

GRRIP Deliverable 3.1: State of the Art review of European RRI projects

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GRRIP Deliverable 3.1: State of the Art review of European RRI projects

D3.1 is one of three deliverables under Work Package 3 (WP3) of GRRIP. The objective of WP3 is to establish a state of the art of Responsible Research and Innovation (RRI) Action Plans (APs) and Quadruple Helix (QH) dialogue platforms. A balance has been sought within the WP between building on the broad outcomes of existing projects and focusing on specific issues relevant to the maritime and marine sector. D3.1, which addresses operationalisation of RRI Action Plans, should be read in conjunction with D3.2, which addresses how the “Quadruple Helix” concept has been taken up and used in selected institutional contexts.

The specific task reported on under D3.1 (T3.1) was designed to review previous and current EU RRI-related projects and selected Research Performing Organisations (RPOs) and Research Funding Organisations (RFOs)¹ with embedded RRI practices in order to learn from their experience. Specifically, the State of the Art (SoA) review is intended to identify lessons, as reported in selected projects, regarding maximum use of excellence during all stages of AP; to document practices with respect to barriers, challenges and mitigation; to learn from experience on indicator development; and to understand how RRI benefits have been assessed, often in rather informal ways. Furthermore, by engaging with relevant organisations, the intention is to learn from their experience and foster collaborations. By its nature, this review is limited to the material reviewed. It does not claim to provide an overview of all efforts to design and implement RRI-relevant Action Plans in the appropriate sense, nor does it purport to evaluate such efforts even within the limited scope of the projects reviewed. Still less does it evaluate the projects themselves. The output of T3.1 will directly inform WP5 (Audit), WP6 (AP creation), and also feed into WP7 and WP8. The mutual learning dimensions of the SoA, which are by design significant, are specifically addressed in a separate task of WP3 (T3.3), which will serve to ensure these internal connections with the GRRIP project. Mutual learning in this area has, in particular, emphasised the comparative weakness of the evidence base, the highly contextualised nature of documented practices and, as a direct consequence, the impossibility of implementing subsequent GRRIP WPs by application of pre-validated “best practices”, a coherent methodology for which does not appear to have been established in the research State of the Art.

The present report summarises relevant information for analytical purposes. All project reviews, interview reports and related documents are available in their original form in an online platform of the project supported by Microsoft Teams.

1 Methodology

The WP3 implementation plan defined the allocation of efforts by partners in the SoA review as indicated in the table below. UNESCO was the leader of task T3.1 and was responsible for compiling the results of the project reviews in this report. The methodology for the SoA was developed by ICORSA and is designed to feed into GRRIP’s Library of Actions and extract best lessons for the SoA report. This Library of Actions will comprise existing effective RRI

¹ Where relevant, RPOs and RFOs will be referred to jointly as RPOs&RFOs.



practices or actions and will propose new actions which should be tested for effectiveness and suitability by RPOs and RFOs participating in GRRIP.

The notion of a “Library of Actions” is not a standard technical term and was not defined in detail in the Description of Action. In so far as its interpretation has significance for the connection between tasks within the GRRIP project as a whole, as structured through the mutual learning approach (T3.3 and related tasks in other WPs), it is appropriate to specify the approach adopted and its limitations.

First, it is clear that the information collated through the SoA reports (both D3.1 and D3.2) has an indicative character, as in all SoA exercises. In the case of D3.1, it does not constitute an exhaustive survey of RRI Action Plans, nor even a direct study of such Plans, but rather a meta-review of relevant information on their design, implementation and significance as documented through a selection of EU-funded research projects. This imposes obvious limitations on the available information.

Secondly, even within those limitations, it will be noted below that the availability of information is less than ideal. While a wide range of practices are documented, with varying levels of detail, there is little systematic evidence on relevance and effectiveness of such practices, and even an absence of systematic reflection/evaluation on what would constitute such evidence. A particular gap in this regard is methodology for controlling interventions against their absence, with the predictable result that much of the information available from the projects reviewed is uncontrolled self-reporting.

However, while these limitations are problematic in a general methodological sense, they do not necessarily detract from the usefulness of the State of the Art reviews, including specifically the present D3.1, for subsequent WPs. As made clear in the DoA (definition of T4.2.1, p. 34) “The output [of the synthesis report based on D3.1 and D3.2] will be used as inspiration for the development of the GRRIP platform.”, the platform being the basis on which “constructive engagement between the QH and RPO&RFOs” will be pursued in GRRIP. For “inspiration”, documented practices compiled into a “Library of Actions”, even in the absence of a clear methodology to qualify them as “good”, still less “best”, offer a sufficient entry point.

1.1 Selection of projects

As input to the selection process, taking account of the preliminary proposals made in the submission document, GRRIP partners were asked to identify relevant existing RRI practices and projects using the following selection criteria:

- 1 Relevance of the practice(s) to RRI;
- 2 Relevance to at least one of the RRI pillars;
- 3 Relevance to RPO&RFOs and within the marine and maritime sector in particular;
- 4 Maturity of action plans or implementation (mandatory);
- 5 Whether evaluation evidence is available

Based on these criteria, the following n=14 projects were chosen, each complying with at least three of the five criteria, including imperatively the maturity criterion, which is indispensable to extract any relevant lessons for GRRIP.



N	Name	Brief description and criterion met	Reviewed by
1	StarBios 2	The general aim of project is promoting 6 Action Plans (APs) oriented to attain a RRI structural change in research institutions from Europe and developing 3 further APs in non-European entities, all active in the field of biosciences.1-4	CNR
2	JERRI	JERRI has orchestrated a deep RRI transition process within the two largest European Research and Technology Organisations (RTOs), the German Fraunhofer-Gesellschaft and the Netherlands Organisation for Applied Scientific Research TNO. The process is conceptualized as an intense mutual learning process between the two organisations, a wider circle of RTOs, and stakeholders across Europe.1-4	CNR
3	Nucleus	NUCLEUS intends to develop, support, and implement inclusive and sustainable approaches to Responsible Research and Innovation within the governance and culture of research organisations in Europe. A major goal of the project will be to stimulate research and innovation which continuously reflects and responds to societal needs.1-4	ICORSA
4	HEIRRI	HEIRRI will create and share on OA a stock-taking inventory constituted by a state of the State of the Art review and a data base. The inventory will gather results of other EU funded RRI projects, good cases and practices of RRI and RRI Learning. Also, different stakeholders involved and/or affected by R&I will participate in a debate and reflection process on RRI Learning through online and offline Forum actions. 1-	ICORSA
5	Responsible industry	Responsible-Industry project designated an Exemplar Implementation Plan of RRI in Industry to demonstrate how to work together with established RRI experts, policy advisors and civil society organisations to drive the research and innovation process with the principles of RRI in mind.1,2,4	PLOCAN
6	Printeger	Enhance research integrity by promoting a research culture in which integrity is part and parcel of what it means to do excellent research, and not just an external and restrictive control system.1-4	EUR
7	RRI practice	The RRI-Practice project brings together a unique group of international experts in RRI to understand the barriers and drivers to the successful implementation of RRI both in European and global contexts; to promote reflection on organisational structures and cultures of research conducting and research funding organisations; and to identify and support best practices to facilitate the uptake of RRI in organisations and research programmes.1-5	DMU
8	Prisma	The PRISMA project conducted pilot studies with 8 companies in order to help them to better integrate Responsible innovation in their innovation process and business practices. These pilots provided case studies and good practices on responsible research and innovation (RRI).1,2,4,5	PLOCAN
9	RRI tools	Repository of RRI practices (tools, projects, programs and organisations) with inputs from 400 RRI stakeholders meeting across 30 countries and a community of practice of more than 1000 users.1-5	UNESCO
10	GENDER TIME	The aim of the GenderTime project is to identify and implement the best systemic approach to increase the participation and career advancement of women researchers in selected institutions where self-tailored action plans are implemented.1-4	DMU
11	RECODE	The project will leverage existing networks, communities and projects to address challenges within the open access and data dissemination and preservation sector and produce policy recommendations for open access to research data based on existing good practice.1-4	DMU
12	MARIE	In MARIE, partners from 8 regions face these challenges together in the context of their smart specialization priority sectors. The objective is to improve regional public policy that supports delivery of RRI to enterprises' product, process and service design,	CNR

		production and distribution. MARIE achieves this through exchanging experiences on 3 types of support action contained in the RRI framework: Quadruple Helix; Open Innovation; Information & Tools for RRI application.1,2,4	
13	SAGE	The SAGE Wheel Toolkit is designed to: Facilitate the process of designing effective Gender Equality Plans (GEPs) in higher education institutions. Be adapted and used by Research Performing Organisations (RPOs) across Europe to promote European research that is gender balanced.1-5	DMU
14	STAGES	Under the coordination of the Department for Equal Opportunities of the Italian Presidency of Council of Ministers, and assisted by a research centre specialized in gender and science – ASDO, 5 Research Institutes/ Universities from Italy, Germany, Denmark, Romania and the Netherlands are implementing self-tailored action plans including activities such as: awareness-raising initiatives in high level institutional bodies; training modules on gender equality for internal decision-makers; mentoring programmes for young women scientists; actions to enhance the visibility of women scientists; updated management and research assessment standards; course content development; leadership development; work-life balance measures; gender quotas in committees; promotion and retention policies.1-4	CNR

Table 1. List of projects selected by criteria and reviewing partners

1.2 Review of projects

As indicated in the WP3 implementation plan, each partner was assigned one or more projects to review, depending on available resources and, in some cases, specific expertise or familiarity with the project under review. For each project, partners were requested to gather and analyse relevant source material, to be stored in a separate online folder. This material, plus the project website information, was used for the desk-based review of the project.

The desk-based review was a documentary analysis guided by the framework in the box below, which was prepared by ICORSA. Although, as discussed in the Mutual Learning process (T3.3), some of the questions were repetitive, the way information was gathered is significant for GRRIP and was designed to be improved through qualitative input (interviews). UNESCO added a final question (n° 12) and requested partners to provide a short summary of project best lessons and practices for GRRIP.

For each question in the framework below, partners were to describe: a) the key learning point for the project; b) the nature of evidence for this learning point (including specific reference and quotations); and c) specific links between evidence and learning point (articulating how the evidence demonstrates the key learning point). It should be stressed that on each point the review concerned the presentation of the relevant information by the project itself. The methodology did not permit independent assessment of e.g. the real effectiveness of outcomes claimed.

1. Institutional structures

What, if any, institutional structures were established such as advisory committees, steering committees, dedicated RRI units, offices or departments, internal RPO&RFO networks?

2. Dedicated RRI roles

Were dedicated RRI roles established and/ or was RRI incorporated into job descriptions?

3. Developing governance

What institution level policy, vision and rules on RRI were instituted?

4. Adapting operational processes

How did the successful projects identify and adapt the existing RPO/RFO operational processes to embed RRI?

5. Integrating RRI

Specifically, how was RRI incorporated into research/innovation practice?

6. Barriers and challenges

What were the best methods to overcome the identified issues?

7. Compliance/monitoring

What compliance and monitoring processes were implemented?

8. Reflection/evaluation

What reflective practice and evaluation processes were implemented?

9. Institutional awareness

How was internal communication achieved successfully across the RPO/RFO from top level to department middle management to grassroots researchers/innovation workers?

10. Training and mentoring

What specific content and modes of training and support/mentoring were developed and delivered on how to incorporate the RRI dimension in research/innovation practice? (including, for example, possible topics such as agenda-setting in research and innovation programmes, co-production of research and innovation content, citizen science, extended peer review in funding agencies, and co-evaluation of proposals, other R&I funding decisions).

11. Quadruple Helix / Public engagement

How were the different categories of the quadruple helix, and societal actors in particular, engaged during this action / implementation process?

12. Lessons learned/reflection for GRRIP

Please produce a short summary (1-3 pages) of the project review including the most relevant information for GRRIP in terms of:

- Good practices
- Lessons learnt
- Main relevant documents/deliverables to be compiled in the project library

Box 1. Framework for project review

1.3 Semi-structured interviews

As indicated in the WP implementation plan, based on partners' suggestions, a preliminary analysis of the project findings and relevance for GRRIP – mainly in terms of best practices and lessons learned – trying to ensure a wide diversity of actions, RRI keys and tools for stakeholders engaging, four projects were selected for interview. The idea was to collect more detailed information on action plan implementation methods and impact, and also to understand more analytically how the notion of an “action plan” might have evolved as it was confronted with real-world situations. The guideline for the semi-structured interviews was developed based on the T3.1 review template annexed to the present report.

The four projects selected for follow-up interview have the following characteristics. **RRI Tools** is considered a pioneer and reference project that produced an impressive number of tools, catalogues and guidelines/training documents on RRI by key/stakeholder to be used in GRRIP. Similarly, **RRI Practices** provided good analysis of main challenges and barriers in implementing a wide range of RRI actions in RPOs and RFOs to be taken into account by GRRIP members. **JERRI** had promoted structural change in the two biggest Research and Technology Organizations (RTOs) and involved the public in co-designing actions to address all five RRI keys. The process and actions proposed can inspire GRRIP partners' own Action Plans. Finally, **SAGE** can help in understanding the complexity and holistic view required to address gender equality in GRRIP Action plans, and has produced self-assessment tools that can be directly used for initial audits of GRRIP RPOs/RFOs.

1.4 Mutual learning (ML)

Mutual Learning (ML) has been suggested as a way to implement RRI by recovering a “forgotten experience of reflection” which requires ‘a deliberative ambiance, a process of mutual learning, a consciously organised process of deliberative and distributed reflection.’² In GRRIP ML is a deliberative process for formative reflection and evaluation; it makes use of partners' and collaborators' distributed expertise and results in learning which shapes future project actions.

In WP3, ML aimed to facilitate refinement of and learning about SoA results across WPs. As indicated in the WP3 implementation plan and WP3 ML protocol, after completion of the SoA reviews (subtask T3.1.3 and T.3.2.3), and during analysis and write up of their results, three mutual learning discussions were held

WP5 (Audit) and WP8 (ML) Leaders took part in the first stage ML discussion in early July reviewing the methods for each SoA and commenting on interim progress of review and data quality. The second stage discussion was split into two conference calls in late July and early August to allow adequate time for all five GRRIP marine and maritime case studies to reflect on the SoAs. Case study representatives and GRRIP project partners took part in each call, facilitated by WP8 Leads (Mutual Learning). A summary two-page document of each 3.1 and 3.2 review was produced and circulated prior to discussion. During the second stage of ML, each case study reflected on its organisational mission, its ethos and what RRI-like policies and practices were already in place. This helped GRRIP partners to learn about each site and contributed information for Audit and Action Plan project stages. It also helped to case studies to reflect on their own RRI practice and compare it with practices unearthed by the reviews. In doing this, it was hoped novel SoA practices would resonate with case studies, so providing useful starting points for their own organisational changes in GRRIP.

