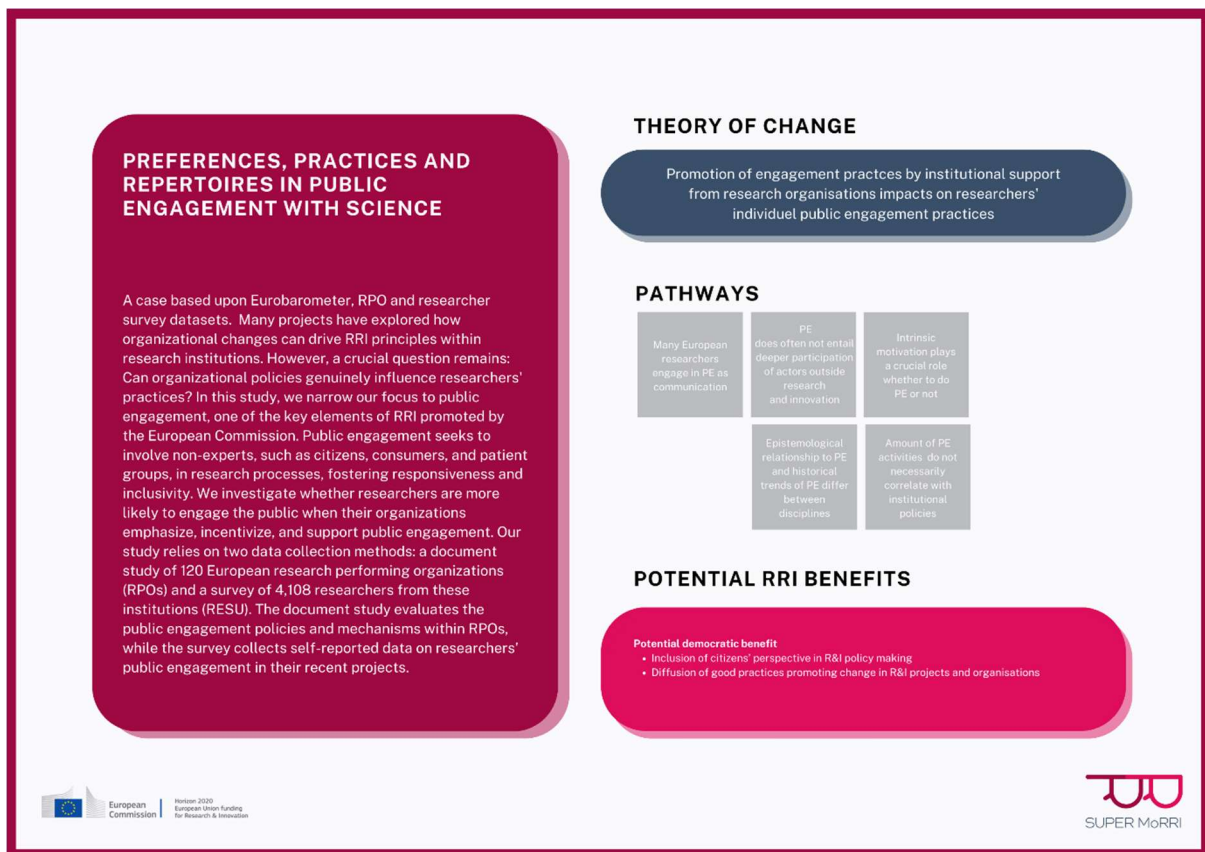




### 7.3.6. Preferences, practices and repertoires in public engagement with science

This case study addressed the question: what are the academic and societal impacts of different implementation modes (specifically degrees of alignment between preferences, practices, and engagement repertoires) in the integration of researchers and citizens? Thus, the study expected that different implementation modes, specifically (mis-)alignment of preferences, practices and available engagement repertoires, will have implications for science (optimising societal robustness and relevance of knowledge products) and for society (cultural authority / legitimacy of science, indicated, e.g., by citizen trust in scientists and scientific institutions).

