D1.1 Stocktaking Report

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EXECUTIVE SUMMARY

Co-Create Change in Research Funding and Performing (CO-CHANGE) project is aimed at building transformative capacity and leadership for RRI through systemic change coalitions around different change labs, that will initiate and implement institutional changes. Seven change labs will co-create and test RRI related practices for institutional change in research funding and performing organisations, allowing the project to co-create and test RRI related practices and in the selected organisations and their ecosystems.

In order to achieve this aim, first step is to identify the most important inroads for change by building on previous RRI projects and literature and through connecting with pioneers in the field as a baseline for activities. For this purpose, the aim of this task is to create a robust experience based and conceptual framework for the project. This exercise of collection, analysis and synthesis of data will contribute to the building up of the theoretical and practical understanding of the Co-Change project.

The objective of this Deliverable *D1.1 Stocktaking Report* is to present the results of Task 1.1 of Work Package 1 (WP1) and wants to provide a stocktaking analysis and synthesis of the successful and failed practices in the implementation of RRI, as well as carefully reflect on differences in terms of organisations, cultural factors, context requirements, drivers, barriers and challenges of RRI in the organisational domain.

The analysis consisted of a systematic literature review of 29 papers, a stocktaking of 23 EU funded projects and the conclusions of 3 virtual workshops with EU RRI project representatives and experts. The analysis was structured based on an initial framework around the two main topics for identifying and analysing focal key issues in literature and previous RRI projects: **organizational change theory and RRI.**

Chapter 7 summarise, compress and articulate the stocktaking synthesis with the identification of two major drivers that can facilitate the adoption of RRI (societal challenges and distribution of responsibilities in R&D ecosystems), five pillars that sum up the empirical evidence gathered around RRI and organizational change (adapting the process to the degree of institutionalization, ecosystem & context, organizational theory, culture, communication and trust, and metrics and indicators), and two windows of opportunity for implementing RRI.

The two **major drivers** identified that can facilitate the adoption of RRI in organisational contexts and its institutionalisation are:

- The emergence of societal challenges.
- The distribution of responsibilities between stakeholders in research and innovation.

At the same time, **five pillars** have been considered as critical to the implementation of RRI from an organisational perspective. These are:

- **Contextualization**

The implementation of RRI should be based on institutional self-understanding and should take into consideration the structures, rules, and values of the target organization/institutional field; The targets, processes and policies need to be adapted to fit the context

- **Ecosystem**

Understanding of the network relationships and dependencies of organizations where it is embedded (ecosystem): Backgrounds, goals and the interest of collaborators, stakeholders and rivals' matter

- **Organisational theory**

Theoretical/empirically studied framework of organizational theory is usually necessity for a successful implementation; Change agents should understand organizational dynamics and processes from various perspectives.

- **Metrics and indicators**

Anticipation and measurement of impacts of RRI support its uptake; KPIs, integrated assessment frameworks etc. may make visible benefits and create incentives for the uptake.

- **Communication, culture and trust**

Open communication and dissemination of RRI is important to increase awareness of RRI and avoid resistance: It is no plot, but transparent practice to help practitioners to improve the effectiveness and value of their work. A trust creating, capacity building and experimentation supporting environment enhance uptake as adaptive and creative learning process.

Last, we also stress **two windows of opportunity** that have been identified during this exercise and can be used during the next years for advancing in the implementation of RRI in different organisational contexts. These are:

- Reorientation of RIS3 strategies in the light of the priorities of next MFF (Multiannual Financial Framework)
- RRI as a powerful tool for institutional learning

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Glossary

AP: Action Plan
CSO: Chief Security Officer
CSR: Corporate Social Responsibility
EC: European Commission
ELSI: Ethical, Legal and Social aspects of emerging sciences and Technology
EU: European Union
FP: Framework Programme
GA: Grounding Action
GDPR: General Data Protection Regulation
GEP: Gender Equality Plan
HR: Human Resources
ICF: Informed Consent Form
KPI: Key Performance Indicator
MFF: Multiannual Financial Framework
NGO: Non-Governmental Organization
OS: Open Science
RFO: Research Funding Organization
RIS3: Smart Specialization Strategies
RPO: Research Performing Organization
RRI: Responsible Research and Innovation
RTDI: Research, Technology, Development and Innovation
SDG: Sustainable Development Goals
STS: Science, Technology and Society
SWAFS: Science with and for Society
TA: Technology Assessment
WP: Work Program

1. INTRODUCTION

Since the beginning of the decade (2010-2020), a formidable effort has been pushed forward by the EC towards the adoption of Responsible Research and Innovation (RRI) in the European Research Area (ERA). This effort was triggered through the Rome declaration (SIS Conference, 2014) and it has been mainly channelled throughout the allocation of significant funds in the Horizon 2020 Framework Program (FP) towards the design, setting up and implementation of EU funded projects. At the time that this deliverable is being written around 150 projects have been funded throughout the "Science with and for Society" (SWAFS) Work Program and more specifically around 35 of those are focused on RRI (Delaney et al., 2020). Moreover, other projects that deal with RRI or some of the keys that are under this umbrella term have also been funded in other subsections of Horizon 2020. This has allowed that a significant number of institutional changes have been implemented throughout Horizon 2020 and surpassing the indicative number of 100 institutional changes implemented thanks to SWAFS (Delaney et al., 2020).

However, after a decade of efforts towards the mainstreaming of RRI in the European landscape there are still several barriers that have deterred the institutionalization and social appropriation of RRI at different research organizations in the EU (Novitzky et al., 2020). This deliverable aims to dig into these issues and provide some orientation for addressing some of the main problems that still exist when implementing RRI at the organizational level. To this extent, the research team has relied upon three main methods (literature review, project stocktaking and participatory workshops) to contribute to the identification of these problems as well as contributing to the development of the theoretical underpinnings of the Co-Change project.

The deliverable provides a review of relevant RRI project results and papers, for understanding what the main drivers and barriers that shape the implementation of RRI practices and procedures in organizations are. The report is also taking stock of successful and failed practices in the implementation of RRI whilst providing room for reflection on particularities regarding organizational contexts, cultural factors, and research career incentives, among others. The analyses of these practices contribute to the theoretical understanding of the implementation of RRI and help to develop practical solutions for implementation.