A final third stage discussion, in parallel with the final drafting phase of deliverables D 3.1 and D3.2, was arranged to reflect on the SoA report and conclusions and again to disseminate SoA learning for future WPs. Representatives from WP3, WP5 (Audit), WP6 (Action Plans) and WP8 (Mutual Learning) took part in the discussion. The mutual learning protocol and minutes from the discussions are available in the online project platform.

While mutual learning in GRRIP was conceived as a powerful internal tool to ensure dialogue and coordination among work packages, enlarging mutual learning beyond the consortium, especially with projects that are running in parallel with GRRIP, deserves be encouraged. In this sense, although not reviewed in T3.1 because of lack of maturity, a number of Swafs RRI projects are to be taken into account: SUPER_MoRRI (knowledge practice), GRACE (institutional change), TERRIFICA, TERRITORIO and SeeRRI (territorial RRI), EU-Citizen.Science, CiteS-Health, MICS, ACTION (citizen science).

2. Project reviews

As mentioned, this report was produced based on the information collected by partners from publicly available sources relating to the selected projects. This information has been archived in the online shared GRRIP platform. In order to ensure transparency and the possibility of follow-up secondary analysis, each project has a file that contains a short summary, review templates and main deliverables / relevant project documents. In this section, a short summary of each project review is included for ease of reference.

- 1- **Starbios 2** developed RRI-oriented structural change processes in biosciences research institutions through designing, implementing and evaluating RRI Action Plans. In order to secure the results emerging from the APs, a sustainability strategy was developed and implemented during the project lifespan. APs were supported by a central technical assistance team and the project was monitored and assessed to have feed-back on learning process concerning: a) resistances and barriers to RRI (which are they, how they manifest themselves, which impact they have, etc.); b) key factors favouring or supporting RRI; c) strategic options and RRI-oriented tools. The final guidelines and RRI model for biosciences institutions were produced in July 2019 (not online). From this review, GRRIP can expect to learn how to produce sectorial specific AP for RRI, mutual learning and evaluation processes.
- 2- **JERRI** pays special attention to organisational change in RTOs and their challenges, analysing the two biggest ones in Europe. The organisational and cultural differences among institutions need to be carefully assessed as to promote sustainable mind-set transformation. Fraunhofer undertook a very participatory process to reflect on societal engagement and co-developed pilot ideas that could provide routes to a long-term institutionalization of societal participation, i.e. the idea of testing a permanent contact point/constituency surgery for local citizens who want to be informed about the institutes' activities or to set up a "dash button" for selected local actors, inter alia to send signals regarding environmental problems that may be addressed by the institutes' research. GRRIP can use some of the tools produced and extract lessons on the challenges of organisational changes.
- 3- **STAGES** promoted structural change and gender-aware management in research institutes and universities in five countries (four coinciding with GRRIP) by developing

self-tailored action plans and promoting mutual learning and coordination among the partners. One of the key messages was to shift from fixing the approach to women in the organisation towards more structural organisational adjustment. The project promoted a women-friendly environment, gender-aware science and women's leadership in science. One of the challenges of the project was to achieve awareness regarding gender equality in science. The use of the Group Model Building methodology proved extremely successful to promote leaders' involvement in gender issues and urge them to take action. The final evaluation of the initiative included indicators and technical tools that could be applicable to GRRIP action plans on gender equality and could be used for the working group discussions.

- 4- **GenderTime** showed the importance of exchange among the various institutions defining tailored-made action plans for gender equality: institutions mapped their capacities in order to share them among the members of the consortium, e.g. on systems for collecting disaggregated data, focus groups, academic career models, etc. Each partner designed an action plan independently according to its needs, with no "a priori" common classifications to organise the actions or practices. This was found to constitute a challenge to the design of the methodological toolbox. Mutual learning and dissemination of case studies were found to be key to ensure overcoming of barriers and promotion of action in other RPOs. This finding can be of use for GRRIP.
- 5- **SAGE** developed Gender Equality Plans along 4 key themes: engendering knowledge, career progression, work life balance and institutional governance. The project used clear indicators for monitoring progress and post-project impact. It also designated implementation teams composed of a diversity of backgrounds and experiences inside the RPO (researchers, support staff, students, etc.) to set priorities for implementation, monitor and engage with others. These made it possible to identify and address sources of resistance: perceptual blocks (i.e. stereotyping); emotional blocks (i.e. fear of taking risk); cultural blocks (i.e. taboos); environmental blocks (i.e. lack of support) and cognitive blocks. Ensuring data-driven actions, building alliances and making visible the support of senior managers were found to be key to overcoming barriers. Concrete actions, such as redesigning incentive structures (e.g. certification and award) were judged to be a good way to overcome blocks. The deliverables (audit template, managers change model, GEP toolkit and guidelines to collect disaggregated data, gender awareness online courses, etc.) are of direct use for GRRIP in the area of gender equality as well as the lessons learned in overcoming barriers for gender equality in particular and for the institutional implementation processes for RRI in general.
- 6- The **RRI Practice** project worked directly with 22 RPOs and RFOs to identify best practices and understand barriers and drivers for RRI at the European and global levels. The project concluded that the RRI concept is not fully institutionalised, although some of the individual keys are well embedded in practice. In order to make progress, the project found that a sustained array of measures, including training, consultation / support departments / job positions, RRI-friendly research assessment models and incentives and indicators for researchers is required. Furthermore, it is important to rely on champions who can lead and guide the process of implementing gender equality and diversity policy and practice. Public engagement, the project found, needs dedicated staff role, data and indicators, with a clear policy, so it better relates to individual researcher's interests. External awards, it was suggested, can be a good tool to promote RRI, e.g. the "*University Suitable for Families*" label in Germany. GRRIP can learn

from these assessments and most successful actions implemented in the RPOs and RFOs.

- 7- The main output of the **RRI Tools** project was a *Catalogue of Good Practices* to provide concrete guidance on how RRI can be put into practice. Deliverable D1.4 of RRI Tools, and the online search tool, developed by the project, were classified by type of project, type of stakeholder, grand challenges (societal needs) or sector and RRI aspect (most on public engagement and science education). Although the project did not develop concrete action plans at the institutional level, it compiled them and is a very good pool of tools, ideas and case studies that can help in the design of GRRIP action plans. *The RRI Tools Report on the Opportunities, Obstacles and Needs of the Stakeholder Groups in RRI Practices in Europe* is constructed over 400 RRI stakeholders in 30 countries and can advise on how to engage with different stakeholder groups. The community created around the project (1000 users) and its communication platform can also be of use to see how to develop communication tools within GRRIP. The training formats and workshops developed in RRI Tools, e.g. the “Guidelines on how to set a multi-stakeholder workshop”, can also be of value to GRRIP.
- 8- **RECODE** identified four groups of barriers for Open Access initiatives: 1. stakeholders’ values and ecosystem incentive structures, 2. infrastructure and technology challenges (e.g. interoperability), 3. legal and ethical challenges (e.g. IPR, privacy and data protection, misappropriation) and 4. institutional barriers (e.g. financial support, training, quality control, value and trustworthiness of research data, etc.). The project findings are organised according to four main types of stakeholders (funders, RPOs, data managers and publishers) and four types of challenges. Three of the stakeholder types are associated with rather broad-brush policy recommendations that deserve to be taken into account by GRRIP partners.
- 9- The **Printeger** project, similarly to STAGES with respect to gender equality, showed the need to move from the individualisation of responsibilities of RPO staff regarding research integrity to the creation of an enabling ecosystem to encourage and support it. It developed a number of useful tools for exchange, awareness and training/mentoring at the institutional level, including new roles and structures to be considered by GRRIP in promoting ethics in science.
- 10- **HEIRRI** pointed out that it is important to consider the complexity of Higher Education Institutions (HEI) – in terms of structures, institutional culture, socio-economic and historical context, resources... – when designing training programs to integrate RRI into curricula. In order to integrate the concept of RRI in science and engineering degrees, the project carried out a review of existing RRI projects to conceptualize RRI, then developed a database containing the evidence collected during RRI reviews. Based on the results from the reviews, the project designed RRI training programmes and training materials.
- 11- The **Nucleus** project showed the importance of qualitative interviews and mutual learning (especially field trips) in order to understand RRI culture, barriers and challenges and promote internal exchange among universities. The interviews on participatory research and innovation and scientific cultures conducted with more than 100 of academic leaders on RPOs are available. The guidelines published and the NUCLEUS living RRI network are both located on a co-production online setting that can be useful to the GRRIP project. NUCLEUS focused on the social interaction among different stakeholders. Such a perspective is useful to develop a better understanding of

RRI in practice and to identify barriers and synergies such as cultural differences across stakeholders.

12- MARIE exchanged experiences on the funding of industry support actions to promote RRI in the area of the Quadruple Helix, open innovation and information & tools, which are all applicable to GRRIP and to GRRIP RFOs in particular. Using interregional activities, communication and stakeholder engagement, 8 regional RFOs developed Action Plans that resulted in improved policy instruments; more and better targeted funding for RRI delivery; increased capacity among innovation actors; consolidated partnerships of Quadruple Helix innovation chain stakeholders. During their activities, partners carried out surveys extracting good practices collected in a project document.

13- PRISMA showed that industrial RRI implementation is context-sensitive, depending on the sector, technology and type of company. Several RRI-related actions were implemented, but without the strategic approach to RRI: there is a need to incorporate RRI in the mission and vision of the company and involve top managers. The RRI roadmaps developed ethical, legal and social impact frameworks and a code of actions to involve stakeholders and integrate monitoring, learning and adaptive mechanisms to address public and social values management in all phases of product development. This has been compiled in an exemplar RRI roadmap (in line with ISO and CEN standards and including a SWOT analysis for RRI implementation) that was tested in eight pilot companies (results available on the web). Pilot implementation of the RRI approach – with particular attention to the gender dimension – within the Corporate Social Responsibility policy of the eight companies resulted in improved innovation processes and products and gained trust from society, therefore built resilience strengthening their position in the market. The project specifically mentioned SDGs and societal needs and is useful to understand industry motivation and arguments to engage it with GRRIP QH actions.

14- Responsible Industry found that industry has different motivations/challenges in adopting RRI practices, among others: motivation vs costs; open access vs IP interests, etc. The project produced a framework with positive impacts (reputation, business risk reduction, public trust in safety of products, environmental sensitivity), comprising case studies, for company top leaders. The project found that public soft incentives (note for GRRIP RFOs) are needed and the promotion of diversity in companies, notably the integration of seniors in research, seems key for success. The focus needs to be on reputation by showcasing the failures: it is difficult to prove that being responsible is profitable but showing the contrary is easy (e.g. Volkswagen) and there is a need to state the impact on the innovation process in terms of e.g. time to market, costs, staff.

2 Summary of main findings

According to the WP3 implementation plan, the main objective of D3.1 is to learn from selected EU projects in order to: 1) Ensure maximum use of excellence during all stages of the Action Plan (AP) design and implementation; 2) Extract best lessons and determinate barriers and mitigation practices, reflection and evaluation and 3) Engage with the public – QH stakeholders. It will be noted that this agreed design stops considerably short of compiling, in the Library of Actions, a list of “best” practices that can be treated as off-the-shelf options for RPOs/RFOs in GRRIP – or indeed outside the project – to develop and implement Action Plans

for specific institutional purposes. It was not assumed that such an approach would be feasible, given the State of the Art in this area, and it has indeed been confirmed that the field does not permit it. In part, this is a consequence of the relative immaturity of institutional development. In part, and in some ways more significantly, it relates to the absence of adequate methodologies for “best” practice assessment, entailing that so-called “good” or “best” practices tend to be self-reported and to some extent self-serving, in the absence of explicit benchmarks or any kind of control how the outcomes of particular initiatives compare to what would have happened anyway in their absence.

Therefore, based on the review templates completed by partners – all available in the online platform – the responses to the 12 questions from the review framework (see 1.2 above) were grouped according to these three objectives:

- 1) Questions 1, 2, 3, 4, 5, 7, 9 and 10 are grouped under category 1 “ensure maximum use of excellence during all stages of the AP” as they are related to:
 - 1.a) RRI governance in terms of institutional structures, roles, policies, and
 - 1.b) processes for the operationalisation of RRI plans in terms of monitoring, integration in R&I practices, raising awareness and supporting internal training and mentoring activities.
- 2) Category 2 “determine barriers, challenges and mitigation practices” integrates responses to questions 6 and 8 of the framework on barriers, compliance and reflection.
- 3) Finally, category 3 reflects on questions related to public engagement and multi-stakeholder dialogue, mainly question 11 which complements the specific focus of D3.2.

Using the same categories, the following table summarizes the most relevant project-level findings/documents for GRRIP from the SoA of projects in relation to governance of RRI, good practices in AP operationalization, barriers, mitigation, reflection and evaluation and QH engagement. Information from the four projects interviewed (JERRI, SAGE, RRI Tools and RRI Practices) is also included in the table below.