Figure 16 Pathways and benefits in Case 6





## 7.4. Comparative analysis and discussion

In discussing the pathways and patterns towards Open and Responsible Research and Innovation (ORRI), we adopt the suggestion of Völker et al (2024) and, instead of talking about “implementation” and “implementation problems”, will use the term “translation”.

The individual cases of WP 5 translate ORRI in specific ways, i.e., as public engagement (“CSOs”, “PVRC and Repertoires in PE”), gender-equality (“Gendered Eco-innovation”), ethics in research and innovation (“Ethics in AI”) or as inter- and transdisciplinary research (“Transdisciplinary Research (funding)”).

In our cases, translations take many forms, often they simply start with bringing together actors that were previously unrelated or were little connected and motivate them to collaborate. This is realized by notions such as inter-disciplinarity (“Ethics in AI”) or transdisciplinary research (“PVCR”, “PE Repertoires”). Attempts to motivate change of organizational or individual practices is another form of translation that can be observed in the cases.

During translations along the pathway towards ORRI several shared themes emerge, such as (1) the significance of culture, (2) organisations, (3) resources and (4) capacities; the (5) challenges of inter- and (6) transdisciplinarity as well as (7) inequality. In the following section we will elaborate on these themes.

The case studies show that existing organizational or disciplinary cultures are key for translations towards ORRI practices. New collaborations or roles and requirements might get in conflict with existing culture.

The case studies show the relevance of how organisations are set up, what their core missions are and what organizational routines are affected by and concerned with the translations into ORRI practices. Organization matters in the case studies in different ways. (1) Existing organizational practices can impede ORRI practices and might be hard to changed. (2) Organizational routines might support ORRI practices. (3) Organizational structures and practices might get decoupled from what individuals are actually doing in terms of ORRI.

The notion of capacity implies the questions whether organizations have the necessary capabilities and knowledge to do ORRI. Capacities play a decisive role in several case studies:

Interdisciplinarity along with PE appears in the cases studies to be one of the panaceas of ORRI. However, the cases show that interdisciplinary research in practice is not that straightforward at all and not so easily to be achieved.

Adding stakeholders, CSOs and/or publics to research adds another level of complexity. Now it 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 are not trained as researchers.

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 emerge in many cases. They concern inequality in 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. The



“CSOs” case shows a strong influence of path-dependency which favours big, well-established and -connected CSOs over newcomers when it comes to responding to transdisciplinary calls, getting funding and cooperation with RFOs. In addition, larger CSOs with ample resources benefit from economies of scale.

Benefits are hard to measure but as the surveys show the researchers often experience them or expect them to occur soon.



## 8. Self-assessment of responsibility

### Purpose and approach of developing a SAT

The SUPER MoRRI Self-Assessment Tool (SAT) aims to provide a method of assistance to various types of stakeholder groups (primarily Research Performing Organizations (RPOs)) to measure/assess their performance in terms various RRI indicators. The SAT can be of use to Research Funding Organizations (RFOs) as well, but rather indirectly. Such tool can inform RFO policies in terms of defining indicators of interest that can be monitored and targets established at the level of funded projects.

The SUPER MoRRI SAT builds on the idea and concerns of a “thinking tool”, particularly we are aware of the Societal Readiness Thinking Tool (<https://thinkingtool.eu/>). We have a common interest with RRI and aim at stimulating thinking and interest in this field. However, the SAT will also be different from a thinking tool, including the one mentioned.

The explicit aim of this tool (as highlighted in the SUPER MoRRI project proposal) is to allow RPOs to self-assess the current status of their implementation of RRI principles in running research and innovation projects, and monitor the development of this status over time.

The SUPER SAT is available on the PROMISE portal ([www.promise4era.eu](http://www.promise4era.eu)), cf. Chapter 9 of this report.