This deliverable is structured as follows: the next section is dedicated to explaining the methods that have been employed, the third section explains the framework of analysis, the fourth section presents the analysis of research papers, the fifth section provides an overview of the project stocktaking, the sixth section deals with the three virtual workshops held during June 2020 with project coordinators and project advisors, the seventh section provides a synthesis of all the information analysed, the eighth section contains an outlook for future research and challenges of the research topic, and the last section recaps the bibliography that has been employed during the elaboration of the deliverable. Finally, Annex 1 contains a detailed information of the examined 23 EU funded projects dealing with RRI and organizational change and Annex 2 comprises the publication review table.

2. METHODS & DATA

The three main methods used for these purposes have been **a literature review of 29 relevant publications, a document analysis of 23 RRI projects funded by the EU, and a Stocktaking Virtual Workshop with 14 EU RRI project representatives.**

Papers were selected based on dedicated searches in the Scopus database abstracts using the keyword RRI in liaison with other terms identified as important for the organizational change in the context of RFOs and RPOs. These keywords were: organizational change, institutional change, transformative change, mission-oriented policy, social innovation, governance, citizen science, ethics, open innovation, management, Research Funding Organization, Research Performing Organization and tool. This exercise delivered a total number of 587 papers (figure 1). After screening carefully, a selection 3 keywords were prioritised (organizational change, institutional change and transformative change +RRI). Results were screened and those projects that have an explicit RRI orientation or ambition towards institutional change were included in the final selection and 31 papers were selected. Later the research team identified four additional papers aligned with the objective of the exercise (35), from this selection and conducting an analysis of the abstracts, six papers were discarded by the research team, as was considered that were not interesting for the development exercise. Twenty-nine papers composed the final list for conducting the literature review.

Fixed keyword	Varying keyword	Number of results
RRI	Organizational change	4
RRI	Institutional change	6
RRI	Transformative change	3
RRI	Mission-oriented policy	0
RRI	Social innovation	122
RRI	Governance	84
RRI	Citizen science	14
RRI	Ethics	82
RRI	Open innovation	28
RRI	Management	111
RRI	Research Funding Organizations	3
RRI	Research Performing Organizations	0
RRI	Tool	130

Figure 1: Initial paper results from the Scopus database

For identifying the relevant EU RRI projects, the research team followed a similar approach in the CORDIS database. This exercise was conducted with the same keywords and with the same combinations of terms as in the case of organizational change.

The results obtained were limited with the filter “projects”, to discriminate between other kind of results such as information packs, reports and others. The period

considered was the last six years from the beginning of Co-Change project (February 2013-February 2019)

These searches in CORDIS database resulted in 1944 hits (figure 2). However, a large number of projects were not related to the topic of our interest. Results were screened with an analysis of the project abstracts and those projects that have an explicit RRI orientation or ambition towards institutional change were included in the selection. In this analysis, 28 projects were identified to be related directly with the aim of our exercise. Of these 28 projects, we selected 23 ones for conducting stocktaking. Five projects were not considered aligned directly or well enough with the aim of the exercise.

Fixed keyword	Varying keyword	Number of results
RRI	Organizational change	12
RRI	Institutional change	59
RRI	Transformative change	22
RRI	Mission-oriented policy	1100
RRI	Social innovation	125
RRI	Governance	80
RRI	Citizen science	69
RRI	Ethics	78
RRI	Open innovation	99
RRI	Management	104
RRI	Research Funding Organizations	65
RRI	Research Performing Organizations	39
RRI	Tool	92

Figure 2: Initial project results from CORDIS database

In addition to the literature review and the project stocktaking, the research team also organized **Virtual Workshops**. To the workshops were invited 18 EU RRI projects that were identified as highly relevant for our development purposes. **The invitation was accepted by 11 project representatives** (mainly coordinators or research leaders). Only one of them was not finally able to take part in the event due to a last-minute issue.

Finally, a Co-Change Sounding Board virtual meeting with five RRI experts was organized for contemplating and discussing the conclusions of the virtual workshops. The design of the Virtual Workshops and the Sounding Board meeting was affected by the rising of COVID-19 and the travel restrictions that were imposed across Europe during the spring and summer of 2020. This activity was initially planned to be delivered on a physical basis at Vienna in the AIT premises. However, due to the pandemic, the virtualization of the activity was the only option for carrying out the encounter. A full explanation of the objectives of the workshop, its structure and a description of the projects involved are presented in point 5 with more detail. The combination of these three methods has made possible to create a comprehensive and adequate picture of the current status of RRI and organizational change in the EU research landscape, as well as identifying barriers and drivers that exist in different organizational contexts.

3. FRAMEWORK FOR STOCKTAKING

As it has been explained, in Task 1.1. a systematic literature review was conducted (see figure 1) that lead to the selection of **29 papers**. The list of the analysed papers is included in Annex 2. Before that exercise, the research team created an initial framework around the two main topics for identifying and analysing focal key issues in literature and previous RRI projects: organizational change theory and RRI. This section outlines the major aspects of the organizational change theory and RRI in general as well as introduces the conceptual framework by which we initially approached the stocktaking material and made choices for further analysis.

In this section of the deliverable, we expose some of the main findings that we have obtained after this exercise in a narrative style, and after having introduced RRI and organizational change concepts.

3.1 Organizational change theory

In the core of the whole project is organizational change: How are we able to change organizational practices, institutional frameworks and people's mindsets so that change towards increasing integration of RRI becomes possible. For that, it is useful to create an overview of the focal perspectives on organizational change. The aim of this section is not to be an exhaustive literature review but to introduce some relevant and important perspectives and topics. An exhaustive review would be out of the scope of this project as organizational change is one of the most studied topics in the social and administrational sciences.

While there are numerous ways of approaching organizational change (e.g. Poole & Van De Ven 2004; Olsen & Eoynag 2001), it could be said by simplifying that the approaches can be crystallized into three ones (while there also different variants). The one, which sees organizations as rational entities. Organizations can be rationally managed and steered in a linear way like "machines". The second and third way to understand organizations is to see them as "organisms" or as a "flow of constant change" which self-organize and "emerge". (e.g. Morgan 1977).