N.	Project	Key RRI dimensions/ Key stakeholder group	Governance: dedicated structures, policies, roles (q. 1-3)	Good practices for AP implementation (q. 4, 5, 7, 9, 10)	Lessons learnt: barriers mitigation, reflection and evaluation (q. 6, 8, 12)	QH/Public engagement (q. 11)	Relevant docs
1	Starbios 2	Open Access, Ethics, Science education RPOs	6 biotech RPOs with RRI Action Plans (AP) Open access policy (U. Senate); Code of Conduct for biosciences; RRI mission statement at faculty level (U. Bremen); Gender observatory from implementation team Gender incorporated as a variable in biomedical research	Core Team (dean, vice dean, member of quality team) lead AP implementation Technical assistance team for the project International Scientific Advisory Committee	Mutual learning sessions Evaluation and assessment team (project) Focus groups with students, researchers (junior, seniors) and citizens 6 AP implemented; learn on how to promote ML and AP specificities and needs of Sectorial (biotech) RPOs	Educational materials, Biotechnology information centre Summer school	Guidelines for RRI implementation and recommendations on how to deal with barriers (07.2019 not on line) Open access policy Code of conduct for biosciences RRI mission statement
2	JERRI	All, RPOs	AP for the two largest EU RPOs (Fraunhofer and TNO) with assistance from U. Manchester Open access WG established by TNO ExB Open Access Strategy of Fraunhofer and the TNO code of conduct.	Rely on dedicated RRI internal leaders Pilot cases by RRI keys Dissemination of good practices among other RPOs ML with China and US	Deep analysis and use of participatory 13 workshops to find out solutions for overcoming barriers defining internal policies and pilot cases External monitoring and evaluation (IHS) Shared lessons learned	TNO created new Strategy Advisory Boards (academia, industry, government and civil society) Ethical and Societal Impact Toolkit Share Best Practices in User involvement/Citizen Science Pilot cases at Fraunhofer as Citizen's office, public debates, etc.	Collection of RRI practices (D.1.1) Stakeholders engagement (D.2.1) Setting objectives for RRI in two organisations (D.2.2&D2.3) Analysis of barriers and solutions (D.4.1&D.5.1) Shared lessons learned (D 10.2) Monitoring and evaluation concept (D8.1)

N.	Project	Key RRI dimensions/ stakeholder	Governance: dedicated structures, policies, roles (q. 1-3)	Good practices for AP implementation (q. 4, 5, 7, 9, 10)	Lessons learnt: barriers mitigation, reflection and evaluation (q. 6, 8, 12)	QH/Public engagement (q. 11)	Relevant docs
3	Gender time	<p>Gender Equality in RPOs</p> <p>No specific reference to RRI in the project documentation</p>	<p>Nominated a transfer agent by institution</p> <p>Institutional mapping of policies and practices</p> <p>7 Gender Equality Action Plans in RPOs including 200 actions and interventions</p> <p>Organisational and managerial processes modified for gender sensitive recruitment, retention and promotion policies</p>	<p>Compiled methodologies in the Gender time toolbox for monitoring and implementation</p> <p>Institutional pairing among partners to promote collaboration and exchange of expertise</p> <p>Training included surveys, interviews and focus groups</p> <p>Workshop for internal monitoring and ML</p> <p>Advisory Committee (8 experts)</p>	<p>Gender monitoring tool for on-going reflection on both a structural and individual level</p> <p>Tailored made indicators</p> <p>Internal monitoring - evolution of organisational culture (beliefs and behaviours)</p> <p>External evaluation including impact and ML</p> <p>Barriers/mitigation: small size of institutions (need to involve all staff); not women issue but institutional issue (training, awareness); financial crisis reduced staff and made GE seems less important (training, awareness)</p>	<p>National teams</p> <p>Knowledge transfer with other sister projects, policy makers, scholars and universities.</p> <p>Dissemination activities in more than 70 conferences, 3 books, 3 books chapters</p>	<p>Gender time toolbox</p> <p>Final report: template for initial mapping,</p> <p>Monitoring Handbook</p> <p>Analysis of APs (D.2.2)</p> <p>Learning organisations - transfer agents</p>
5	SAGE	Gender Equality in RPOs	<p>GE APs along 4 themes</p> <p>Implementation teams to design, monitor and engage (diverse and inter sectorial: faculty HR, academic and non-academic staff and students)</p> <p>SAGE wheel for AP design</p> <p>SAGE template for initial institutional assessment</p> <p>Change Management Model</p>	<p>Institutional awareness through provision of research content on gender, intervention in culture and management practices and curriculum.</p> <p>Protocols for researchers, R& I practices, online modules for integrating GE in all teaching activities, tailored mentoring programs, gender balanced external lecturers and visiting professors, and academic and admin leadership programs for women.</p>	<p>When designing AP, producing a blueprint post-SAGE project</p> <p>AP include risk analysis and mitigation</p> <p>GE indicators and guidelines to collect and institutionalized their collection</p> <p>Case studies book/evaluation published</p>	<p>Educational online trainings</p> <p>Gender courses in curricula</p> <p>Partnership with ICT industry to promote women, summer courses, mentoring, visits</p> <p>Dissemination and exploitation plan</p> <p>GE conferences at national level with Policy makers, CSO, RFOs academics and board of industries</p> <p>GE international conferences to present cases for mutual learning (Madrid 2020)</p>	<p>SAGE Wheel Model for GEP</p> <p>D2.1 Primary data collection tools</p> <p>D2.2 Audit Guidelines</p> <p>D2.3 Template for the collection of gender disaggregated secondary</p> <p>D2.5 Review of Gender equality certifications</p> <p>D3.1 GEP Implementation Guidelines</p> <p>D4.1 Change management process model</p>

N.	Project	Key RRI dimensions/ stakeholder	Governance: dedicated structures, policies, roles (q. 1-3)	Good practices for AP implementation (q. 4, 5, 7, 9, 10)	Lessons learnt: barriers mitigation, reflection and evaluation (q. 6, 8, 12)	QH/Public engagement (q. 11)	Relevant docs
6	RRI practice	All, RPOs/RFOs	<p>Organisational code of conducts</p> <p>Rely on champions</p> <p>Support from leadership</p> <p>Dedicated staff for public engagement</p> <p>Explicit rewards and career improvements to staff doing public engagement</p>	<p>-Advisory Board to monitor and make recommendations composed of national experts (presently meetings)</p> <p>-Exchange with non-Eu partners</p> <p>-Budget for RRI and interdisciplinary collaboration</p> <p>-Rewards structures and merit promotions</p> <p>-Communication of institutional values</p> <p>Training on GE and diversity</p>	<p>Action research methodology</p> <p>Barriers of budget, support from leadership, lack of training tools for implementation/ engage with public</p> <p>Negative perception of public engagement as challenge instead of opportunity to improve ability to innovate</p> <p>Lessons learnt by key</p>	<p>National workshops and link with national networks of scientists and communicators</p> <p>Funders to support public dialogues at larger scale</p> <p>Invest in researchers and student training about how to engage with public</p> <p>Lessons learnt regarding science education</p> <p>Policy recommendations</p>	<p>Handbook for Organisations aimed at Strengthening Responsible Research and Innovation)</p> <p>D.15.2 Analysis of national and organisational conditions (barriers and drivers) for implementing RRI (31.08.2019)</p> <p>Summary of RRI-Practice Advisory Board recommendations</p> <p>12 national case studies</p> <p>12 national workshop reports (France and UK contextual factors)</p>
7	RRI tools	All- repository and search tool for good practice, not real AP implementation	<p>Project toolkit with some 300 entries – tools, inspiring practices, RRI projects, and library entries that can be expanded by the community of practice</p> <p>I.e. RRI self reflection tool</p>	<p>Catalogue of Practices, with 31 examples that show how the processes of RRI work in practice and lead to societally Important outcomes. Some of these have been developed further into “RRI Showcases” (some from marine sector) that can be used for training purposes.</p>	<p>The RRI Tools Report on the Opportunities, Obstacles and needs of the Stakeholder Groups in RRI practices in Europe has been constructed as a result of over 400 RRI stakeholders meeting across 30 countries</p> <p>The review of RRI tools project was published in the Journal of Responsible Innovation 2017</p>	<p>Community of practice with 1000 users from all QH divided in 5 categories: researchers, CSOs, policy-makers, industry and educators</p> <p>Training modules available for different public/objectives</p> <p>Advocacy briefing sheets to target key stakeholders: “What’s in it” for them, what might happen if they do not take heed?</p> <p>D.1.3 Definition of the collaborative platform</p>	<p>Project toolkit</p> <p>RRI Tools Report on the Opportunities, Obstacles and needs of the Stakeholder Groups in RRI practices in Europe</p> <p>RRI catalogue of practices and showcases (D.1.4) by stakeholder</p> <p>Recommendations and guidelines on how to set up a multi-stakeholder workshop in terms of setting, methodology, content and participants</p>

N.	Project	Key RRI dimensions/ stakeholder	Governance: dedicated structures, policies, roles (q. 1-3)	Good practices for AP implementation (q. 4, 5, 7, 9, 10)	Lessons learnt: barriers mitigation, reflection and evaluation (q. 6, 8, 12)	QH/Public engagement (q. 11)	Relevant docs
8	RECODE	Open access in RPOs	<p>Reviews and interviews to address four grand challenges in open access to research data</p> <p>Policy recommendation by type of institutions functions: funding, content creation, dissemination, etc.</p>	Model of the open access ecosystem	<p>4 types of barriers identified: stakeholders values and ecosystems structures; infrastructure and technological challenges; legal and ethical challenges and institutional barriers</p> <p>Report with solutions</p>	Findings and recommendations organized by stakeholder: funders, RPO, data managers and publishers	<p>D.1. Stakeholders values and ecosystem</p> <p>D.2.1 Infrastructure and technology challenges</p> <p>D.3.1. Legal and ethical issues in open access</p> <p>D.4.1. Institutional barriers and good practice solutions</p> <p>D.4.1. Policy recommendations for open access</p> <p>D.5 Guidelines for different stakeholders groups on supporting open access and preservation of research data</p> <p>D6 Using Open Access networks to support policy harmonization across Europe</p>
9	Printeger	Ethics: research integrity in RPOs	<p>Local integrity officer (D5.2: experienced, High level researcher with clear responsibilities and confidentiality policy)</p> <p>Employee appraisal discussions including integrity</p> <p>Managerial assessment of performance criteria</p> <p>Ethics guidelines</p> <p>Work environment mapping</p>	<p>Integrity Café; value visioning and ethics reflection workshops</p> <p>Whistle-blower training</p> <p>Improved educational resources for teaching research ethics to future and young scientists (the UPRIGHT tool)</p>	<p>Expert Advisory Board (EAB)</p> <p>Policy Advisory Board (PAB)</p> <p>Quality assurance system</p> <p>Local stakeholder panels</p> <p>Institutional context is key vs individual responsibility</p>	<p>Local stakeholder panels at universities to consult documents produced</p> <p>Tools for editors and journals (D3.8); Policy brief for scientific and scholarly publishers (D5.3);</p>	<p>UPRIGHT educational tools for ethics</p> <p>D5_2 Printeger Tools for research leaders and managers</p> <p>D3_9 Organisational Best Practices</p> <p>D2_6 Printeger Organisational approach to miscor</p> <p>Working with Research Integrity—Guidance for Research Performing Organisations: The Bonn PRINTEGER Statement</p>

N.	Project	Key RRI dimensions/ stakeholder	Governance: dedicated structures, policies, roles (q. 1-3)	Good practices for AP implementation (q. 4, 5, 7, 9, 10)	Lessons learnt: barriers mitigation, reflection and evaluation (q. 6, 8, 12)	QH/Public engagement (q. 11)	Relevant docs
10	HEIRRI	All in Higher Education Institutions	RRI guidelines for PhD candidates	<p>Three Advisory Boards - i) the Multidisciplinary Contents Council (MCC), ii) the Business & Entrepreneurship Advisory Board (BEAB), and the iii) Science Communication & Internationalization Advisory Board (SCIAB).</p> <p>Training programs for students at different levels</p> <p>Corporate and institutional communication: latest news, meetings, interviews to consortium members, WP publications, events, congresses, etc....</p>	<p>Issue of RRI governance based on linear model of R&i</p> <p>Evaluation protocol (including surveys and interviews)</p>	<p>HEIRRI forum</p> <p>Communication and dissemination plan including social media YouTube, Facebook, Twitter, LinkedIn, Flickr, Academia.edu and Research Gate with Key Performance Indicators and different activities with a) already RRI knowledge b) new stakeholders</p> <p>Mailing list-newsletter</p> <p>Videos</p> <p>Traditional media</p>	<p>D.3.Training materials (MOOC)</p> <p>Midterm and final evaluation report (not open access)</p> <p>D.2.3 HEIRRI database good practices</p> <p>D.7.1. Communication and dissemination plan</p> <p>D.8.1 Evaluation protocol</p>
11	Nucleus	Public engagement in RPOs	Roadmap for Responsible Research for RPOs	<p>Mutual learning</p> <p>Field trips</p>	<p>Field trips for evaluation of Roadmap implementation</p> <p>Network for ML</p>	<p>Academia, policy makers and civil society workshops, science dialogue, science cafes</p>	<p>Implementation roadmap (not available on line)</p> <p>Survey report</p>
12	Marie	RFOs role to promote RRI in industry: QH, Open innovation and Information tools	<p>8 regional Action Plans for RFOs aiming at policy instruments; funding for RRI delivery; capacity among innovation actors; Quadruple helix innovation chain stakeholders</p> <p>Catalogue of 10 RRI policy instruments</p>	<p>10 interregional (ML) events including study visits and workshops</p> <p>Policy learning platform</p>	<p>Interviews to understand industry barriers to RRI (23 enterprises in 8 countries)</p> <p>Proposal to overcome barriers categorised under 4 type of enablers</p> <p>RRI Maturity Assessment process for self-assessment of regions in RRI and elements to support it (12 indicators)</p>	<p>Steering groups / committees with the participation of stakeholders</p> <p>8 local stakeholders groups (meeting twice/year)</p>	<p>Mainstreaming Responsible Innovation in European S3:</p> <p>- Enterprise Survey</p> <p>- Interregional Comparison of Regional RRI Maturity and Needs.</p> <p>Policy Learning Platform;</p>

N.	Project	Key RRI dimensions/ stakeholder	Governance: dedicated structures, policies, roles (q. 1-3)	Good practices for AP implementation (q. 4, 5, 7, 9, 10)	Lessons learnt: barriers mitigation, reflection and evaluation (q. 6, 8, 12)	QH/Public engagement (q. 11)	Relevant docs
13	Prisma	All (ethics, public engagement focus) in biomedical industry	<p>Exemplar roadmap developed including management systems in the areas of social responsibility, sustainability, innovation, quality and risks</p> <p>Research ethics and testing procedures Data collection and usage protocol</p>	<p>Pilot cases description with actions undertaken in the 8 companies, i.e.;</p> <p>ethical analysis, awareness-raising and training initiatives for R&D personnel, design for values;</p> <p>implementation of RRI and CSR tools and methodologies</p>	<p>Experiences in pilot companies compiled (D.2.4)</p> <p>Validation, monitoring and evaluation processes adopted</p> <p>10 RRI Key Performance Indicators (KPIs) have been developed, selected and tested together with the pilot companies.</p>	<p>Cooperation/ communication strategy with regulatory bodies, funders, authorities and patients</p> <p>MOOC on "Responsible Innovation: Building Tomorrow's Responsible Firms"</p> <p>Industry dialogues</p>	<p>D5.2 - PRISMA RRI-CSR Roadmap</p> <p>D 2.4 - Responsible innovation in practice: experiences from industry</p> <p>Analysis of conditions for success of RRI uptake by industry (D5.1)</p>
14	Responsible industry	All in industry	<p>Exemplar Implementation plan or RRI in industry tested in 4 companies</p> <p>Tools and production matrix</p> <p>Use existing structures/roles (HR, legal, marketing departments, CSO) and adapt it to RRI needs</p>	Case studies	<p>Quality assurance plan</p> <p>Governance depends on size and structure of organisation</p>	<p>Stakeholders networks and discussions with industry partners, RRI experts, policy advisors and CSO for inclusion in different phases of product development</p> <p>Joint (project) and individual (companies) exploitation plans</p>	<p>Guide for the implementation of RRI in the industrial sector</p> <p>Tools and Production Matrix. D.1.3. Responsible Industry – Quality Assurance Plan Final. D.6.4.</p>

Table 2. Summary of main project findings

3 Main findings from the mutual learning (ML) discussions

As indicated above, mutual learning (ML) discussions were designed to ensure that other WPs were given full opportunity to consider the implications of the SoA reviews (both T3.1 and T3.2) for the conduct of GRRIP. In other words, while T3.1 and T3.2 focused on compiling information from project reports, supplemented by interviews, T3.3 was concerned with establishing what that information might *mean* for the operationalisation of RRI. This included identifying and addressing the limitations of the SoAs' results for informing future RRI practices in GRRIP's case studies specifically, despite their general relevance for contributing to RRI discourses. It follows that ML constituted an additional constructive critique of the practical relevance of the information collected and conclusions drawn. In this way it served to hold both SoA reviews to account and as a validation of each finalised review.