### Brief description of the SAT

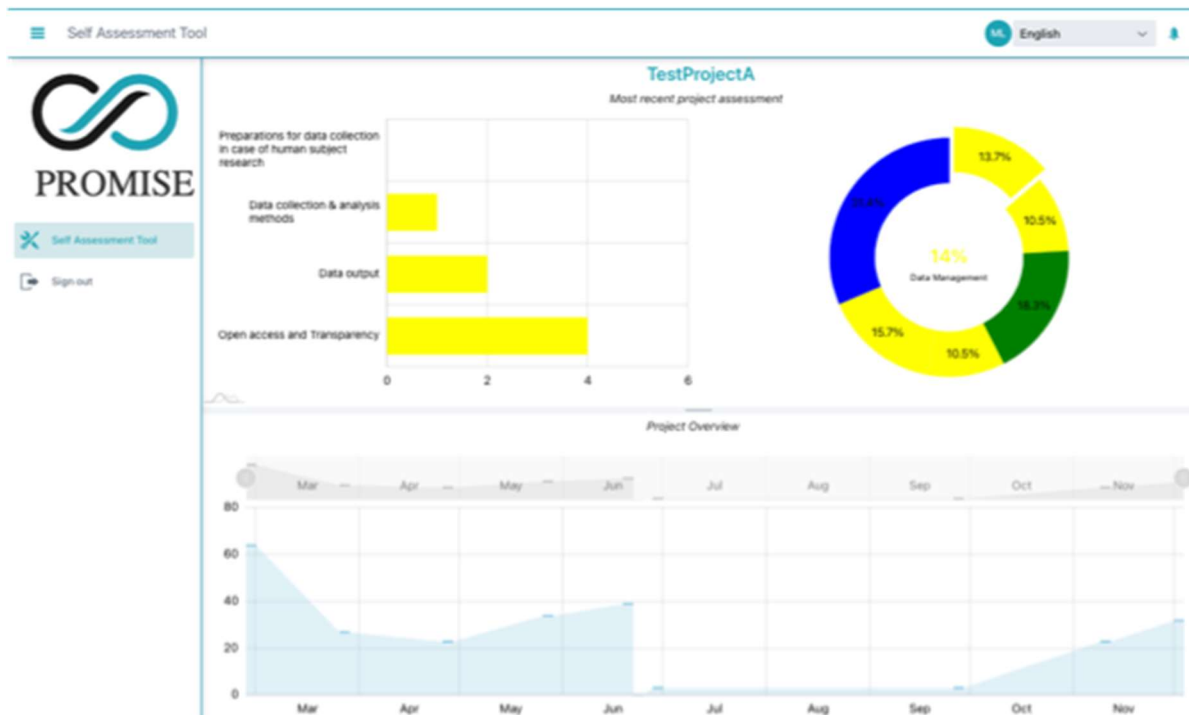
The SAT includes and focuses mainly (but not necessarily exclusively) on indicators with pre-defined scales of measurement, although some open answer questions may still be desirable. Because of having pre-defined answers (measured at categorical/nominal, ordinal, interval or ratio scales) the SAT will allow to compute composite indicators and make comparisons:

- Either within the same project
  - between different time points
  - between reported results and targets;
- Or between one’s project and others:
  - comparing with other projects within the same organization (with full access to other projects data);
  - comparing with outside projects (who have given their consent for sharing data, but under anonymous use: i.e. comparisons will be made with aggregates of other projects with a minimum number of projects needed in a category before aggregates become accessible).

Indicators of RRI relating to projects, will be grouped in 6 categories/pillars:

1. Science Education & Communication;
2. Ethics;
3. Organizational Governance and Gender;
4. Data Management;
5. Stakeholder Participation;
6. International Organizational Management & Governance

Figure 17: Dashboard of project performance of imaginary 'TestProjectA' (screenshot)



### Learnings and recommendations

The tool we have developed provides basic functionalities and allows users to run the analysis between projects and between individual perspectives as we originally planned. We acknowledge that a Self-Assessment Tool for RPOs may have additional functionalities, in addition to the basic functionalities that what we have built into the tool at this moment. We hope that follow-up projects will further be inspired by the current version and content of the tool to help RPOs to self-assess their project in light of RRI indicators.