To machine-like organizations is connected an idea of controlled change. When an organization's and its environment´s relationship develops into an incompatible direction, it creates external pressure to change and the leadership of an organization attempts to move the organization into a new more compatible position by rational and target-oriented planning and actions.

Usually, these change actions follow a three-step model, which has been connected to Kurt Lewin (Palmer & Hardy 2000; Cummings et al. 2016): unfreeze - move - refreeze.

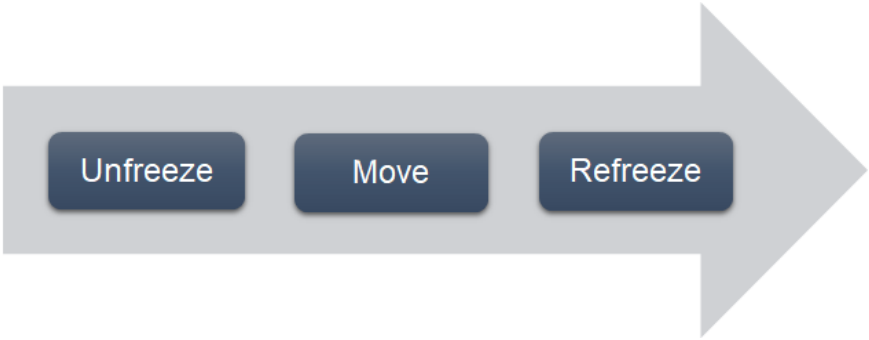

Figure 3: Kurt Lewin's idea of organizational change

This view assumes a linear, controlled path of change, during which the organization moves from one state to another one. The change process can be supported by analysing the current status of the organization, creating a plan for the change, and implementing it by adjusting operations and piloting different ways to action. The change can be also supported by the alignment of various organizational aspects from culture to practices in the process. Various popular change programs and initiatives are based on this model even though there is a lot of evidence that they often fail in practice (e.g. Kotter, 1996; Eccles & Nohria, 1992; Schein, 2004).

Instead, if an organization is understood as an organism, the action models are somewhat different. In the core is then the capacity for self-organization of the organization and its people, which adapt the organization and its processes as a continuous dynamic process to contextual requirements. Also, in this view, a change is seen more or less as an adaptation to external pressures and requirements (Beeson & Davis, 2000).

Still, a bit more dynamic view on organizational change emphasizes organizations as "continuous flow of change" emphasizing the role of continuous learning and interaction among people both within and outside of the organization which changes peoples' reactions and ways of action. Due to learning, an organization is in a continuous and a systemic process of change, and there is no stable state of affairs as, for instance, the various "sequence models" of change suggest (e.g. Burnes 2004). In this view, also the distinction between external and internal incentives for change is insignificant as the core issue is continuous interactive learning in which external and internal factors intertwine with each other (Tsoukas & Chia, 2002).

This view also comes close to various systemic views of organizational change. For instance, Complex Adaptive Systems Approach (CAS) emphasizes that organizations are (e.g. Mitleton-Kelly 2007; Holland, 1995; Nieminen & Talja 2017):

- open systems, which develop in constant interaction with their environment.
- non-linear systems, which are characterized by "emergence". There are always complex interaction and feedback loops between the system elements, which create unpredictability.

- learning systems, in which the actors of the system learn all the time from each other and the system developments. Furthermore, due to interactive learning, multifarious connections and feedback loops, the actors of the system "self-organize" and develop flexibly and collectively new rules for the interaction and action.
- co-evolving systems; because of interaction and learning, the system and its environment co-evolve.
- systems in which heterogeneity increases their survival options as heterogeneous systems develop more likely or rapidly new adaptive solutions to the challenges the changing environment sets for the system.
- systems, in which there is always historical "path-dependency" due to earlier developments and decisions. Due to this, systems may also be conservative structures, which resist changes.

As this view emphasizes interactive learning, it is claimed that instead of control, leadership should support organizations continuous learning, freedom of action, engagement of personnel, intensive communication and interaction within organization. (e.g. Clarke 2013; Biggs et al. 2012, Binney et al. 2005; Eyoang & Holladay 2013) Thus, leadership should be decentralized, "lean", and engaging. (Nieminen & Talja 2017).

However, this approach does not deny the applicability of planned change, even though it emphasizes more the role of small, everyday changes, which are taking place at all the levels of the organization. More like the incremental, step by step by change view and the radical, planned change view complement each other so that they can be seen as extreme points of a continuum, where there are various combinations of them. There is no "universally best" change mode, but change is always a contextual and context-sensitive phenomenon, and we need frameworks, which combine both views. (Dunphy & Stace, 1988; Dunphy, 1996).

This kind of "dialectic thinking" or structuration of organizations is presented, e.g. in so-called neo-institutional organization theory, which maintains that change pertains to the change of practices, procedures, rules and norms. Thus, when we address institutional change, we focus on changing the practices, procedures and norms that define organizations both from an individual and wider societal perspective. By changing institutionalized practices and norms, we can change organizations.

The following table draws together some of the related views based on review by Batras et al. (2016).

Some examples of change theorist with alternative views	The nature of change	How to implement change
Kurt Lewin	Usually organizations try to maintain status quo, which is supported by number of social forces in their operational environment. Change follows from questioning and deconstructing the status quo.	Methodologically destabilize the status quo, implement the alternative and re-stabilize the organization. Continue until appropriate fit with organizational elements and environment is found.
Everett Rogers	Organizational change and innovation depend on organizational structures, characteristics of individuals and external factors in the environment.	Change and adoption of innovations take place as a sequential course and attention to structures, individuals and external factors is required
Edgar Schein	The culture of the organization (its groups and their beliefs, values and assumptions) determines the possibility of change.	To embed a change, it needs to become cultural i.e. embedded in organizational beliefs, values, assumptions and actions.
Andrew Pettigrew, Ewan Ferlie and Lorna Mckee	Change depends on a combination of variables including e.g. availability of key people leading change, long-term environmental pressure, supportive organizational culture, cooperative inter-organizational networks, and clarity of goals and priorities.	Use the variables for selecting appropriate practical measures to support change.