ML resulted in a number of findings. Firstly, ML discussions emphasized the importance of follow-up interviews which were conducted in both SoAs to bring out more nuanced findings about RRI implementation than were available in published RRI project results. This indicates how project publications continue to struggle to tell the whole story of successes and failures which are vital for future learning.

Secondly, discussions revealed the differences between RRI maturity in case studies at baseline. On the one hand, two case studies (MaREI and Swansea) conveyed a familiarity and compliance with all five RRI keys or comparable RRI policy frameworks indicating the presence of existing, comprehensive (five-key efforts), and institutionalised RRI. For these cases, SoA practices were largely not new. However, while this indicates GRRIP will need to avoid duplicating practices, it also indicates the difficulty in contributing meaningfully to grounded RRI, especially where sites have been previously subject to a number of similar policy objectives and there is the risk of policy fatigue or disengagement. On the other hand, three case studies (Plocan, WavEC and EC Nantes) indicated less comprehensive (five-key) and institutionalised RRI, but nevertheless the ethos and mission of each was sympathetic to RRI. This was demonstrated by case studies' commitments to social and environmental sustainability, existing outreach and public engagement programmes, and a commitment to improve these. In light of this, GRRIP's role will be to support case studies to reveal and develop their grounded RRI practice, building on existing committee structures and adding policies to move towards institutionalisation.

Thirdly, discussions recommended that the conclusion sections of SoAs could usefully highlight "best practices" for future GRRIP project use, stratifying these by Work Package and by RRI stakeholder in the case of 3.1 (RRI projects) and 3.2 (RRI projects with QH involvement) respectively. Fourthly, as indicated above, discussions reflected on the difficulty of being able to decide what was "best", both in terms of RRI practices in projects reviewed, and what would be best for GRRIP going forward. The methodological inadequacies that underpin this difficulty have already been discussed in this report, and by their nature cannot be resolved through a State of the Art approach. However, a library of good actions has been compiled and summarized in the table above (p.12).

Fifthly, and with particular relevance to 3.2, discussions grappled with the under-determination of the QH concept. In GRRIP the QH concept is taken to build on the TH concept of



government, industry and academia. To this it adds a fourth helix of societal actors.² This concept did not resonate meaningfully with any case study, and GRRIP partners also preferred to use the term ‘stakeholders’. This both reflects the issues the QH is trying to address and highlights its potential limitations in doing useful conceptual and practical ‘work’ for grounded RRI. In particular, the ‘Q’ part of QH comes to mean non-professional actors such as citizens, failing to reflect a holistic, more equitable view of different R&I stakeholders as anyone with a stake in R&I (including those professional actors traditionally understood as part of the research and innovation establishment). Furthermore, by referring to the Q as societal actors, the idea of the single, double or triple helix of relationships in the TH as also comprising societal actors (with societal responsibilities) is lost.

While mutual learning in WP3 focused on disseminating and reflecting on SoA findings of completed RRI projects, several further ongoing Swafs projects may also provide insights relevant to GRRIP’s objectives. These include: SUPER_MoRRI (focusing on how to monitor RRI); GRACE (examining institutional change and the cultural production of gender equalities within Europe); TERRIFICA, TeRRitoria and SeeRRI (where RRI is developed in more than one territory³), EU-Citizen.Science⁴, CitieS-Health, MICS, ACTION (projects examining and building citizen science activities in Europe). GRRIP will take opportunities to liaise with and (informally) ‘learn’ from such projects where possible.

4 Discussion and lessons learned for GRRIP

On the basis of the project review templates and documents compiled, interviews and mutual learning discussions, some general and specific key recommendations for GRRIP partners have been developed.

4.1 General conclusions

Conclusion 1

The RRI conceptual framework is abstract, dynamic and evolving: in order to achieve specific project objectives, GRRIP needs to agree a common framework and to be flexible in adapting to new insights.

While this point, which constituted an initial GRRIP working hypothesis, may appear generic and even trivial, it is actually significant in several respects that it should be confirmed by the SoA review. Despite the institutionalisation of RRI as a widely recognised EU framework, it is not the case that a clear set of principles and practical tools are available “off the shelf” to design contextualised Action Plans. Contextualisation raises issues that will need to be addressed explicitly within GRRIP, not least for sectors such as the marine and maritime

² From GRRIP proposal: ‘The concept of the Triple Helix of university-industry-government relationships was initiated in the 1990s by Etzkowitz and Leydesdorff (1995)². The quadruple helix (Carayannis & Campbell, 2009)³ is even more recent, with the addition of the Societal Actor stakeholders. RRI has this stakeholder group as one of its five keys called Public Engagement.’

³ See SwafS 14-2018-2019-2020 description of territorial RRI as follows: ‘For the present topic, ‘territory’ should be understood broadly. Territories may be defined by any particular area characterised by certain geographical features, or any area with shared cultural, environmental or economic ties. Consortia should focus activities in more than one territory in Europe (and possibly also in Third Countries), with a view to developing and promoting shared learning and diffusion of governance innovations.’

⁴ See <http://eu-citizen.science/>



sectors which have a lower level of overall development in this regard than, say, biotechnologies or information technologies. Furthermore, while some dimensions of RRI, such as gender equality and research equality and reasonably stabilised, others, including public engagement and the multiple aspects of governance are either less well developed analytically and normatively or controversial. In addition, it remains unclear how to operationalise open access, with significant objections being raised to current options such as “Plan S”.

The following specific points are therefore important for GRRIP, as indications of how a particular organization needs to go about reflexive elaboration of an RRI Action Plan:

- Establish its own conceptual RRI framework to be validated internally at the institutional level. It needs to be understood as a whole, not as an *à la carte* list of actions.
- A clear policy for stable careers for researchers (including women, junior and older staff) is a prerequisite to RRI.
- Showcase RRI practices and tools and use clear examples adapted to every Quadruple Helix (QH) group’s interests/language.
- Include internal and external consultations within the action plan design, monitoring and evaluation to ensure all stakeholders can contribute to the notion of RRI and make it evolve.
- Pay particular attention to R&I outcomes as to provide effective solutions to societal challenges and show pilot actions while implementing structural change to attract agents of change inside and outside the institutions.
- Design flexible and tailored actions plans with short, medium and long-term (post-project) objectives/initiatives.

The following paragraphs make the link between the above conclusions and the review material that substantiates them.

As indicated by **HEIRRI**, describing RRI as a policy concept suggests that RRI terminology is used by policy-makers, managers, funders, politicians and scholars of science, research and innovation, rather than the practitioners of research and innovation themselves. This is of course not entirely correct. Alternatively, one might explain RRI in terms of research and innovation practice: RRI is research and innovation that is practiced and organised with responsibility.

It is important to recognize that *responsibility* in R&I may have multiple meanings. Issues of social justice, environmental depletion and protection, peace and disarmament, or ethics related to controversial technologies are just some examples of relevant aspects of responsibility. Such issues reflect the context in which they emerge and hence the notion of responsibility is dynamic and differs from the various stakeholder or sector/discipline perspectives.

Again, fixed concepts such as, e.g. the RRI keys, tend to miss this point as they are more in line with the traditional linear model of R&I. **RRI Tools** and **HEIRRI** define RRI as dynamic and evolving process and therefore, the organisational features which can be understood as manifestations of RRI are also likely to change over time. The box below summarises the key points of the definition offered by RRI Tools.

The *RRI Tools* project (2014), one of the pioneers in RRI awareness, following a survey of the relevant literature and consultation with experts, defined RRI as follows: ***Responsible Research and Innovation is a dynamic, iterative process by which all stakeholders involved in the R&I practice become mutually responsive and share responsibility regarding both the outcomes and process requirements.***

This means that research and innovation can only be labelled “responsible” in case (1) they are aimed at particular outcomes and (2) certain process requirements are met. Briefly this means that:

1. RRI’s aim is to create a society in which research and innovation practices strive towards sustainable, ethically acceptable, and socially desirable outcomes; and
2. RRI does so in such a way that the responsibility for our future is shared by all people and institutions affected by and involved in research and innovation practices.

Outcomes – based on literature about responsible research and innovation, the outcomes of RRI are divided in three categories:

1. Learning outcomes

RRI should lead to empowered, responsible actors across the whole range of our socio- technical systems (scientists, policymakers, CSOs, businesses and innovators, educators). Structures and organisations where these actors function should create opportunities for and provide support to actors to be responsible, ensuring that RRI becomes (and remains) a solid and continuous reality.

2. R&I outcomes

RRI practices acceptable, sustainable and socially desirable outcomes. Solutions are found in opening up science through continuous, meaningful deliberation with societal actors. In the end, the incorporation of societal voices in R&I will lead to relevant applications of science.

3. Solutions to societal challenges

Today’s societies face several challenges. The European Commission has formulated seven ‘Grand Challenges’ as one of the three main pillars of the Horizon 2020 programme. In order to support European policy, R&I endeavours should contribute to finding solutions for these societal challenges.

Process requirements:

- 1) **Diversity & inclusion,**
- 2) **Openness & transparency,**
- 3) **Anticipation & reflexivity,**

Box 2. RRI definition by RRI tools project (2014)

Conclusion 1 was discussed in follow-up interviews, which tended to provide additional confirmation.

Thus, working within the above definition, **RRI Tools** indicated in the interview⁵ that, in 2014, the RRI concept (especially with respect to the six “keys”) was one of the main barriers to its dissemination. RRI was not popular, “sexy” or easily bought into, since it implies a negative assessment⁶ (identifying the “missing” keys) and workload for researchers (who derive from it no direct benefit in their careers, since RRI compliance does not count as time invested in publications for example). Therefore, the advice for GRRIP when addressing the subject inside and outside of the RPOs is to showcase practices and tools and use clear examples adapted to

⁵ Interview report in the online project platform.

⁶ *RRI tools self reflection tool-blanksheet* includes all aspects and basic questions to build an RRI action plan (available in the online platform).



the Quadruple Helix (QH) groups⁷: e.g. RRI promotes science excellence and make it easier to get EU funds (when addressing researchers); it enhances social reputation and thus profitability (industry); makes science more relevant and more engaging (CSOs); or promotes critical thinking, science careers (educators).

RRI Practice used the definition of RRI tools and, although its Advisory Board commented⁸ that the scope of the keys was too narrow and tended to favour fragmentation into supposedly different parts (5 keys) of a whole system, the emphasis on the process dimensions (see above) compensated for that, offering a very good starting point to structure local and national conceptualisations, such as for example the fact that, in Germany, environmental sustainability is a key aspect of RRI understanding.

This point also came up in the exchange with **JERRI** during the interview with the Fraunhofer project coordinator⁹. At the beginning of the project, the separation into 5 keys was “frustrating”, since it was like separating parts of a whole. **JERRI** partners wanted a more holistic approach to RRI but, as the project advanced, the separation by key became instrumental to promote visible change in all aspects of RRI. Once assessment and actions were defined by key, it was possible to integrate them and look for synergies. The participatory process to develop goals and actions is well described in the lessons learnt document produced¹⁰. With respect to some keys, e.g. science education in the case of Fraunhofer, it was judged unnecessary to act, since this was already a very well-funded area of specialisation. Experts would be unlikely to integrate any of the RRI aspects and would continue to do business as usual. It was therefore more meaningful to transfer resources to other areas. Therefore, in order to promote change, there is a need to show visible changes (pilot actions) while implementing abstract concepts such as RRI.

The EC has evolved more into the sustainability science approach also in its definition of RRI “an approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation, with the aim to foster the design of inclusive and sustainable research and innovation” also giving more emphasis to the principles (inclusion, transparency, diversity, reflection and anticipation) of RRI than to the so-called pillars.

Alongside these internal considerations, the global and national contextual environment and governance are also main drivers for the evolution of the RRI conceptual framework, which subsequent GRRIP work will need to be sensitive to. [The Sustainable Development Goals \(SDGs\)](#) are characterised by three signature elements: balancing the economic, environmental and social dimensions of sustainable development; leaving no one behind; and ensuring the basic requirements for the well-being of future generations. Within this global framework, along with the Paris Agreement, RRI should include environmental (low footprint) and social sustainability (promoting equity of access, information, opportunities) to compile with this first element of SDGs; promote just economies (addressing inequalities¹¹ and enhancing distributional justice) and addressing basic societal needs (pro-poor and action-driven R&I).

⁷ RRI tools D1.4 Catalogue of practices have examples in the marine and maritime sector.