## 9. Accessing responsibility: The PROMISE portal

### 9.1. Rationale of the PROMISE portal

Throughout SUPER MoRRI's lifecycle, a variety of studies were conducted, resulting in a wealth of content and deliverables generated by the consortium partners. It was evident that all this content would be included on the project's website. However, concerns arose about the long-term sustainability and accessibility of this material once the project ended and team members moved on to other endeavours. This realization led to the conception of the PROMISE portal (<https://promise4era.eu/>). The project's website would continue to host all its deliverables but serving as a snapshot of past efforts. For the future, another portal would be created, distinct from the original project's identity while still yielding many significant results. This new portal would be able to keep evolving from the efforts of other initiatives.

With this vision in mind, the PROMISE portal began to take shape following a consortium meeting in Vienna, Austria. Discussions focused on identifying the best approach to produce the dashboard already planned for the project. It was concluded that, beyond merely making data available, interactive exploration was essential. Providing context, such as case studies that select the displayed data, could communicate valuable research and responsible innovation experiences. At the same time, these would serve as examples for users to delve deeper, exploring the data to find relevant connections for their own contexts.

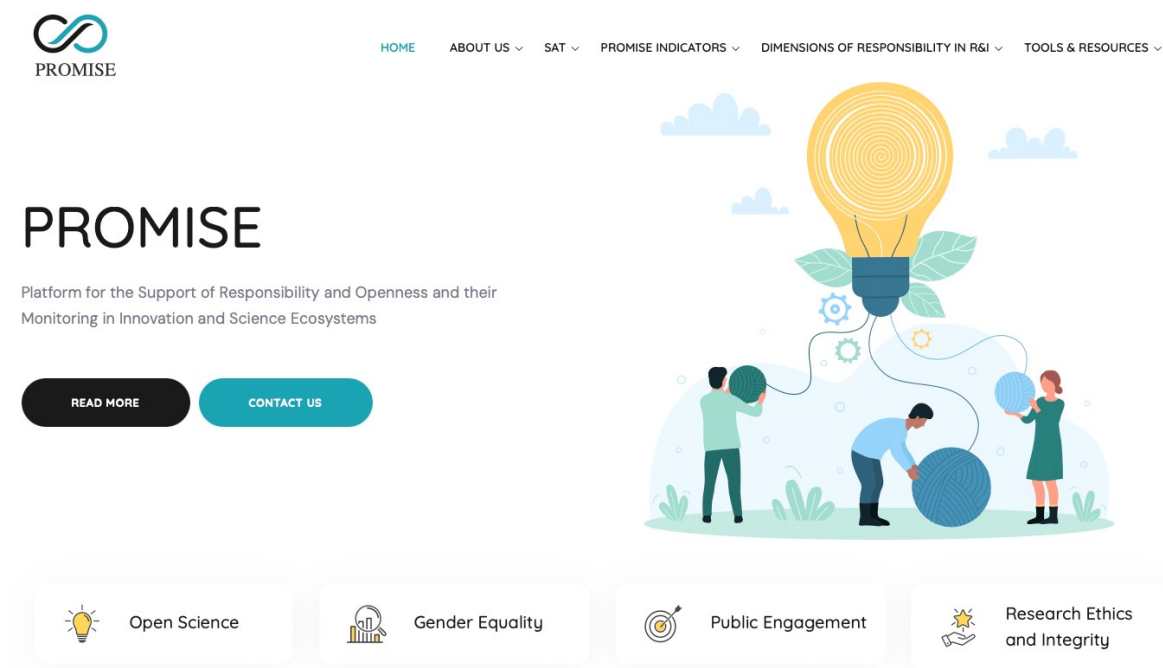
A special working group was formed at that meeting to lead the development of the portal. This group met frequently, sometimes online and sometimes in person. Two in-person design sprint rounds were conducted, where members from the different partners collaboratively began organizing the contents to be shared. An important decision made during this process, motivated by a review of the nomenclature around RRI, was that the PROMISE portal should continue to refer to all the key and conditions that guided the group's work over the five years of the project. However, the portal should also look towards the future. To this end, instead of maintaining RRI as the content's main pillar, four key points were used to aggregate the content on the site: open science, gender equality, public engagement, and research ethics and integrity.