Figure 4: Some exemplary perspectives on organizational change.

Source: Batras, Duff, Smith 2016, page 234

By summarizing essential dimensions and aspects that should be paid attention in the introducing RRI from the perspective of organization theory are:

- **Source of change is important:** From where is the change initiated, and why? What is the most efficient way to initiate change in a specific case? Are there internal/external pressures and incentives for change? How does social and institutional context with action patterns, values and norms, regulation, funding/resources, and networks affect the change?
- **Nature of change:** Are we trying to support radical or incremental change or both? Why do we think this is the right way to proceed in a particular case?
- **Idea of change:** Radical and incremental change processes can be either planned or emergent. Are we trying to initiate a planned, rational process or support emergent one or both at the same time and what does it require from you?
- **There are several organizational factors supporting or challenging change,** which would be good to keep in mind:
  - Goals and priorities of the organization,
  - Existing leadership styles and targets,
  - Structural factors in the organization,
  - What is the role of learning in the organization?
  - How well does interaction and co-operation work in the organization?
  - What are the existing values, norms, and beliefs in the organization?

While this is not an exhaustive overview of organizational perspectives and theoretical approaches to understanding organizational change, we believe that it covers some of the most critical factors affecting the uptake of RRI seen from the perspective of organization theory. Besides RRI specific uptake challenges, it is important to understand organizations and their change dynamics more general, as they affect and contextualize the uptake. It is also important to explicate various organization theories to be used as focusing devices and heuristic "tools" to construct the context specific theory of change, how to support the change towards RRI uptake.

3.2 Responsible Research and Innovation (RRI)

RRI is the latest step in a long tradition of several approaches that have drawn their attention to social aspects, implications and impacts of science, technology and innovation in society (Owen and Pansera, 2019; Rip, 2014; Zwart et al., 2014). In this long list, we can stress "Technology Assessment" (TA), that appeared in the ´60s across the US, "Science, Technology and Society" (STS) studies and more recently in the 90´s and in the same country the "Ethical, Legal, and Social Implications of emerging life sciences" (ELSI) approach (Burget et al., 2017; Ribeiro et al., 2017; Thapa et al., 2019). The ELSI model also was transferred to Europe in the form of ELSA (Ethical, Legal and Social Aspects of emerging sciences and technologies) during the 4th EU Framework Program (FP) for Research and Innovation (Zwart et al., 2014), but from around the last decade RRI has commonly tried to displace and to congregate several methodologies, approaches and previous trends in Science, Technology Studies (STS), ethics assessments, sustainability issues and Corporate Social Responsibility (CSR) among others (Burget et al., 2017; Dreyer et al., 2017; Ladikas et al., 2019; van de Poel et al., 2017). This prominence of RRI in the European Research Area has been accompanied by a dedicated strategy by the EC to disseminate the concept across the 8th EU FP called Horizon 2020 and mainly with one of the two specific objectives under the three-pillar structure: the "Science with and for Society" Work Program (WP) (Delaney et al., 2020; European Commission, 2017a; Griessler et al., 2018).

Although the term has been primarily used in the EU, the idea of ethical and responsible research and innovation gathers together also a wide community of researchers outside of Europe with prominent examples in the UK, US, Australia and even China (Guston, 2014; Mei et al., 2020; Owen and Pansera, 2019; Stilgoe et al., 2013). **As we have stressed, the EC has attempted to operationalize the concept through the Horizon 2020 FP by defining the so-called "keys" for RRI: ethics, societal engagement, gender equality, open access, science education and governance** (Geoghegan-Quinn, 2012). The EC approach has also been framed as a normative one, supporting the integration of such keys into the research and innovation activities, which are considered of growing importance for the future of the EU and for sustaining its position in the global economy (Lammy et al., 2017). The EC also defines RRI as *"an approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation, to foster the design of inclusive and sustainable research and innovation"* (European Commission, 2017b).

There are different definitions of RRI (Owen et al., 2012; von Schomberg, 2013) (Sutcliffe 2011) that share common characteristics such as focusing on societal

challenges, stakeholder engagement, opening up research and innovation activities towards society and anticipating risks or non-desired outputs of these activities (Smallman 2018; Gurzawska 2017). **For instance, Owen et al. (2012) suggests four basic dimensions of responsible innovation which include the already mentioned elements**. These dimensions comprise anticipation, reflexivity, inclusiveness and responsiveness. The first one, anticipation, is a necessary part of the analysis of the social, economic, technological and environmental impacts of innovation activity in a rapidly changing society. The second one, reflexivity, is an essential part of actor's operations. All the actors need to identify their own underlying motivations and purposes in the innovation activity and ponder them openly together with the other actors. Reflective learning requires one to evaluate/reflect whether these align with the external value system. The third one, inclusiveness, brings into the common discussion's various stakeholders and citizen interests, values and perspectives. Finally, the fourth dimension, responsiveness, stresses how R &D processes need to be adaptive, leading to learning, changing of target-setting and operative practices. These processual principles and normative starting points of the EC (policy) can be connected via desired social outcomes or impacts including, e.g. solutions to various societal challenges like the Grand Challenges (Kuhlmann and Rip, 2018).

In recent years **the EC has funded a growing number of projects focusing on the implementation of RRI in organizational and program contexts, as well as creating tools to support the uptake of RRI**. In addition, there have been projects dealing with the obstacles of the uptake of RRI such as JERRI. This and other projects are properly screened in the fourth section of this deliverable in detail, but we would like to use this example to illustrate how difficult is to monitor changes during the lifespan of a project. Even though the project reached remarkable milestones, it also demonstrated that profound changes are unlikely to happen if the ecosystem where the RPO acts is not taken into account. For an RPO to truly transform towards RRI, it has to coevolve with the ecosystem, and it is embedded in a relevant context. Several of the enablers and barriers for change identified by JERRI were situated in the overall research and innovation landscape. However, some authors have argued that it is still possible to implement RRI in research organizations successfully without this requisite (Fisher 2007, Flipse 2013). In the next section, we pay attention to the specific literature identified throughout the systematic literature review, and we expose some of the findings that have been shared by the researchers involved in WP1.