⁸ Summary of RRI practice advisory board recommendations, 2017.

⁹ Interview report available in GRRIP platform

¹⁰ JERRI D10.2 Lessons learned for goal development

¹¹ The *World Social Science Report 2016*, co-published by UNESCO, analyses the multiple dimensions of inequality (economic, social, spatial, knowledge, cultural, digital, educational, gender-based, environmental).

[The UNESCO Recommendation on Science and Scientific Researchers](#), revised in 2017, will have an impact in national and institutional policies that can impact the RRI definition and requires anticipation from RPOs and RFOs. The Recommendation paves the way for RRI relevant aspects such as ethics (intellectual freedom, ensuring scientific researchers' protection and career prospects/facilities, responsible and peaceful application of S&T, pluralistic values, impact on society-environment); diversity (of disciplines and non-discrimination on race, gender, age, disability; societal engagement (include ILK, right to health, promotion of science diplomacy); open science (much broader than open access). Within this package of issues, the emphasis on the well-being of researchers deserves note: fair retribution, career stability/prospects, public recognition, social security, mobility support and equal access and participation in the international community, are not just conditions for individual participation in R&I but also requirements for STI systems to serve their societies and contribute to internationally agreed development objectives.

Most of the projects reviewed implicitly use the standard EU definition for Responsible Research and Innovation (except for SAGES or Printeger which do not mention RRI at all) but they also refer to other potential elements and dimensions of RRI that can usefully be taken into account in the definition of the GRRIP conceptual and methodological framework, the need for which is clearly established by Conclusion 1. Such aspects include **sustainable development, environmental and social sustainability, research integrity, co-design of knowledge, transfer of results, critical reflection, transdisciplinary, social accountability, corporate social responsibility, quality standards and corporate citizenship**. It is suggested that RPOs and RFOs should, in their assessment of the institutional and national/international context, incorporate these elements as part of the ethical and governance aspects of RRI in the definition of the mission and vision for their respective Action Plans.

It is striking in this regard that the new configuration of the future EU R&I funding programme, Horizon Europe, is itself evolving and does not mention RRI or “keys” at all, but aims *at boosting the impact of EU-funded research and innovation by having ambitious, measurable and time-bound goals around issues that affect citizens' daily lives*. It is organized about a limited set of missions – more in line with SDGs than the 5/6 RRI keys/policy agendas – that purport to make a *real difference in the lives of citizens and society as a whole*:

- Adaptation to climate change including societal transformation;
- Cancer;
- **Healthy oceans, seas, coastal and inland waters;**
- Climate-neutral and smart cities;
- Soil health and food.

Along similar lines, the majority of projects reviewed¹², especially the ones involving HEIs, stress the public engagement key of the traditional RRI definition – the disconnection between RPOs and society being perceived as one of their main challenges. This was also mentioned in the WP3 mutual learning exercise as a main expectation of GRRIP RPOs. However, creating sustainable two-way links with society (from broad dissemination of knowledge/science communication passing through the co-designing of research agendas to coproduction of

The relevant sections of the Report are available at <https://unesdoc.unesco.org/ark:/48223/pf0000245950> and <https://unesdoc.unesco.org/ark:/48223/pf0000245904>.

¹² HEIRRI, JERRI, NUCLEUS, RRI tools, RRI practice, Responsible Industry, Starbios 2 and MARIE



knowledge and innovation including with indigenous and traditional knowledge holders) requires building trust relationships, researchers' capacities and processes that are costly in terms of both effort and time. Building such links also requires stable careers for researchers (including women, junior and older staff), which may be supported by institutional and policy-makers' commitment to the 2017 Recommendation on Science and Scientific Researchers.

Therefore, as stated by **HEIRRI**, RRI is a long-term objective, of which continuous reflection about the notion itself and adaptation to governance systems at all levels is part and parcel.

These points underpin the conclusion that, in practical terms, GRRIP needs to establish its own conceptual RRI framework to be validated internally at the institutional level and design flexible and tailored actions plans with short, medium and long-term objectives/initiatives. The monitoring and evaluation system requires internal and external consultations to ensure all stakeholders can contribute to this evolving concept. **RRI Tools**¹³ has produced recommendations on how to set them up.

Conclusion 2

RRI is a complex process requiring flexibility and long-term engagement: GRRIP needs to carefully assess institutions in order to design self-tailored actions and processes leading to concrete outputs and sustainability.

This conclusion is closely connected with Conclusion 1. What it adds is that, even once GRRIP has addressed the general concerns about the suitability and applicability of RRI, the project will not be equipped with a framework that can simply be rolled out. As discussed below, the following are important lessons:

- "One size fits all" practices do not exist.
- A mind shift is required to institutionalise the involvement of other sources of knowledge/stakeholders i.e. for the co-design of RPOs/RFOs R&I agendas and projects; not just one way, one time QH exchange.
- Self-assessment needs to address all aspects of RRI as a whole, not an "à la carte" approach.
- Participatory processes alone cannot ensure RRI. Specifically, beware of "post-it" workshops

The immediate conclusion coming from the RRI definitions above and the analysis of the project review findings in the section 3 below is that there is no "one size fits all" practice or exemplary Action Plan that can be used as a model for GRRIP. Even at the good practices level, as stated by **RRI Tools**¹⁴, it is difficult to find practices that are exemplary with regard to *all* RRI process requirements and *all* outcomes that have been identified as distinctive of RRI, and this is especially problematic with respect to basic research programs. This conclusion reflects both the weak methodological basis for making judgements about "good" or "best" practices and the wide diversity of relevant situations/institutional needs. An important task for the future of GRRIP will be to tease apart these two issues by developing in each RPO a more rigorous and explicit approach to practice assessment.

¹³ RRI tools recommendations and guidelines on how to set up a multi-stakeholder workshop in terms of setting methodology, content and participants avai

¹⁴ The RRI Tools Catalogue of RRI practices (D.1.4) has no practices including basic research in the category *learning for doing*.

Again, **RRI Tools** makes the point that taking the deliberative and inclusive turn to R&I that RRI stands for involves changing current power structures and current routines. Those who were previously the sole decision makers on R&I will henceforth be required to share this power with others and to adapt their normal ways of working. This requires a mind shift, since it means a reevaluation of the knowledge inputs of those who were previously neglected because they were considered irrelevant (co-design and co-production of knowledge). This is by no means an easy process and good processes in themselves do not amount to RRI. There is a need to provide solutions to societal needs and address co-design with society of development agendas. The involvement of society in defining the institutional research agendas seems a good way to overcome this barrier and engage with citizens promoting ownership and collaboration. However, evidence on this point is still largely anecdotal and tends to privilege success stories over failures.

When looking at the weaknesses, obstacles and needs that have been identified in the **RRI Tools** catalogue of practices some patterns emerge. For instance, many R&I projects, and also some organisations, are financed through **short-term** (EC) funding programs, which can make it difficult to involve basic research, create commitment with temporary researchers, partners and to realize continuity between all phases of R&I, from design to implementation and ensuring the sustainability of the outcomes. Of course, this problem exists in research and innovation projects generally, and is not unique to RRI. However, because RRI seeks to address the grand challenges/missions/SDGs *and* emphasizes the importance of going through time-consuming cycles of inclusion, anticipation, reflection and adaptive change, it makes sense to say that with regard to RRI practices especially, financial security and a longer time horizon would add to the quality of such practices. Hence, strong links with outcomes to address societal needs calls for support/pressure from funding agencies, awareness-raising and training in RRI competences.

A further issue that emerged from the analysis relates to the nature of engagement with various stakeholders and publics. From the **RRI Tools** analysis of practices¹⁵, it is striking that engaging different stakeholders or publics often does not take the form of profound participation. Rather, practices tend to engage stakeholders or publics either for the purpose of (one-time) consultation or to raise awareness. In these regards, it appears that there is still a lot of ground to cover, and GRRIP should try to promote not just one-off engagement or one-way awareness raising, but institutionalized inclusive deliberative practices throughout all phases of R&I trajectories. Using existing European and national networks of CSOs, science museums, schools, and women is, according to the reported experience of practitioners, an effective way to do it. It remains to be verified to what extent the reported effectiveness is related to background conditions – specifically to the fact that such approaches are tried only when they enjoy favourable conditions in terms of established practices and support in principle.

Two related issues also deserve attention. First, although inclusive deliberation is in place in some practices, policy impacts and practical change are not always as prominently in evidence. Secondly, most practices are distinctively focused either on research or on innovation. Both issues undoubtedly point back to the short funding periods for research and innovation – hence the need to link with RFOs during the whole period of project implementation to promote longer cycles of funding and the closer collaboration of QH stakeholders to promote better

¹⁵ D1.2 Collection and classification of RRI practices



links between research and innovation agents (e.g. joint calls for sustainable solutions addressed to CSOs and industry).

Conclusion 3

The nature and culture of the institution and national STI context must be taken into account to assess the institution and design effective and tailor-made RRI plans, which can in turn inspire national RRI policy instruments.

- Institutional and national STI contexts, including conceptualisations and implicit policies, need to be included in the initial audit as to identify blocks/opportunities for RRI.
- RFOs and national policy organisations need to find interest to support the project (e.g. included in Advisory Board or invited to regular meetings at country level) in order to as to raise their awareness and design RRI policy instruments for the country/region.
- Gender equality is a complex challenge, where unconscious bias and implicit policy instruments can block RRI uptake. It requires specific indicators, tools and expertise to go beyond parity and effectively address all four levels: institutional governance, career progression, work-life balance and engendering knowledge.

Some of GRRIP's RPOs directly belong to or highly depend on HEIs. **HEIRRI** underlined the need to understand their complexity – in terms of structures, institutional cultures, socio-historic contexts and scientific fields, and bringing together a multitude of societal actors and actor groups with different interests – in order to increase the likelihood of RRI programmes being adopted and integrated in curricula and, ultimately, having a beneficial impact on R&I processes and HEI organisational change aiming at aligning knowledge production to the needs and values of society.

In terms of barriers, **HEIRRI** interviewees noted that universities are bureaucratic and change-averse institutions, in which current reward structures and definitions of excellence do not necessarily accommodate transition towards higher degrees of responsibility in R&I. RRI does not fit very well with the current incentive structures or with the disciplinary model for organizing teaching and research at universities. Moreover, some interviewees mentioned that RRI may be seen as a cosmetic action, a mere practice of box-ticking and not an actual transformation. This kind of “RRI-washing” represents a barrier to its genuine implementation.

The **HERRI** State of the Art review¹⁶ stresses the need to enhance visibility and build solidarity and mutual learning initiatives between RRI practitioners. In the **JERRI** project in Fraunhofer, a dedicated team was established for each of the 5 keys with 3-4 in-house experts that advanced in the 5 keys with a common roadmap: this was considered essential for all actions. Once the vision was developed and (short-, medium- and long-term) actions to fulfil it defined in consultation with external stakeholders and the Advisory Board, the implementation work started. That was judged to be one of the main contributions of the **JERRI** project: allowing interdepartmental reflection and work, thus enabling colleagues with similar interests to look for synergies between keys. The process contributed to building the identity of a huge, diverse and highly decentralised institution.

¹⁶¹⁶ HEIRRI D.2.2. [State of the Art review](#)



These considerations also point to the need to revise the policies and strategies of HEIs and RPOs (ideally with the support of RFOs) to strengthen outcomes such as: commercialisation, industrial relevance and technology transfer, measuring merits and promotion through publishing in high impact journals, patenting R&I results to incorporate other indicators such as the number of socially relevant projects, co-design of knowledge and innovation initiatives, science education events, promotion of project staff diversity, frugal and social innovation products, open access papers, MOOCs, etc.

RRI Practice also incorporated explicit rewards and career improvements measures to staff doing public engagement as it found that academic culture is both a barrier to and a driver of RRI. Based on an analysis employing Edgar Schein's layered model of organisational culture,¹⁷ this suggests that the drivers have not been sufficiently leveraged and that a significant part of the identified resistance to RRI hinges on current cultural artefacts and espoused values, whereas RRI in many cases does have significant overlaps with basic underlying assumptions found in academic culture. A significant part of the artefacts and espoused values posing resistance to RRI appears closely tied to current definitions of academic excellence, which were profiled during the reforms of the European science system in the 1980s and 1990s, inspired by the New Public Management paradigm. In similar vein, **RRI Tools** has offered a dedicated practical chapter on how to incorporate RRI in Higher Education Institutions, which is available [here](#).

Similarly, GRRIP's RFOs need to understand the structure and culture of HEI as well as public and private research organisations and innovative businesses to promote effectively the transformational change required for RRI and, more broadly, to support policy-makers in the implementation of the 2017 UNESCO Recommendation on Science and Scientific Research.

Mutual learning and collective ownership of a specific societal problem and a marketable approach to its solution, including risks and rewards, can be stimulated by funding agencies through specific requirements. **RRI Tools** describes the Challenge Driven Innovation programme of Vinnova,¹⁸ showcasing RRI's potential as a win-win governance approach for all the stakeholders involved.

Similarly, a salient finding of **RRI Practice** (D.15.2) is that RFOs have the capacity to significantly impact the culture and organisation of RPOs. These are very responsive to the policy signals coming from funding organisations, not least through requirements in funding calls. Therefore, the EU, and in particular national funding organisations, have the potential to significantly alter the current landscape in the science system as the values and logics promoted by the way funders organise their calls trickle down into RPOs, beyond the people and organisational units directly affected. The data collected points to tensions between excellence criteria, premised on maximising grants and publications on the one hand, and making room for adherence to RRI aspects on the other. As funding organisations increasingly adopt elements of RRI in assessment criteria, while still adhering to the ruling definition of research excellence, the normative signals to research performers are at times incoherent.

On **industry** culture, **Nucleus** found that, in particular in ICT-related sectors, industry works at a much faster pace than academia, and might have the willingness, knowledge and skills to deliver societally focused projects, but it must make business sense to engage or be supported

¹⁷ Edgar H. Schein, *Organizational Culture and Leadership*. 3rd edition. San Francisco, CA: Jossey-Bass, 2004.

¹⁸ www.vinnova.se/en/

by soft public incentives (**PRISMA**). **MARIE** identified barriers against promotion of industry by regional RFOs when promoting RRI in industry, such as scepticism, resistance to change, lack of financial resources, lack of transparency in practice, unclear benefits / added value from RRI and lack of interest / engagement of stakeholders. The project also defined two indicators to monitor and assess the governance dimension of RRI in regional R&I policy-making:

- G1: Extent of R&I networks (e.g. platforms, hubs, incubators, accelerators) promoting / supporting RRI in the region,
- G2: Activities of funders to promote RRI at regional level.