### 9.2. Brief introduction to the portal

As mentioned, the PROMISE portal was intended to be an aggregator of relevant content, not only derived from the SUPER MoRRI project but also from other future projects and initiatives. Therefore, the portal was built dynamically, using content tags that can be aggregated and displayed in multiple ways, depending on the growth of each topic and the natural evolution of the content. For example, considering the four central axes displayed in figure 18, different content pages can be aggregated under Open Science. In this group, citizen science is also present, but the number of pages with this content in the initial version of the site is not significant enough to justify creating a specific page for the theme. However, if the theme gains new content in the future, its access will be facilitated for users.



Figure 18: Landing page of the PROMISE Portal (screenshot)



Considering the diversity of projects undertaken by SUPER MoRRI in recent years, it is crucial for the PROMISE portal to be structured in a way that allows the inclusion of various types of content. For instance, case studies can be presented in a narrative form, while studies involving quantitative data can be explored interactively as data stories. Users should be able to not only navigate through these stories but also access the main project dashboard to explore other available data. In the case of data collected from surveys or interviews, users can interact with properly anonymized information, which can reveal insights far beyond what static options offer. Examples of such content can be seen in Figures 19 and 20. It is also relevant to notice that the portal provides access to the Self-Assessment Tool developed during the project.





Figure 19: Content page example, derived from the Researchers Survey (screenshot)

**Integrity And Ethics Of Research**

Research integrity and ethics can be considered a cornerstone of societal trust in researchers and research institutions. Promoting ethical behavior and research integrity is of utmost importance to ensure reliable, high-quality research results and a transparent, fruitful dialogue between science and society.

We explored contemporary perceptions and practices of ethical research conduct in the European research and innovation landscape in a large-scale study comprising 4,180 researchers from 277 different research performing organisations (RPOs) and 45 different countries of residence. The gender distribution was 54.5% male, 41% female, and 0.5% non-binary. Respondents' disciplinary background ranged from Social Sciences and Economics to Natural Sciences, Engineering and Arts and Humanities.

**Recent Posts**

- Integrity and ethics of research  
November 30, 2023
- Country Correspondents?  
November 29, 2023
- Gender Equality in Higher Education Institutions  
November 29, 2023

**Categories**

- Open Science
- Researchers survey

Figure 20: Content page with interactive visualization available (screenshot)

**RESEARCH FUNDING PRIORITIES IN PERSPECTIVE**

There are numerous factors which affect what priorities research funders set. Many public funders' priorities reflect closely the preferences of their national government. Others are negotiated in close collaboration with representatives of scientific communities. Private funders have more autonomy to prioritise those topics or challenges that concern them. Many research funders also include stakeholders from society in governance or advice structures, providing opportunities for voices distinct from politics and science to contribute to the strategic direction and funding priorities of funders.

Information on the presence of scientific and societal stakeholders on formal advice bodies or committees can be considered a simple indicator of research funders' access to ideas or priorities from these different perspectives.

**Geographical view**

4 of 4

**Innovation pathways**

- Included in general / mixed policy
- Planned / aspiration expressed



### 9.3. Recommendations to sustain the portal

Unlike the project's original website, which will become a permanent snapshot of the project's achievements, PROMISE has been designed to be a standalone portal, acting as a comprehensive repository that encapsulates many of the project's deliverables in a format that is intended for the general public. It can be transferred to and managed by different entities or initiatives – such as the REINFORCING project, for instance (see 10.1) –, ensuring the continued dissemination and utilization of the project's outputs.

In an ideal situation, PROMISE will continue to welcome contributions from multiple sources, being managed by editors that can curate and moderate content that could enrich its overall value. Through that, the portal represents a strategic approach to managing the outputs of present and future research projects. It can ensure that the valuable work produced does not diminish in relevance or accessibility over time, but instead continues to grow from ongoing initiatives and research endeavors.