4. RRI AND ORGANIZATIONAL CHANGE: REVIEW OF RESEARCH PAPERS

First of all, we would like to note that the exercise that we aim to conduct in this document is also based in previous experiences that have dealt with the diffusion and adoption of RRI in different domains, contexts and organizations. In this sense and as we have stated in the previous section, **we aim to compile, analyse and screen what other projects such as the RRI Tools, PRISMA or MORRI have previously delivered** (Bührer and Wroblewski, 2019; Groves, 2017; van de Poel et al., 2017). RRI has gathered a significant amount of literature during the last decade, and its theory is well informed on different disciplines that have been attracted by the concept (Bührer and Wroblewski, 2019; Florin, 2019; Owen et al., 2012; Ribeiro et al., 2017; Stilgoe et al., 2013; Uyarra et al., 2019; von Schomberg, 2013).

However, its practice**, implementation and institutionalization remain to be a missing objective** in the growing trend towards the redistribution of responsibilities in science, technology and innovation (STI) between the different stakeholders affected and involved (Florin, 2019; Fraaije and Flipse, 2020; Novitzky et al., 2020; Ribeiro et al., 2017). Here, RRI and organizational learning remain to be a joint path (Hansen et al., 2020) that not many institutions and organizations have taken in the last years despite the efforts of the EC to mainstream the concept (Novitzky et al., 2020).

More attention to the institutionalization of RRI needs to be addressed (van Hove and Wickson, 2017) though good will by scientists towards its operationalization seems to be available (Carrier and Gartzlaff, 2020). However, incentives and key performance indicators (KPIs) in organizations devoted to research and innovation seem to be not properly aligned towards this already needed implementation. In addition, **the lack of clarity of the concept and their multiple definitions and meanings** (Burget et al., 2017; Stahl et al., 2014; Timmermans, 2017) does not contribute towards its effective implementation, especially, in non-academic environments such as corporate or industrial research settings (Burget et al., 2017; Dreyer et al., 2017; Nazarko and Melnikas, 2019).

These needs that stems from the published literature and from empirical evidence ask for operationalization of the concept in practice and avoidance using RRI as a shortcut without actual impact (Fraaije and Flipse, 2020). Clear drivers for operationalization can be observed in the uncertainties that rise for emergent technologies such as robotics, climate change engineering or biotechnologies but applying RRI theory to these particular domains seem to present several difficulties (Florin, 2019).

At the same time, **RRI also seems to be one of the latest manifestations of a larger tradition that questions the objectivity and value neutrality of Science, Technology and Innovation (STI) policies** (Politi and Grinbaum, 2020; Rip, 2014) and that reclaims the concept of RRI as a platform for discussing with different actors and their responsibilities towards society (Douglas, 2003; Forsberg et al., 2015; Hartley et al., 2017). Of course, **the concept of RRI is not value-free** (Papaioannou, 2020; van Oudheusden, 2014) and we can find several authors that stress that the democratic and liberal values that push RRI forward can be problematic in some

contexts (Gutiérrez and Bierwirth, 2019; Lukovics et al., 2017) as well as it can be implied as another step in the growing trend towards the neo-liberalization of STI (Wong, 2016).

In this sense, we have to stress that the hegemonic and optimistic visions of innovation associated with their economic benefits do not help in the mainstreaming of the RRI concept. **The narrow visions of Schumpeter´s legacy are called into question with the concept of RRI**, as the master narrative around innovation and its direct relationship with economic growth are a formidable barrier for the social appropriation of the concept (Khan et al., 2016). This "innovation imperative" (Pfotenhauer and Jasanoff, 2017; Pfotenhauer et al., 2018) that seems to lie at different policy agendas possess greater influence than the advocates of RRI currently have. Though we have to remind that this narrow vision of Schumpeter´s theory of innovation (Schumpeter, 1934) is being contested by a growing number of scholars as the socio-cultural particularities of innovation and their contexts seem to outpace technical aspects (Papaioannou, 2020).

In addition, **RRI also seems to be the latest step in a large tradition of opening new dialogues and establishing new science-society interactions that can result in a more open, inclusive and participatory STI policies** (Åm, 2019; Taebi et al., 2014; Zwart et al., 2014). This recent participatory turn in STI policies has been caused by the **larger influences of "grand challenges"** (Kaltenbrunner, 2020; Kuhlmann and Rip, 2018; Schot and Steinmueller, 2018; "The Lund Declaration," 2009) that stress the need of meeting the pressing problems that our society confronts in the global landscape and that demands participatory approaches to involve new stakeholders into research and innovation activities (von Schomberg, 2013, 2011). Traditional innovation policies and linear models (Lundvall, 1992) seem to be ineffective for dealing with societal challenges that confront society nowadays such as poverty or climate change what has also provoked a "normative turn" in innovation policies (Uyarra et al., 2019). RRI seems to be a very flexible and agile tool for promoting participation among a wide array of stakeholders guaranteeing inclusivity, sustainability and care among other values during the process (Burget et al., 2017).

The aim here is to develop more inclusive, participatory and systemic solutions that might combine different kinds of innovations (technological, inclusive, social, responsible) that can meet these challenges.
In particular, the growing prominence of the United Nations Sustainable Development Goals has been a significant influence on the ongoing transition, where many innovations and research policies are embarked nowadays (Schot and Steinmueller, 2018). However, this transformation of STI also demands several reorientations of current incentives and indicators that are used by individuals, organizations and ecosystems for steering research and innovation. Here we found one of the bigger barriers that the concept of RRI faces in its institutionalization: **the lack of career rewards for adopting RRI principles** (Ferretti et al., 2018; Hardeman et al., 2013)**.**

This ambition of RRI is also rooted in its focus on R&D processes and their governance by different stakeholders that take part and should take part on them (Davis and Laas, 2014; Thapa et al., 2019). It is not coincidence that RRI is usually perceived as a process as its systemic vision also emphasizes the context-specificity of the innovation

process and its importance when dealing with the complexity of stakeholders that play a role on it. RRI aims to shift the focus of responsibility from R&D outcomes to R&D processes for emphasizing public engagement and personal commitment as key aspects of societally desirable innovations (Burget et al., 2017). This focus on R&D processes can also explain the **synergies that can be found between RRI and Smart Specialization Strategies (RIS3**) as both paradigms confer to the ecosystem dimension paramount importance in the innovation processes (Thapa et al., 2019; Uyarra et al., 2019). RIS3 strategies have been used since almost a decade in the EU for aligning research and innovation policy priorities with the capacities of regions and territories across the EU, and it is a very popular concept at the policy level[1] (McCann and Ortega-Argilés, 2015).