PRISMA also underlined the most common barriers to RRI industrial uptake that should be addressed with RFO support. These include lack of expertise, limited resources, the challenges of fulfilling all functions within the company and the project partners and value chain actors, unclear added value of RRI approaches and the lack of long-term vision among others. To overcome these barriers, **PRISMA**¹⁹ offers some good lessons to take into account:

- Link RRI with ISO and CEN standards regarding management systems in the areas of social responsibility, sustainability, innovation, quality and risks- such as ISO 26000, ISO 31000, ISO 9001 and ISO 56000
- RRI provides a complementary approach compared to existing Corporate Social Responsibility (CSR) practices, adding a specific focus on the R&I process and based on three key actions:
 - 1. Integrate analysis of ethical, legal and social impacts from the early stages of product development (reflection and anticipation)
 - 2. Perform stakeholder engagement to inform all phases of product development (inclusiveness)
 - 3. Integrate monitoring, learning and adaptive mechanisms to address public and social values and normative principles in product development (responsiveness)
- Need to provide specific industry tools for top management commitment and leadership, context analysis, materiality analysis, experiment and engagement, validation and AP design/implementation and monitoring/evaluation
- Use good practices and case-study dissemination to raise RRI awareness in industry.²⁰ As discussed above, this will work only if methodologies for characterizing practices as “good” can be sharpened and if “case studies” can go considerably beyond anecdotal success stories.

Collaboration between research sectors and the “rest of the world”, as well as RRI advocacy in big companies, require intermediation and specific expertise that can be supported by RFOs. The chances of real success are increased when people or organisations with expertise in working with social entrepreneurs and their communities and the research world get involved – as showcased by *Socience* in the **RRI Tools** catalogue of practices.

RRI tools,²¹ SAGE (for gender equality) and Marie have developed very useful tools for the initial audit/assessment to be considered by GRRIP (see table in section 3 above).

¹⁹ PRISMA has developed an exemplar roadmap for industry based on experience from pilot cases in EU.

²⁰ PRISMA D2.4 - Responsible innovation in practice: experiences from industry.

²¹ <https://www.rri-tools.eu/self-reflection-tool>



One important point of consideration when working in organisational changes, as underlined by the UNESCO Global Observatory of STI ([GO-SPIN](#)), is that national STI governance systems, culture and values can also play an important role in promoting/blocking the implementation of RRI policies and practices.

RRI Practice conducted a comparison of key related case studies, showing the impact of policy settings across countries²². It concluded on these points as follows, in language that is directly relevant for the tasks to be undertaken within GRRIP:

...national policies, regulatory frameworks, laws and monitoring systems appear to be the most effective drivers, alongside dedicated pilot programs and organisational units providing institutional homes for practices, as well as organisational mandates, organisational goals, guidelines, procedures, routines, and like measures. These drivers function not only across various aspects of the RRI concept, but also across types of organisations. Other than drivers already clearly tied to the existing organisational remits and operations, strong drivers seem to have a rather generic character. The dominant barriers identified in the project are principally, lack of financial resources, and secondly, lack of time, people, training for expertise, incentives, strategy, policy, frameworks, systems and formal structures supporting RRI. Organisational fragmentation is also mentioned as a significant barrier, in part due to the formulation of the RRI concept as an umbrella concept. As an umbrella concept, the organisation and implementation of RRI tends to embrace multiple institutional homes, such as gender and diversity offices, ethics committees, and outreach offices. In general, it appears from our research that practices will change only with sufficiently strong structural measures. Similarly, practices may not change because of an RRI champion if that person cannot refer to interchange or structural forces to back her or his ideas.

This brings us back to two basic ideas that need to be translated into actions for GRRIP:

- a) The national context and STI system (including implicit policies – see below) as well as local and national conceptualizations of RRI need to be taken into account in the initial assessments;
- b) RFOs and national policy organisations need to be aware of and support the project (e.g. included in Advisory Board or invited to regular meetings at country level, as to raise their awareness and feel inspired to design policy instruments to support RRI in the country/region).

RRI Practice produced (June 2019) **Policy recommendations and roadmaps** that focus on change the incentive regime to promote an organisational culture for RRI, broaden the concept of excellence and impact; build capacity and a culture of RRI through training and resourcing and support RRI as a creative and adaptive learning process.

Building on GO-SPIN lessons, when talking about RRI policy instruments, there is no doubt about the evident impact of explicit national legislation and funding availability for RRI. However, there are implicit or non-targeted policies and policy instruments, with considerable importance in assessing GRRIP partners' capacity to achieve RRI transformational change, that also require care attention.

Migration policies designed without specific reference to R&I, in the context of BREXIT for example, can prevent recruitment and mobility of RRI experts and researchers of Swansea University (UK). The general political instability in Spain (with new elections scheduled in November), and freeze on some public funding for SMEs, can also provoke internal crises that will reduce interest in RRI and could challenge Plocan's activities. The legal and administrative

²² RRI practice D 15.1 Implementing RRI: comparison across case studies



restrictions on surveys based on ethnicity in France block monitoring and evaluation of diversity policies in Nantes University.

These policies and policy instruments, which were raised in informal manner during preliminary WP3 discussions, need to be properly addressed during the initial audit phase, as stated in *RRI Practice*. The GOSPIN survey template can serve as a model of how to integrate all these factors in the initial audit of RPOs and RFOs.

When talking about mind-set transformation, **gender equality** is one of the RRI keys of which institutions may have longer experience, especially as RFOs have extensively integrated some aspects in their calls. However, this can be a barrier as institutions will have the impression that there is no need to call for experts to support it. As being incorporated as prerequisite for many calls for funding, gender equality can be understood as a check-box tool rather than a real mind-set change, which can remained full of unconscious bias both at the individual and institutional level, even in institutions with Athena SWAN awards such as University College Cork (part of GRRIP).

Gender equality is, therefore, a very complex subject on its own that requires specific tools, indicators and expertise to promote sustainable change at four levels: *Institutional Governance (including policies and practices)*, *Career Progression*, *Work-Life Balance*, and *EnGendering Knowledge* (see *SAGE initial assessment template in the annex*).

The general RRI projects reviewed – which covered all 5 keys – were clearly unable to address gender equality at all four levels. Gender parity (which is the most evident/basic element of the institutional governance dimension) was the only question addressed in most institutions, with the exception of JERRI, which also included engendering knowledge. Even in discussing gender parity, the bias was high, especially as researchers associate it with a risk to scientific excellence (although in reality is exactly the opposite).

The SAGE project (Project coordinator interviewed), defined a holistic Gender Equality plan toolkit (available online) tested in 5 RPOs from 4 of the 5 countries participating in GRRIP: Portugal (Instituto Universitário de Lisbon), France (Science Po Bordeaux), Ireland (Trinity College Dublin) and UK (Queen’s University Belfast). Moreover, the initial gender equality institutional assessment template (in the annex) includes both national governance and cultural aspects.

The project “Wheel” tool, initial checklist (in the annex of this report), data gathering guidelines and contextual national aspects, and list of partners from national workshops, can be directly used by GRRIP partners as well as many tools to assess, develop and implement holistic gender equality actions in RPOs and promote links with RFOs and the general public.

More importantly, the training on unconscious bias for gender equality will be very useful also within the consortium, to embed gender equality in management and implementation practices and decisions, and could be organised as part of the next AGM meeting in February 2020.

Box 3. Gender equality aspects by SAGE project coordinator

Apart from policies and legislative frameworks, national cultural factors and nuances are important, especially when dealing with gender equality, diversity and ethics aspects and, more generally, when promoting mind-set transformation. The need to adapt to local conceptualisations expressed by the **RRI Practice** coordinator is vital also for ensuring national and local partnerships towards sustained transformational action – which takes longer than project duration – as well as for continuous adaptation to quickly changing RPO environments. Such adaptability is also important to raise awareness and motivate organisations and stakeholders as well as to sell messages that are quickly understood when



engaging with public. The promotion of success stories, at the national and local level, can also inspire change in other stakeholders.

Conclusion 4

Even once RRI has been clarified and contextualised, and even if it is broadly accepted in principle, there may be significant barriers to the process of rolling it out within a particular institution. Absence of objections, in particular, does not translate automatically into positive commitment. In this regard, there are a number of good lessons and practices to promote institutional awareness and mutual learning for transformational change.

Specific options identified in the SoA review that can be applied for GRRIP purposes include:

- Tools such as thematic cafes and reflection workshops that can support the implementation of RRI by building practical positive buy-in among relevant personnel.
- Implementation teams at the institution level should be balanced, have power to decide/give example and be committed throughout the process.
- A project technical assistance team and an external advisory board can provide support on specific issues and compensate for missing expertise.
- Internal project evaluation should support partners in a positive manner and should not be used to control/ micromanagement partners' actions.

To a considerable extent, these indications reflect familiar findings in organisational sociology, notably in the change management literature. They are less specific indications on RRI than a reminder that RRI roll-out shares many features with any other change process – digital transformation being perhaps the most helpful parallel and external reference point. The most general statement of these findings would perhaps be that RRI cannot be grafted onto an institution without other correlative changes that, ultimately, constitute a comprehensive cultural shift. From this it does not follow that incremental change is impossible – simply that the process barriers are typically less about the specific features of the change than about the general context within which it is planned to occur. Unsurprisingly therefore, RRI is never just about RRI.

On the other hand, it should be clear that the methodological basis for defining these as actions to be considered is typically rather limited. It consists of documented successes – in other words initiatives judged to be successful by their promoters and intended stakeholders according to metrics that are often weakly specified or even entirely implicit. In the absence of systematic documentation of failures, or of changes occurring in the absence of specific initiatives, it is usually difficult to be certain whether the perceived successes were truly attributable to the initiatives and whether the perception of success is relevant with respect to the underlying institutional change. An important challenge for GRRIP will be to ensure methodological refinement at both of these levels.

The following paragraphs provide more detailed information on how particular elements of the SoA review substantiate the above claims, with the limitations indicated.



PRINTEGER described three types of process tools to facilitate open dialogue for research integrity that can be used for RRI in general, both internally and when preparing site visits / project partner discussions, along with indications on how to conduct them: integrity café, value visioning workshop, and integrity workshop (D5_2 p2-3). An “integrity café” is designed to facilitate and stimulate dialogue between different stakeholders, including around cumbersome and potentially sensitive ethical issues. The visioning workshops are a form of team-building exercise centred on values and ideals in the organisation. All are tools to lead to summary statements such as “RRI for us [the organisation] means ...” A third tool used in the project was ethics (RRI) reflection workshops. The main purpose of such workshops is to raise awareness about research integrity and what it means to be a “good” researcher. Reflection workshops may take different forms, but the central point is that they are crafted in order to facilitate systematic dialogue and reflection. A range of topics may be discussed, such as forms of dilemma games, concrete cases, or issues brought up by the researchers themselves. These gathering tools are especially important when dealing with the keys more related to institutional and cultural visions of RRI: ethics, gender and diversity in particular.

The need for implementation teams that are balanced (in terms of gender, diversity, positions, roles, departments) and committed to leading the process, collecting the data, raising awareness and supporting the Action Plan design and implementation is key in all projects. Such teams need to be supported by a technical team and linked to the national context and QH RPO networks.

Alongside the four conclusions discussed in detail above, the SoA also leads to some specific indications on good practice in project management that can be beneficial to GRRIP. To some extent, these are separate from the focus on Action Plans that is distinctive to D3.1, but are nonetheless noted here for convenience.

A general indication stemming from the SoA, apart from ethics and gender/diversity equality aspects, which require very specific competencies/expertise to work, is to build the capacities on existing structures and roles, instead of creating new ones, in order to accelerate institutional buy-in and establish strategic partnerships in areas that need further expertise/networks. For example, for engagement with society WaVEC can approach Ciencia viva in Portugal, MaREI the Irish Science Gallery, Nantes Euroscience, and Plocan Iberciencias (all of these being partners in **RRI Tools**).

Regarding technical assistance and quality control of GRRIP project deliverables, the model of **STAGES** can be useful for discussion. **STAGES** appointed an International Board of Scientific Advisors aiming to externally support the Steering Committee in control of the scientific and technical quality of the activities. It is composed of representatives of national RPOs, RFOs and international experts/facilitators. The IBSA’s main role is to give non-binding advice on the most relevant deliverables of the project, providing comments and observations on scientific quality.²³

JERRI advises that the monitoring and internal evaluation of the project results be done in a positive and supportive manner. In **JERRI** the evaluation partner was not a Research and Technology Organisation (industry financed) so it did not understand the organisational culture

²³ This may be compared and contrasted, for **GRRIP** purposes, with the somewhat different model adopted for quality control within **RRING**, in which a number of **GRRIP** partners are engaged.



and constraints and did not support the two institutions effecting structural changes, but rather increased pressure on them and sought to exert too much control.

4.2 Recommendations for GRRIP related to the RRI Keys

After a presentation of the above general challenges to embed RRI in GRRIP institutions, this section presents more concrete challenges/barriers and mitigation practices/lessons learned in relation to the five RRI dimensions, excluding governance which is of limited direct relevance to the question of Action Plans within institutions. Undoubtedly, prevailing patterns of R&I governance at national and other relevant levels will have implications of the climate in which specific institutions develop RRI Action Plans, but it will not typically be within the purview of such Plans to act in this area. Conversely, the question of governance *within* the institution is effectively co-extensive with the Action Plan, the process of its establishment and the modalities of its implementation.

Among the important implications of R&I governance for institutional contexts of Action Plan development, it is important to stress that if researchers and associate professionals careers are not properly secured and promoted, long term RRI action will make little sense. It would even be “bad governance” at the institutional level to try to get short-term, precarious staff committed to long-term actions, especially when dealing with ethics. This is why the UNESCO Recommendation on Science and Scientific Researchers, which includes a number of sections explicitly addressing scientific employment and career issues, provides a broad conceptual background for RRI action.

A second appreciation is that the lessons for ethics and gender equality are mostly interchangeable as they are related to the institutional vision, values and cultures and how to institutionalise processes to integrate them. This section draws on barriers/mitigation results from all 14 projects reviewed.