## 10. The way ahead

This final report marks the end of a five-year project journey. Yet, the ambition to support open and responsible research and innovation practices with appropriate and responsible approaches to monitoring and evaluation continues to be highly relevant. Regardless of the relative decline of RRI-related policy support at the EU-level in the recent past, the need to transform our research and innovation systems in order to better respond to societal needs remains a key objective for STI-policy. With regard to monitoring and evaluation, the fact that numerous initiatives promoting a more responsible use of indicators and metrics mushroomed in the recent past – such as the Leiden Manifesto, Responsible Metrics for Open Science, DORA, CoARA and others – shows the growing support for change. But also the broader shifts of STI-policy, reflected by more directionality to address societal challenges and new approaches such as mission-oriented innovation policy, actually call for more, not less anticipation, responsiveness, ethics and integrity, participation and co-creation in view of the far-reaching changes for everyday lives these transformative types of research and innovation will entail. Without careful and prudent governance and responsible research and innovation practices, intensified controversies and opposition to the needed transitions are likely. We are convinced that the findings and outputs of the SUPER MoRRI project can contribute to the development of renewed research and innovation governance and practices.

### 10.1. Keeping SUPER MoRRI's outputs accessible and sustaining data collection

To increase the likelihood of making the project's findings and outputs available to future users, the SUPER MoRRI consortium developed a number of sustainability measures (cf. D7.5, Meijer and Lindner 2024). Most importantly, SUPER MoRRI established close ties to the EU-funded project REINFORCING<sup>7</sup>, which has the objective to establish a central point of knowledge and expertise for matters related to Open and Responsible Research and Innovation (ORRI). REINFORCING can potentially act as a curator and re-user of the SUPER MoRRI outputs and ensure their accessibility. This may include the sustained support of one of SUPER MoRRI's major outputs, the PROMISE portal ([www.promise4era.eu](http://www.promise4era.eu)) and/or the integration of SUPER MoRRI's data and resources in REINFORCING's future one-stop source, which will offer a single entry point for information and support for interested research and innovation performing organizations pursuing transformative ambitions.

In addition, SUPER MoRRI's sustainability plan also includes establishing contacts to initiatives that are developing monitoring and evaluation frameworks and guidelines, for which the insights and outputs of SUPER MoRRI might be considered to be useful.

In case a similar monitoring programme as the one conducted by SUPER MoRRI is to be initiated in the future, the following critical elements should be taken into account:

- Maintain a diversified approach to monitoring: do not regress to national level horserace.
- Maintain a reflexive focus on the credible contextualization of monitoring data and information.

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<sup>7</sup> More information available at: <https://reinforcing.eu/>



- Maintain a strategy of developing monitoring information and tools with different purposes (learning, community building, formative adaptation, etc.).
- Maintain a strategy of monitoring with the objective to support RRI (monitoring *for* RRI not *of* RRI).

As with any monitoring activity, the processes of data collection are crucial. If the data collection performed by SUPER MoRRI were to be repeated, we recommend the following measures:

- Reinstall the Country Correspondent Network (CCN), as data collection in local languages is critical to grasp the diversity and intricacies of Member state policies on ORRI practices. If possible, the CCN could be expanded to include more global countries currently not represented.
- A funding body or organisation that will cover the costs of the data collection procedures, handling of the data, coding practices, making data open source available, data transfer and all other related activities. We suggest that a next round of the RPO and RFO's to be conducted around 2025-2026.<sup>8</sup>

## 10.2. Evidence-informed recommendations

As demonstrated in the summarising chapters of this report, the SUPER MoRRI project performed an ambitious and multifaceted empirical research programme. The central pillars of the project's empirical work are the various data collection vehicles, particularly the RFO and RPO studies and the researchers' survey on the one hand (cf. D2.5, Ryan et al. 2023b; D5.2, Woolley et al. 2023b), and the case research programme covering six qualitative in-depth case studies in a broad range of different research and innovation contexts (cf. D5.3, Griessler et al. 2023a; D5.4, Griessler et al. 2024) on the other. Taken together, this rich empirical material offers countless opportunities for deeper analyses and exploration. This includes a number of policy-oriented conclusions that can be drawn from the material.