These sets of tools and policy priorities emerged after the failure of Lisbon strategy for emphasizing the context in the policy decision making and has a great familiarity with different policymakers across the EU as it was designed for being an ex-ante condition for receiving EU funds associated to regional development. However, **there are also several tensions between the two concepts as geography seems to be missing from RRI**. RIS3 strategies have deployed several tools for regional innovation policy that can be benefited from the flexibility and reflexivity that drives the RRI concept for enriching the prioritization processes (Fitjar et al., 2019). In this sense, positioning RRI as a concept that can help regional innovation policy to adopt responsibility and sensitivity in policy planning can help to facilitate transformative change and a greater societal challenge orientation (Uyarra et al., 2019).

Nevertheless, **it is still not clear which societal actors should be involved in governing research and innovation** (Fitjar et al., 2019) as the contexts of these two domains differ greatly between disciplines and domains of application. RRI only targets the achievement of societal benefit by providing a process with multiple actors (Davis and Laas, 2014). For sure, **governance is also a major topic of interest from the lenses of RRI** (Åm, 2019; Guston, 2014) though it seems that the EC dropped off this key recently[2] from its original conceptualization at the beginning of the decade (2010) (Geoghegan-Quinn, 2012). One of the important aims of RRI is to democratize R&D governance (de Jong et al., 2018; Groves, 2017) but such a big mission also needs other resources and tools to effectively produce such a significant change. As we have argued, stakeholders can vary in research and innovation as well as in their fields of expertise, and this uncertainty demands to experiment with different approaches till having a formula that can guarantee the involvement of the right stakeholders as a pre-condition for introducing new mechanisms of R&D governance. In this sense, **institutional learning is revealed as an essential concept that needs support from the top managerial positions** in research and innovation for improving governance (Egeland et al., 2019).

Modern technoscience is defined by the **importance of R&D managers in current research and innovation,** and these profiles should also be addressed by the RRI discourse as well as researchers and innovators are (Carrier and Gartzlaff, 2020; Grimpe et al., 2020). Previous implementations of RRI has alluded to the individual

[1] See the official website for this policy concept at https://s3platform.jrc.ec.europa.eu/
[2] See official site for RRI at the Horizon 2020 webpage at https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation

responsibility of researchers (Åm, 2019). However, this approach has been revealed to be not effective as most researchers feel that this will create an additional bureaucracy to deal with on an individual perspective or in project-related issues (Åm, 2019; Carrier and Gartzlaff, 2020). That is one of the reasons that the right involvement of stakeholders pursue**: to allocate responsibilities collectively and to facilitate the process for involving non-previously present stakeholders in R&D** (Thapa et al., 2019).

Another concept that also shares synergies with the RRI paradigm is **Corporate Social Responsibility (CSR) which has been popular in the business domain during the last decades** (Dreyer et al., 2017; van de Poel et al., 2017). RRI also differs from CSR because it is not conceived as an output or a side responsibility. RRI aims to make research and innovation more reflexive as its primary goal. This reflexivity demands first order reflexivity (values, motivations, purposes) and second-order reflexivity (norms, contexts, practices) for its effective implementation (Owen and Pansera, 2019; Stilgoe et al., 2013). The lack of an explicit understanding and conceptualization regarding RRI has provoked that industry has not shown too much interest on the concept while others previous concepts such as CSR, Creating Shred Value (CSV), sustainable finance or ethical leadership have triggered remarkable interest in the business community (Dreyer et al., 2017; Nazarko and Melnikas, 2019). Nevertheless, **RRI and CSR also share some values at their respective discourses such as safety, integrity, openness and fairness**. Several companies usually claim these values at their CSR policies, mission statements and corporate strategies, which can favor the introduction and adoption of RRI into business organizations that have openly declared that values (van de Poel et al., 2020). In this sense, the dialogue between business and academia should be much stronger and relevant to facilitate significant interactions and engagements in the innovation processes that can benefit a larger part of society (Dreyer et al., 2017).

Last, **sustainability, as well as risk, seem to be two other concepts that share synergies with RRI** (Florin, 2019; Ladikas et al., 2019). Both concepts have a larger history than the RRI discourse as well as they have shown a greater power of traction at some territories and economic sectors. **Sustainability shares some values with the original conceptualization of RRI such as transparency, reflexivity, inclusiveness and anticipation** (Ladikas et al., 2019), and it is also usually included in the current conceptualizations of RRI due to these emerging connotations (Burget et al., 2017). However, at the same time, these overlapping's can also difficult its diffusion in contexts were sustainability has attracted the attention of a great number of researchers and innovators as a guiding principle (Ladikas et al., 2019).
In the same line, **risk governance can also support RRI in its uptake by different institutions**. Both concepts share values such as responsibility, reflexivity, fairness, anticipation, deliberation and responsiveness, and therefore can be benefited from each other perspectives (Florin, 2019). In this sense, RRI can function as a compass for risk governance. At the same time, the latter can facilitate the adoption of RRI at institutional level due to its broad presence in many organizational contexts.
However, it is of particular importance that RRI shifts the focus of responsibility at the process of responsibility and that implies engagement and personal commitment (Burget et al., 2017), which differs with the approach of the two previous concepts as they have been developed in the literature and its practical implementation.