4.2.1 Ethics

PRINTEGER was dedicated exclusively to ethics, more concretely research integrity²⁴. The Bonn PRINTEGER statement (2018) provides guidance for work on research integrity in RPOs. However, all lessons are applicable to ethical aspects in general, as defined by the EU RRI concept, and to the extended concept of RRI (environmental sustainability, equality, diversity, gender equality etc.) to be define by GRRIP and partners in the kinds of participatory settings described above (integrity café, visioning workshops, etc.). The general idea is to create a safe atmosphere to motivate open conversation and reflection. There is a list of central dimensions that facilitate this: (a) set the contexts (e.g. objective), (b) create hospitable space (i.e. safe and inviting), (c) explore questions that matter (i.e. clear, focused, relevant), (d) encourage everyone’s contribution, (e) connect diverse perspectives, (f) listen together for patterns and insights, and (g) share collective discoveries.

The **PRINTEGER** final report provided some good lessons that are relevant for GRRIP:

²⁴2016, UNESCO Bioethics chair, University of Barcelona. The first declaration on research integrity and RRI recognizes “ that truth, rigour, objectivity, independence, impartiality and neutrality, cooperation and honesty, transparency and fairness, commitment and social responsibility are fundamental principles in scientific integrity and should be the pillars of responsible research and innovation”.

- Although existing codes (such as the ALLEA code) perform an important function, including across borders (as an international code addressing integrity issues in various disciplines), there still is a tendency in codes to focus on individual responsibilities (“individualisation” and penalization of misconducts), while more attention should be given to the institutional context. The responsibilities of RPOs and RFOs are to establish a supportive institutional ecosystem where integrity (and other ethical) challenges can be deliberated and addressed and where integrity is regarded as a joint responsibility and as part of the daily functioning of good science.
- A systematic focus on researchers’ well-being, work environment, identity-building, and open discussions on research misconduct and integrity can prevent scientific misconduct and foster integrity.
- “Public trust is of key importance for science ... In our output we stress (a) the insight that research integrity affects the credibility of research and research-performing institutions; (b) that institutional responsibility requires a shift of focus from reputational damage prevention to transparency and mutual learning and (c) that research integrity can only adequately be fostered by learning organisations who are open to deliberations and reflection and willing to learn from mistakes.”
- The nature and type of the institutional ethics system may differ depending on the objective and conditions of the organisation. Some central characteristics are nevertheless that the quality system should:
 - be developed in conjunction between leaders and researchers in the research organisation
 - seek to avoid unnecessary bureaucracy and use of resources, be known, recognized and understood by all members of the organisation
 - be continuously developed based on new circumstances and needs.
 - be practically used and followed up by management
 - be used not (only) as a control tool, but as a basis for reflection and learning
 - assign tasks and responsibilities to specific people or groups of people in order to ensure accountability

The quality system may be general but it may also focus specifically on certain risk areas. Examples of such focus may be:

- the avoidance of the situation where access to data or data analyses are restricted to individual researchers
- efforts to provide knowledge to younger and less experienced researchers
- efforts to integrate researchers or groups being in risk of being isolated from the broader research organisation
- efforts to make researchers aware of not only FFP (fabrication, falsification, plagiarism), but also various forms of QRP (questionable research practices) such as self-plagiarism/recycling text, authorship, conflicts of interest, “cherry-picking” analyses, etc.

Finally, the specific role of the research integrity officer is key to support the actions. The officer should have a clear mandate, stating what the expectations are and what means are at the role’s disposal. The reason for a clear mandate is to avoid the role ending up “empty” with no real power in the organisation.



Fraunhofer, within **JERRI**, took the opportunity of being also a funding body for cutting-edge projects and managed to incorporate a proposal screening for ethical aspects in the funded projects to raise awareness on the impact of the research activity for society, e.g. artificial intelligence. The project also developed a self-assessment toolkit to be filled in by researchers (30 minutes – 2 hours), reflecting on their research impact in society, that was published in the internal newspaper. Social scientists need to be part of it and facilitate group discussion based on the assessments. Researchers were reportedly relieved after the discussions, as if they had left a burden behind. Finally on the methodology, although it is good to share with external partners for fresh insight and review (Advisory Board and consultation workshops) when dealing with ethical aspects, small internal groups are more effective for free discussions.

4.2.2 Gender and diversity

Gender equality is, as stated before, a very complex subject on its own that requires specific tools, indicators and expertise to promote sustainable change at four levels: Institutional Governance (including policies and practices), Career Progression, Work-Life Balance, and EnGendering Knowledge (see **SAGE** initial assessment template in the annex).

Regarding equality (gender and diversity), RRI Practices offers some concrete lessons:

- Ensure that gender equality and diversity are promoted and implemented in an appropriate way within organisational settings.
- Provide funding / allocate a budget for gender equality and diversity activities.
- Exemplify the value of gender equality and diversity in organisational codes of conduct.
- Develop appropriate reward structures and merit promotions.
- Make values and policies more explicit so that they are recognised and embraced by wider audiences. Better communication of institutional values helps accountability and democratic debate, and facilitates the wider uptake of principles of gender equality, diversity and inclusion.
- Provide training of staff on issues related to equality and diversity.
- Monitor and regularly evaluate the practice on gender equality and diversity in the organisation. Include the performance in this area in organisation's annual report. Commission independent audits or reviews of the organisation's performance.
- Create inter-organisational fact-finding missions to learn from the experiences of other organisations. Similar organisations have similar needs but not necessary similar approaches to fulfilling them. Learning from each other's experience is vital to avoid making the same mistakes.
- The importance of champions who can lead and guide the process of implementing gender equality and diversity policy and practice.

On Gender Equality Plans, the **SAGE** project coordinator interviewed by UNESCO indicated that one of the challenges of the project was to address unconscious bias (through training – online – and open discussions and evidence-based data on how gender enhances excellence in science).

One of them was the idea that GE is a “women's business”, so it was hard to engage men in the Action Plan design and implementation teams. The use of targeted invitations issued by the



President of the institution and the recognition of time and effort towards promotion was a key instrument to get them on board and constitute balanced, representative and active teams.

Every case study has produced their own document on the evaluation of the AP implementation and lessons learnt. The ones on Portuguese, French, English and Irish institutions are very relevant to GRRIP as they take into account the national context (enablers and barriers) for gender equality measures.

4.2.3 Open Access (OA) or more broadly Open Science (OS)

According to **RRI Practice**²⁵, Open Access appears as another key of RRI, which seems to be more advanced than others towards “new” responsibility thinking. The comparison report places OA in a wider context, i.e. Open Science, which calls for a change from standard practices towards sharing and use of all available knowledge, including beyond the traditional publication process. As such, OA itself is a key element in opening up knowledge on science and its findings towards anyone interested, within but also outside the academic community. This implies openness towards peer communities, but also to a wider public. As in the case of Gender, this means a shift away from traditional thinking and structures, which cultivate an academic culture based on publications in high impact-factor journals.

Regarding Open Access (OA) or more broadly Open Science (OS), RRI Practice gives some lessons:

- Define a wide diversity of OA/Os framings, policies & approaches, and dynamics of exchange within the broader R&I system
- Not useful to propose tailored approaches to clusterings of research organisations with respect to size, mandate, jurisdiction, etc.
- Important interplay between funding requirements & development of OA practices – and actual implementation! – in organisations
- Interest & support on the part of organisational leadership is key!
- Especially important for research performing organisations, given the incumbent academic culture ...
- The need to rethink incentive infrastructures for researchers, especially at universities
- e.g. incorporation of statements on data ethics/data practices in hiring practices
- Research funders have a key role to play here
- Opportunity to reconfigure evaluation criteria so as to encompass OA & OS
- Implementation can only succeed if both RPOs & RFOs work in parallel to create new incentive structures & mechanisms
- Importance of closer collaboration between researchers & research departments & their respective research administration units (libraries, etc.) in helping to propagate & implement OA & OS.

Like dealing with cultural aspects (such as gender and ethics), OA requires good understanding/ participatory processes. The **JERRI** stakeholder workshop on open science revealed a need among scientists for support and enabling services to decide if research results, especially research data or publications (patent relevant information), can be made openly

²⁵ RRI practice D15.1 Implementing RRI: comparison across case studies



available or not. In many cases, researchers do not have the expertise and relevant information about the possibilities of value creation or exploitation of the research output

JERRI concludes that within many projects for industry, commercial interests of the clients impede the realisation of open access. Complementary to the development of case-based open access business models, a paragraph in existing model contracts with industry that explicitly deals with open access issues, e. g. as part of the IP section, will be developed and tested. This will help researchers to discuss different ways of exploiting research data generated in the projects with their clients, including the possibility of open access.

4.2.4 Science (STEM) Education

Regarding science education, RRI Practice²⁶ talks about measures to attain the most traditional objectives of science education, such as improve visibility and desirability of scientific careers, create prestigious fellowships or prizes for science students involved in science education, fund programs aimed at cultivating children curiosity or include education in the mission and in the evaluation scheme of research organisations.

Similarly, the **JERRI** project coordinator mentioned the impossibility to work in science education within Fraunhofer as it is a main core of the institution with a big budget, teams and reputed expert that were not interested in interference by non-experts in including new aspects of science education, related to sharing the benefit of science with society but also learning from them (traditional knowledge for example).

Contrary to other more recent dimensions of RRI, science education seems to be an old area of expertise for European institutions and therefore, “business as usual” inertia can be difficult to overcome. Again, linking it with public engagement actions and looking for synergies can be the way to get the message of education real needs of society passed to educators, especially in RPOs.

Concerning the objectives for RRI teaching and training, **HEIRRI** underlines the importance of “critical reflection” emerges as a core element. A general observation from the interviews conducted is the emphasis on developing students’ critical skills, i.e. their capability for critical thinking and meta-cognition. RRI teaching should enhance students’ understanding and ability for continuous critical questioning of what constitutes good practices within their respective disciplines or fields of research; but even more importantly how their scientific field and the competence and skills which are nurtured in their education relate to other areas of science and to society at large. This requires, among teachers as well as students, critical epistemological or foundational reflection/training upon one’s own scientific field or discipline, the need for critical reflection upon the relationship between science and society, and the need to understand that the epistemological and social problems of research and innovation are not independent. Without a proper level of critique, any concept or practice of RRI will remain superficial and shallow. A number of training materials for high education level is available in the website and online library of actions.

²⁶ Interview report in online GRRIP platform.



RRI Tools has developed [a *Quick Start Guide in RRI for Science Engagement Organisations* \(developed by Ecsite\) for informal education](#) and a [Handbook for teachers for primary and secondary education developed by European Schoolnet](#) (both available online).

4.2.5 Public engagement (or societal engagement in a broader sense)

Public engagement (or societal engagement in a broader sense) will be extensively treated in D3.2. However, since it is a key aspect of GRRIP, some key conclusions from the T3.1 project review are summarised below.

The main implication of the findings emerging from the reviews is that GRRIP partners should identify international, national and local events, occasions and have a budget for pilot activities showcasing the importance of RRI for the general public and using them as a way to attract key stakeholders in the QH systems. In other words, institutions cannot be expected to produce stakeholder engagement solely through their specific efforts, but depend also on the existence of a broader engagement ecosystem that reduces transaction costs and stabilises expectations across categories of stakeholders. This suggests that effective design and implementation of RRI Action Plans may depend inter alia on appropriate patterns of exchange *between* institutions with similar profiles and objectives. GRRIP is of course designed specifically for this purpose.

Concerning the interchange dimension, the first kinds of barriers that have emerged from the **RRI Practice** project national reports are lack of support by national institutions²⁷. For example, national rules and evaluations processes rarely take into consideration the activities of public engagement and the same occurs concerning funding schemes, even though national funding schemes in EU countries increasingly include public engagement in explicit ways, mimicking European research calls. Indeed, their national scientific institutions allegedly do little to support the right conditions to develop public engagement activities.

Although the momentum is there as results show that RPOs and RFOs are striving to redefine their relation to society, i.e. open up to society, public engagement does not have dedicated staff role, data or indicators, nor a clear policy, so it is more based on individual researchers interest. External evaluation can be a good tool, e.g. the *University Suitable for Families* label in Germany, to give visibility and promote further activities.

RRI Practices identified three crucial aspects that need to be taken seriously into account by research organisations to improve public engagement activities.

- First, scientific organisations should focus on the need to overcoming the fragmentation of public engagement activities within their organisations, an issue which is more relevant for very large research institutions. In this case, what could be useful include actions like building up a dedicated staff team, establishing web sites able to gather and make more visible the existing experiences and also to start collecting indicators and data to assess their own performances in public engagement.
- Secondly, scientific organisations should invest in order to create a context more favourable to embrace public engagement activities: on the one hand, by elaborating an explicit system of rewards and career improvements related also to the efforts devoted to public engagement; on the other hand, by investing in training and education,

²⁷ RRI practice national workshops reports (12 countries).

especially for PhD and early-career researchers, about how to perform more advanced forms of public engagement.

- Finally, and more generally, scientific organisations need to robustly acknowledge that, far from being an ancillary and subordinate work, public engagement represents instead a crucial challenge to improve their ability to innovate and their chances to compete in an increasingly complex and competitive scientific world.

MARIE identified two categories of activities for increasing the inclusion of stakeholders of the quadruple helix were identified:

- Official / formal processes, which include open deliberation processes, formal debate sessions with stakeholders, co-decision making processes with stakeholders (e.g., in general assemblies of stakeholders, in production and promotion processes), steering groups / committees with the participation of stakeholders, stakeholder forums and workshops.
- Interpersonal / informal processes, which include personal contact and meetings among team members and stakeholders, bilateral informal meetings, and social events for networking, cooperation and idea sharing between teams.

In order to influence policy and make a strong link with national key stakeholders, **STAGES** set up national committees, in this case, convening twice a year. The role of the committees is to follow the implementation of the Action Plans, to support their achievement and the dissemination of their results at national level, suggesting forms of capitalization on the experience and synergies with other initiatives. These committees are intended to include at least the main stakeholders concerned with gender equality in research including policy makers, university networks, CSO, RFOs, experts and trade unions among others.

On the light side of public engagement, the dissemination activities make use of both “traditional” and social media. In order to build a sustainable digital network (community of 1100 members), **RRI Tools** has produced advocacy briefing sheets targeted to policy makers, research communities and innovation enterprises, making them aware of “what’s in it” for them, as well as what might happen if they do not take heed.