With the aim of strengthening Open and Responsible Research and Innovation (ORRI), in the following, recommendations for key actors of the research and innovation systems – RFOs and RPOs, individual researchers and policy makers – are presented.<sup>9</sup>

### 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,

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<sup>8</sup> To allow for a repetition of the data collection activities performed by SUPER MoRRI and thus guarantee comparability of data across time series, approach, procedures and methods were diligently documented, see Woolley (2023a), Mejlgaard et al. (2019) and Ryan et al. (2023b).

<sup>9</sup> The recommendations are taken from D5.4, Griessler et al. (2024: 43ff.). A similar version is made available in the 2<sup>nd</sup> SUPER MoRRI Policy Brief (D5.5, Griessler et al. 2023b).



- 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 which 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.

#### Recommendations 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, 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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## Appendix I:

All public deliverables and reports of the SUPER MoRRI are available for download at:

<https://super-morri.eu/findings/>

Table 4: List of public deliverables and additional project reports

Del. Nr.	Authors	Deliverable title
D1.2	Richard Woolley, Paula Otero-Hermida, Niels Mejlgaard, Thomas Ryan, Kjetil Rommetveit, Roger Strand, Wouter van de Klippe	<a href="#">A Monitoring Framework for Responsible Research and Innovation. Strategic Development Plan 2020-2024</a>
D1.3	Richard Woolley	A Monitoring Framework for Responsible Research and Innovation. Revised Strategic Development Plan
D1.4	Ralf Lindner, Richard Woolley, Hendrik Berghäuser, André Brasil, Susanne Bühner-Topçu, Steven Flipse, Erich Griessler, Thomas Kjeldager Ryan, Carolina Llorente Lopez, Ingeborg Meijer, Gema Revuelta de la Poza, Kjetil Rommetveit, Shauna Stack, Roger Strand, Emad Yaghmaei	SUPER MoRRI Final report
D2.1	Niels Mejlgaard, Thomas K. Ryan, Wouter van de Klippe, Richard Woolley	<a href="#">Implementation Plan for Monitoring Responsible Research and Innovation</a>
D2.2	Massimo Graae Losinno, Thomas Kjeldager Ryan & Niels Mejlgaard	<a href="#">1<sup>st</sup> RRI Monitoring Report</a>
D2.3	Thomas Kjeldager Ryan, Christine Baker, Massimo Graae Losinno, Niels Mejlgaard, Richard Woolley	<a href="#">2<sup>nd</sup> RRI Monitoring Report</a>
D2.4	Thomas Kjeldager Ryan, Richard Woolley, Hendrik Berghäuser, Signe Carlsen	<a href="#">Annotated Methodological procedures report</a>
D2.5	Thomas Kjeldager Ryan, Signe Carlsen, Richard Woolley, Hendrik Berghäuser, Merve Yorulmaz, Emil Bories Hüttel	<a href="#">3<sup>rd</sup> RRI Monitoring Report</a>
D4.1	Carolina Llorente, Gema Revuelta	<a href="#">Global response to RRI monitoring</a>
D4.2	Carolina Llorente, Gema Revuelta	<a href="#">RRI and benefits beyond Europe</a>
D4.3	Carolina Llorente, Gema Revuelta, Ralf Lindner and Kjetil Rommetveit	Recommendations for RRI measurement and implementation
D5.1	Magdalena Wicher, Erich Griessler (WP lead), Richard Woolley; Hendrik Berghäuser, Susanne Bühner-Topçu, Wouter van de Klippe, Ingeborg Meijer, Niels Mejlgaard, Kjetil Rommetveit, Thomas K. Ryan, Roger Strand	<a href="#">Case study co-creation methodology report</a>