5. PROJECT STOCKTAKING

As we have previously exposed in the "Methods" section, the core of Task 1.1 has been the project stocktaking exercise that examined **23 EU funded projects dealing with RRI and organizational change theory in detail.** To deliver the analysis, several categories have been proposed for gathering significant information about the projects in terms of RRI and organizational change. **These categories stem from the initial conceptualization that the research team did around RRI and organizational change theory (objective, learnings and recommendations, context, building blocks, barriers and drivers, and RRI meanings.** The analysis of the 23 projects that it is included in the Annex 1 of this deliverable, starts with a description of the basic administrative data (acronym, full name, GA ID, website and the coordinator) of each project and continues with an overview of the following aspects:

- ***Objective:*** *What is the objective of the project in a nutshell?*
- ***Project learnings & recommendations:*** *What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?*
- ***Context of change****: What is the context where the project has been framed? What kind of particularities have affected its implementation?*
- ***Narrative of change:*** *What is the message that the project is promoting? What is the language that accompany the project?*
- ***Building blocks for change:*** *What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?*
- ***Barriers and drivers for change:*** *What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?*
- ***RRI meanings:*** *Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?*

This section summarizes some cross-cutting observations based on the main barriers and drivers for RRI identified during the project analysis.

The main **barriers** for RRI were identified as:

1. Diverging views of science and society relations: The strict division of moral labour between science and society argues that regulation is meant to take care of the social and ethical issues of scientific activities. As a result, some features of RRI are seen as challenging the freedom of science and thus in conflict with the idea of good science.
2. Fear of the loss of scientific autonomy: RRI is often perceived as another top-down burden assigned to scientists and its implications as brakes on the advancement of science.
3. Difficulty to apply RRI in practice: It is often difficult to formalize RRI into a practical procedure and translating RRI-criteria into practice is often left to individual scientists and projects.
4. Tendency to outsource RRI: Research projects often outsource or compartmentalize RRI without integrating it more broadly into the research process.
5. Lack of incentives: RRI is time-consuming and not recognized by the current scientific culture, which rewards writing publications, not the practice of RRI. RRI practices can also be in tension with commercial interests.
6. The unpredictability of scientific enterprise: It is often difficult to anticipate the future societal impacts of research and to imagine what RRI would mean in practice.
7. Insufficient resources and capacity for RRI: The current institutional configuration does not provide enough resources for RRI practices, resulting in the lack of training, awareness and understanding of RRI.
8. Unclear added value of RRI: RRI as a concept is often perceived as too academic and its definition too vague to be of any practical value for industry and businesses.

The main **drivers** for RRI were identified as:

1. Pursuit of good society: Enhancing democracy, trust and legitimacy by increasing the acceptability, accountability and desirability of science and technology R&D&I processes and outputs.
2. Responsible Scientists: Personal bottom-up motivations, commitments and interests of scientists and innovators towards responsibility, sustainability and ethics related approaches.
3. Alignment of Science and Society: The trend towards more reflexive science through broader societal engagement, interaction and alignment.
4. Response to Societal Challenges: The new orientation of science and technology R&D&I towards solving societal challenges resulting from top-down governance and bottom-up societal demand.
5. Participatory Science: RRI as a participatory agenda-setting mechanism for increased inclusivity and diversity in order to avoid societal harm and controversy.
6. Risk Governance: RRI as a way to broaden the governance, assessment and anticipation of the inherent uncertainties and risks of current and emerging technologies.
7. Social Innovation: Innovation in a broader societal context and the Co-creation processes between citizens and experts can provide new added value.
8. Social License to operate: RRI enhances the competitiveness and creativity of products and services by making them more aligned with society and end-users, thus improving the corporate image.
9. The gap between the implementation of RRI and the theory of RRI.

6. VIRTUAL WORKSHOP

Although it was initially planned at the GA to deliver a workshop at Vienna in a physical manner, due to COVID-19 pandemic several travel restrictions were imposed during spring and summer 2020 all over Europe. These restrictions forced the Co-Change team to look for new formulas that allow to carry on the work planned in a telematic way. To this extent, a new formula based on a set of virtual workshops was designed, approved and implemented. The design of these virtual events paid attention to the different particularities that digital platforms and telematic channels can infer on participants (non-verbal communication, screen fatigue, etc.), as well as the different technical challenges that can emerge unexpectedly.
To this aim, a format of 3 hours workshop was set up, divided into two sessions for the 12-14 participants (6 participants in each session) envisaged in the physical workshop. The WP1 decided to split the workshop into two sessions for facilitating the enrolment of participants, but also to facilitate interaction and opinion exchange between participants into these small forums of debate. The objectives of this virtual workshop were focused in the WP1 objectives of the GA and are listed as follows:

- To incorporate the explicit and tacit knowledge of previous EU RRI projects related to organizational change in various contexts.
- To explore the main barriers and drivers around RRI institutionalization in other EU funded projects.
- To discuss critical implementation questions (e.g. organizational, disciplinary or cultural aspects) with experienced experts to learn insights that can help in the development of the co-created actions in the Co-Change project.

The agenda for these events comprised **an introduction of the Co-Change project for the participants and the objectives of the workshop.** It also had another slot dedicated to the **introduction of projects invited and two blocks more related to RRI and organizational change, as well as barriers and drivers around RRI in organizational contexts.** A last slot in the agenda was oriented to make a **recap of the discussions and providing a farewell to participants**. Afterwards, an evaluation form was delivered to the participants in liaison with the minutes of the workshop.

6.1 First Virtual Workshop (9/6/2020)

The first virtual workshop was conducted on Tuesday, 9th of June of 2020 from 2:00 to 5:00 pm CET. This virtual forum of the debate was held on Microsoft Teams digital platform, and the session was recorded for research purposes. All participants received relevant information prior the workshop such as the agenda, guidelines and tips for facilitating conversation during the event and an Informed Consent Form (ICF) that reflected the kind of data that was collected during the event and how it will be stored and analysed following General Data Protection Regulation (GDPR) guidelines.

The list of participants representing different projects and organizations for this first virtual workshop have been anonymised for complying with GDPR requisites but

affiliation of these representatives and the list of RRI EU funded projects involved are listed as follows:

- One representative from European Science Foundation (France), Grace project coordination.
- Two representatives from Institute for Advanced Studies (Austria), New HoRRIzon project coordination, RI Configure project partnership.
- One representative from Karlsruhe Institute of Technology (Germany), RRI Practice project partnership.
- One representative from Danish Board of Technology (Denmark), GONANO project coordination.
- Two representatives from Politecnico di Milano (Italy), SISCODE project coordination.
- One representative from Vienna University of Economics and Business (Austria), LIV:IN project coordination.