One of the case studies is the Fishery Benchmarking project of the IPMA – based in Portugal, available online.

A preliminary mapping of communication resources, considered three different types of resources: project resources (websites, newsletter, dissemination events); university resources (website, internal media, internal events and occasions); external resources (networks and associations, national and local media, partners’ communication channels, public events). This is usually forgotten but is very important, **STAGE** used the occasion of the Universal Milan EXPO with the organisation of a “Week of women and science” in the framework of the Exposition, devoted to events aimed at raising awareness of the issue among the general public. The intensive use of the UAIC-STAGES website for dissemination, the widespread presence on local and national media, the production of documentary films, and the many national and international presentations of the activities and results of the Action Plan are part of this communication strategy.



In **JERRI**, Fraunhofer developed very interesting participatory process to respond to this universal right to share in the benefit of scientific advancement and its application²⁸. The institution co-developed with QH some ideas for pilot activities that could be inspiring to showcase the importance of RRI action plans to the QH RPO and RFO networks:

- Citizen’s office: a series of citizens' meeting in which social needs can be put forth to science
- Fraunhofer Debate: a public debate with actors from academia and civil society on a topic of high public attention
- Stakeholder Avatar: an algorithm that will systematically browse the World Wide Web for relevant social interests
- UMSICHT Dash Button: a software-based solution to enable sustained citizen engagement in environmentally relevant scientific topics on a continuous basis

4.3 Library of Actions – GRRIP Downstream workpackages-related recommendations

On the basis of the above analysis of the State of the Art, the following practices have been compiled as a Library of Actions available for use within GRRIP, and indeed beyond. These practices have been documented as “good” on the basis of perceptions and assessments reported by the relevant stakeholders, with all the methodological caveats emphasised in previous sections. In so far as any of the practices listed in the table are taken up by GRRIP partners for their own institutional purposes, it will be important to assess their effectiveness in a more methodologically rigorous way.

WP	Workpackage Title	Good practices
1	Project Coordination, Standardisation and Methodology	Reflect on a common definition of RRI (on principles on keys?) Create platforms for exchange among RPOs Ensure internal support (technical assistance group) and not micromanagement of institutions (need freedom for self-reflection) International Scientific Advisory Committee Internal capacity-building on gender, Open access or other aspects with less consortium expertise
2	Dissemination, Exploitation and Communication	Combine traditional (workshops, open days, citizens office. Etc) and digital tools Adapt in content and language to each QH target – What it is in for me? Update web and project information
3	State of the Art on	RRI Action Plans and QH dialogue platforms
4	Quadruple Helix engagement	A mind shift is required to institutionalise the involvement of other sources of knowledge/stakeholders i.e. for the co-design of RPOs/RFOs R&I agendas and projects; not just one way, one time QH exchange. Define collectively a QH list for the institution based on current and ideal collaborations of different departments of the RPO State clear of the role/objective of every QH stakeholder for both the project and RPO Ensure that expectations from RPO and QH are discussed and co design a plan of interactions/objectives/timelines agreed upon Ensure face to face interaction apart from surveys/online discussion

²⁸ Art. 27 of the Universal Declaration of Human Rights, UN 1948.

		<p>Run away from “post-it” type of workshop, design carefully objectives and tools for real exchange – create a trustful environment and privilege new actors (i.e. local associations and policy-makers)</p> <p>Ensure follow-up</p> <p>Use opportunities of other events to reflect on RRI aspects</p> <p>Pay special attention to ethics, gender, diversity and open access themes, as there are a number of biases that require special training</p>
5	<p>RPO&RFO</p> <p>Working Groups setup, and audit and impact assessment of RRI maturity</p>	<p>Working group need to be diverse (include HR, Admin, budget and executive departments, junior and senior researchers and support staff) and constitute of representatives of different sectors with capacity to decide. Senior and institutional champions need to be there in order to inspire change and engage others in a collective sense of ownership.</p> <p>Members of the group to be selected by management and rewarded by its commitment to the process.</p> <p>Ethics and gender trainings are required to fight individual and sectorial bias. External expertise should be called upon if the RPOs do not have them.</p> <p>Researchers career and rewards policies shall be adapted to RRI and promote/reward effort and time of researchers into RRI practice (i.e. public engagement, ethics cafes)</p> <p>Audit and impact assessment should take into account the local, regional and national conceptualizations as well as policy instruments that block or support RRI (also implicit²⁹ ones)</p> <p>RRI assessment should bring forward all efforts done by the institution and not seeing with a negative perspective of what is “missing”</p> <p>A number of self- assesment tools are available (see table of project deliverables in section 2 above)</p> <p>The assessment of gender equality maturity needs to address all 4 aspects (see section above)</p> <p>Self-assessment questions need to be added responding to specific sectorial issues structured by the 5 RRI principles: How can marine and maritime R&I be more inclusive, reflective, anticipatory,?</p>
6	<p>RRI Action Plan creation</p>	<p>No one size fits all action exists</p> <p>If the R&I does not address societal needs, it cannot constitute RRI, even if participatory process are established</p> <p>Institutions shall collectively decide on the areas/principles that shall concentrate in the short, medium and long term from a holistic RRI approach, not à la carte. In this sense, the division by the 5 pillars can block this understanding.</p> <p>Working groups should lead the co-creation of the AP</p> <p>Engagement with QH stakeholders in the definition of priorities, needs and synergies is key in the co-design of AP and should be continuous – i.e. through focus groups with students, researchers (junior, seniors) and citizens</p> <p>A secure and stable careers policy is a prerequisite for RRI</p> <p>Sufficient time and budget should be allocated at the institutional level</p> <p>A number of tools are available and APs (especially for gender) are public</p> <p>Gender actions need to address all 4 aspects (see section 4 above)</p> <p>See 3.2. section for specific actions by pillars</p>

²⁹ According to the definition of implicit policy instruments by the UNESCO Global Observatory of STI policy instruments

7	RRI AP Implementation & RPO/RFO case study	<p>Working group need to be supported technically when required and have freedom to think their own way of implementing AP – this is a mind-shift process that is very much related to the culture, structure and vision of the individuals and institution.</p> <p>Use this process to enhance the sense of institutional ownership and establish secure debate platform for other issues (i.e. mobility, collaborations, reward system, etc.)</p> <p>Failures in case studies need to be acknowledge in order to extract lessons and improve the methods</p> <p>Tools such as thematic cafes and reflection workshops that can support the implementation of RRI by building practical positive buy-in among relevant personnel</p> <p>Culture and structure of institutions and individuals need to be carefully studied and align in order to avoid blocks in implementation</p> <p>Exchange among case studies is key</p> <p>Implementation shall go beyond the project duration, RPOs need to be committed to continue post-project action</p> <p>APs should include risk analysis and mitigation</p> <p>Local integrity officer and other roles if required</p>
8	RRI Mutual Learning-Monitoring, Reflection and Evaluation	<p>Structural and cultural changes are hard to predict, some of the planned results will not occur and others will appear. Keep a good monitoring system and close feed back to the EC project officer to adapt to new developments or RPOs needs.</p> <p>Flexible evaluation systems, not controlling but supportive are requested, especially if they are internal.</p> <p>Mutual learning among RPOs, among WP leaders and among other on-going RRI projects is essential to promote synergies and learn from failed experiences.</p> <p>Not only journal papers but policy briefs, open workshops and other formats should be considered in order to ensure feedback from other stakeholders in the monitoring, reflection and evaluation</p>
9	Marine and Maritime Legacy outputs	<p>Failed experiences need also to be published in order to avoid its repetition</p> <p>M&M platform on RRI need to address specific issues and promote exchange of expertise among institutions and broader societal engagement.</p> <p>RRI tools platform to be looked at</p> <p>Publication of case studies</p> <p>Use them as examples at the national and international level</p> <p>Advise policy makers on how to support other institutions to promote RRI</p>



5 ANNEXES

5.1. GENDER EQUALITY SELF ASSESSMENT- CHECKLIST by SAGE project



SAGE template

Description of Deliverable 2.2 as per SAGE Grant Agreement: “Guidelines will be developed for the conduct of audits of internal procedures and practices, to identify any existing gender bias at the organisational level”.

Each SAGE partner conducted a gender impact assessment/audit of internal procedures and practices to identify gender best practices at organisational level. The analysis included data on Institutional Governance (including policies and practices), Career Progression, Work-Life Balance, and EnGendering Knowledge. This information will: identify critical gaps and challenges; assess the level of resources allocated to gender activities; establish the baseline for possible improvements and innovations, and feed into the design of Gender Equality Plans (GEPs).



	Yes	No	Partially	Don't Know
A. Institutional Governance				
A.1 Does the University have a policy on gender equality/diversity?				
A.2 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)? _____ _____				
A.3 Is gender equality integrated into the University's objectives (e.g. Strategic Plan)?				
A.4 Does the University have a LGBTQI+ ³⁰ Policy?				
A.5 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)? _____ _____				
A.6 Is there a working plan or roadmap to achieve gender equality for the university?				
A.7 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)? _____ _____				
A.8 Does the University's annual budget include provision for the promotion of gender equality? (e.g. budget to organize activities on gender-related issues, funding to research on gender, child care facilities or subsidies)				
A.9 Does the University have a policy to combat bullying and harassment?				
A.10 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)? _____ _____				
A.11 Are there institutional activities to counteract or prevent sexual harassment and gender discrimination (e.g. information campaign, contact persons)?				
A.12 If yes, please elaborate: 				

³⁰ Lesbian, Gay, Bisexual, Transgender, Queer and Intersex +



	Yes	No	Partially	Don't Know
A.13 Is training (e.g. on unconscious bias) available to staff to prevent and combat gender discrimination and sexism?				
A.14 If yes, (i) to whom is this targeted? _____ (ii) is this training obligatory for members of interview panels, or other recruitment/promotion roles?				
A.15 Is attention given to gender-sensitive language and images in all University official documents and on the University website? (e.g. does the university have guidelines or principles on gender-sensitive communication?)				
A.16 If so, give a brief overview: _____ _____ _____				
A.17 Are gender pay gap audits conducted?				
A.18 If yes, how often? Please elaborate _____ _____ _____				
A.19 Are members of recruitment, selection and promotion panels required to undergo equality training or awareness?				
A.20 If yes, how is this conducted? Please elaborate _____ _____ _____				
B. Engendering Knowledge				
B.1 Are there courses on gender at undergraduate level?				
B.2 Are there courses on gender at postgraduate level?				
B.3 Does the University have a research centre(s) that focuses on gender equality or related activities?				



	Yes	No	Partially	Don't Know
B.4 If yes, please name/list the centre(s)				

B.5 Does the University allocate financial resources to promote gender in the curriculum?				
B.6 If yes, please elaborate				

B.7 Does the University organise events relating to gender equality (e.g. International Women's Day)?				
B.8 Are staff members rewarded for or encouraged to engage in activities to advance/promote gender equality?				
B.9 If yes, please elaborate				

B.10 Are any initiatives in place to encourage women to take leadership roles in research (e.g. by applying for ERC funding?)				
B.11 Are researchers required or encouraged to include gender dimensions in research projects?				
C. Career Progression				
C.1 Is recruitment monitored to provide gender disaggregated data on applications/short-listing/appointments outcomes?				
C.2 Is promotion monitored to provide gender disaggregated data on applications/appointments outcomes?				
C.3 Does the University provide leadership training specifically for women?				
C.4 Are there mentoring programmes for:				
i. early-career female researchers?				
ii. mid-career female researchers?				
iii. senior academic women?				



	Yes	No	Partially	Don't Know
C.5 If yes, please elaborate				

D. Work Life Balance				
D.1 Does the University have a policy on work-life balance?				
D.2 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)?				

D.3 Does the University have a policy on maternity leave?				
D.4 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)?				

D.5 Does the University have a policy on paternity leave?				
D.6 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)?				

D.7 Does the University have a policy on parental leave?				
D.8 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)?				

D.9 Does the University have a policy on adoption leave?				
D.10 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)?				

D.11 Does the University have a policy on carer's leave?				
D.12 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)?				



	Yes	No	Partially	Don't Know
D.13 Does the University have a policy on sabbatical leave?				
D.14 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)? _____ _____				
D.15 Does the University have a policy on flexible working?				
D.16 If yes, where is this accessible (e.g. the University's website, policy booklet, etc.)? _____ _____				
D.17 Is there an institution-wide core hours (e.g. meetings scheduled between 10am and 4pm) policy to take account of caring/family/other responsibilities?				
D.18 If yes, please elaborate _____ _____ _____				
D.19 Is teleworking/telecommuting ³¹ available?				
D.20 Are there any support services or benefits available to staff with child caring responsibilities (e.g. workplace crèche, breast feeding facilities, baby-changing stations in both women's and men's toilets or separate toilet, subsidies for child care)? If Yes, please elaborate _____ _____ _____				
D.21 If yes, please indicate if any of these are accessible to women only _____ _____ _____				
D.22 Do you have further comments? If there are any other policies or practices you would like to highlight please do so here. _____ _____				

³¹ Teleworking and/or telecommuting refers to working remotely via internet, phone, etc. In the university context it may be defined as working a portion of contracted hours in the University and a portion at home.



5.2. Interview guidelines – by UNESCO

Name of the project, implementation dates

Name of the institution, contact person, date of interview

1. What would you consider be the project main contributions and how were they achieved in terms of :
 - Institutional structures created and dedicated RRI roles?
 - Governance: institutions policy, vision, rules?
 - Operational process for integration of RRI into R&I practices
 - Institutional awareness: internal communication and Training /mentoring on aspects as R&D agenda-setting, co-production, citizens science, co-evaluation of proposals for funding, ethics, gender?
 - Monitoring/evaluation processes?

2. What were the main barriers/challenges identified (rate 1-5)?

And how you managed to overcome them?

3. How the notion of RRI changed/evaluated over the project implementation?
– regarding 5 keys?

– regarding RRI aspects: anticipatory/reflection; transparency and openness; diversity and inclusion; responsiveness and adaptation to change?

– Others? Environmental aspects? Co-design?

4. How do you manage to involve QH stakeholders and especially civil society?
Did the project provide good ideas or concrete improvements on public engagement for your institutions?
5. What were the main learning points (both positive and negatives)?
6. Any specific advice to GRRIP partners?
7. Main Outputs useful for GRRIP
8. Would you like to be integrated in the project list of contacts/advisory boards?

Thank you