Del. Nr.	Authors	Deliverable title
D5.2	Richard Woolley, Thomas Kjeldager Ryan, Niels Mejlgaard, Shauna Stack, Magdalena Wicher, Erich Griessler, Ingeborg Meijer, André Brasil, Hendrik Berghäuser, Susanne Bühler-Topçu, Ralf Lindner, Kjetil Rommetveit, Roger Strand	Patterns Studies Report
D5.3	Erich Griessler, Ingeborg Meijer, Shauna Stack, Richard Woolley (eds.)	Pathway Studies Report
D5.4	Erich Griessler, Hendrik Berghäuser, Emil Bories Hüttel, Andre Brasil, Susanne Bühler-Topçu, Signe Carlsen, Ingrid Foss Ballo, Thomas Kjeldager Ryan, Wouter van der Klippe, Ralf Lindner, Ingeborg Meijer, Niels Mejlgaard, Paula Otero-Hermida, François Perruchas, Kjetil Rommetveit, Shauna Stack, Roger Strand, Magdalena Wicher, Carolina Wienand, Richard Wooley, Merve Yorulmaz	Analytical synthesis report of experimental cases
D5.5	Erich Griessler, Hendrik Berghäuser, Emil Bories Hüttel, Andre Brasil, Susanne Bühler-Topçu, Signe Carlsen, Ingrid FossBallo, Thomas Kjeldager Ryan, Wouter van der Klippe, Ralf Lindner, Ingeborg Meijer, Niels Mejlgaard, Paula Otero-Hermida, François Perruchas, Kjetil Rommetveit, Shauna Stack, Roger Strand, Magdalena Wicher, Carolina Wienand, Richard Wooley, Merve Yorulmaz	Policy Brief No. 2: Strengthening Open Responsible Research and Innovation
D6.1	Emad Yaghmaei	<a href="#">Report on RRI added values assessment tools and methods</a>
D6.2	Emad Yaghmaei, Steven Flipse, Andrei OGREZeanu	<a href="#">Self-assessment tool</a>
D7.2	Wouter van de Klippe	<a href="#">2020 annual event executive summary</a>
D7.3	Ingeborg Meijer, Anestis Amanatidis	<a href="#">Policy report on the state of SwafS RRI projects</a>
D7.4	Ingeborg Meijer, Andre Brasil, Carolina Llorente	<a href="#">Executive summary from the 2<sup>nd</sup> annual event</a>
D7.5	Ingeborg Meijer, Ralf Lindner	Sustainability Plan
D7.6	Anestis Amanatidis, André Brasil, Richard Woolley	<a href="#">Executive summary of the 3<sup>rd</sup> annual event</a>
D7.7	Tjitske Holtrop, Ingeborg Meijer, Anestis Amanatidis	Summary report of exchange with SwafS funded projects related to RRI. The SUPER MoRRI ecosystems – doing RRI together
D7.8	Anestis Amanatidis, Ingeborg Meijer	Executive summary of the final event



Del. Nr.	Authors	Deliverable title
Additional project reports		
	Roger Strand, Kjetil Rommetveit	Task 1.1: Concept Note
	Paula Otero-Hermida, Richard Woolley	Task 1.1: Literature review on RRI key areas, AIRR and other selected literature
	Magdalena Wicher, Roger Strand, Erich Griessler, Shauna Stack, Kjetil Rommetveit	<a href="#">Understanding impact, impact pathways and benefits of RRI within SUPER MoRRI WP5 and beyond</a>
	Carolina Llorente, Gema Revuelta, Ralf Lindner and Kjetil Rommetveit	Policy Brief No. 1: Advancing Global RRI Monitoring
	Erich Griessler, Hendrik Berghäuser, Emil Bories Hüttel, Andre Brasil, Susanne Bühner-Topçu, Signe Carlsen, Ingrid Foss Ballo, Thomas Kjeldager Ryan, Wouter van der Klippe, Ralf Lindner, Ingeborg Meijer, Niels Mejlgaard, Paula Otero-Hermida, François Perruchas, Kjetil Rommetveit, Shauna Stack, Roger Strand, Magdalena Wicher, Carolina Wienand, Richard Wooley, Merve Yorulmaz	Policy Brief No. 2: Strengthening Open Responsible Research and Innovation
	Ingeborg Meijer, Anestis Amanatidis	<a href="#">Digital booklet: Monitoring and Evaluation of Responsible Research and Innovation Practices: Approach and Findings.</a>



## SUPER MoRRI

Scientific Understanding and Provision of an Enhanced and Robust Monitoring system for RRI Horizon 2020, Science with and for Society Work Programme 2018-2020, Topic: SwafS-21-2018 Grant Agreement Number: 824671



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