Several researchers from the consortium partners involved in WP1 (AIT, TEC, VTT) were present in the workshop with different roles (facilitation, moderation, time management and note-taking). The workshop followed the structure of three main blocks previously exposed at the beginning of this section: Project presentations, RRI and organizational change, and drivers and barriers around RRI. A major recap of the conclusions and shared lessons between participants is exposed here, around several topics discussed:

Theory of change

It was agreed that change tends to begin with small pockets of change at first, and not with wholesale institutional change, although the slow pace of change can be hard to accept. Often it might even be useful to first focus on smaller pockets of change in order to create cumulative change through smaller iterations. Moreover, the institutional layer is just one layer among many other layers such as individual, sectoral and policy levels. **The key issue is how to build coalitions that cut across these various layers and successfully manage questions of power and interest within organizations**. This management of different interests can be governed through the construction of **advocacy coalitions, which help to align the different layers within an organization**. Thus, in order to create advocacy coalitions, it is crucial to see organizations as conglomerations of many different parts and layers that also extend to the surrounding environment, i.e. **ecosystem**. The so-called policy entrepreneurs (intrapreneurship) can help to create change by acting as a connection between the grassroots and decision-makers in order to create a 'critical mass' - 'tipping point' for change.

The importance of combining both top-down and bottom-up governance approaches was recognized widely. This alignment brings together grassroots experimentation and knowledge with a more comprehensive strategic approach, which is looking at the big picture of an organization and its environment. Often, change is highly dependent upon the personal dedication of individual decision-makers, which can give a strong backing for initiatives from above but can also create a strong dependence upon political changes. Projected changes can implode after a key person leaves his/her post. One meaningful way to counteract the dependence on changing policymakers is to create more lasting relationships to civil servants who

often remain at their posts, irrespective of the changing political landscapes. Similar situations of engaged persons leaving are faced in organizations.
Furthermore, it was agreed that **RRI needs to better recognize the question of power and interests** in order to change ways of doing things on a practical level. Everybody agrees on the principle that ethics is a good thing, but the value of ethics comes by putting it to practice. It is thus vital to translate and implement ideas and principles on a concrete organizational level. One crucial way to create practical change and organizational transformation is to recognize the important role of 'learning by doing'. This requires studying the flows and transmission of knowledge and dynamics within an organization and the ecosystem around it.

The concept of RRI
It was suggested that the **biggest challenge with the concept of RRI is the concept of RRI itself.** There are many similar concepts related to RRI, which are more recognizable and related, such as ethics and sustainability. Thus, many organizations do not perceive a need for RRI -related organizational change other than as a part of the discussion on best practices. Not every organization needs a compass such as RRI which might lead to resistance once introduced in the organization. However, on the other hand, in some instances, RRI was seen as a very inviting concept and a language, which resonated with a dedication to change. It is thus important **to recognize the differences between how organizations can perceive RRI differently**, from substantive content to an irrelevant label.

Different Contexts & Needs
The need to be attuned and responsive to the actual needs of organizations was recognized. In order to address the issues of an organization, **a certain amount of engagement is required.** The different contexts, problem definitions and needs that organizations, as well as individuals, have, should be further emphasized. Studying the context of change, e.g. organization, is highly important.

Marketing & Implementing RRI
The problem identified with implementing RRI is that **the RRI community is 'selling' RRI to organizations but often not implementing it into their own organizations**. Furthermore, the RRI community should provide consolidated lessons on RRI in order to convince the public about the benefits of RRI. The problem is that as academics, the people in the RRI community are often downplaying and problematizing their results. However, examples from the field, such as the Human Brain Project, indicate that it does take much time and lots of top-management support to integrate and implement RRI into a project/organization successfully. In order to implement **RRI, it needs to be linked to other ongoing and relevant socio-political conversations.** Accordingly, it makes much difference how RRI is 'packaged' and 'sold'. It is also important to note that in trying to 'sell' RRI, there is competition from other Social Science Humanities (SSH)-related communities around the concept of responsibility/ethics, which have established themselves in power broker positions.
Framing of RRI & Science-Society Relations
One important question that was raised relates to the market-analogy in the implementation of RRI; whether or not the focus should be on selling the concept of social responsibility or just on 'doing the right thing' irrespective of the market demand for it. It was emphasized that the RRI community should not frame itself in neoliberal

language, because the value of RRI cannot be properly articulated through the neoliberal discourse. **RRI is more than just another business case**.

Measuring / Evaluating Impact
One big problem with RRI is how to measure and show its impact in order to 'sell it'. Many big organizations tend to require specific impact indicators for their projects. Evaluation poses problems because it is often done by comparing projects to each other, whereas it might be more fruitful to conduct formative internal evaluations. This means establishing a baseline for each project to evaluate their own individual impact and development. **It is important to note that the impacts of RRI should not be measured in a traditional way**, but rather through visions of possible future impacts, as many of the impacts are not measurable within the duration of the project.

6.2 Second Virtual Workshop (10/6//2020)

The second virtual workshop was conducted on Wednesday, 10th of June of 2020 from 2:00 to 5:00 pm CET. This virtual forum of the debate was held on Microsoft Teams digital platform, and the session was recorded for research purposes. All participants received relevant information prior the workshop such as the agenda, guidelines and tips for facilitating conversation during the event and an Informed Consent Form (ICF) that reflected the kind of data that was collected during the event and how it will be stored and analysed following General Data Protection Regulation (GDPR) guidelines.

The list of participants representing different projects and organizations for this second virtual workshop have been anonymised for complying with GDPR requisites but affiliation of these representatives and the list of RRI EU funded projects involved are listed as follows:

- One representative from Rhine-Waal University of Applied Sciences (Germany), Nucleus project coordination.
- One representative from Fraunhofer ISI (Germany), Jerri project coordination.
- Two representatives from Vienna University of Economics and Business (Austria), LVI:IN project coordination.
- One representative from TU Delft (The Netherlands), Prisma project coordination
- One representative from Sapienza Universitá di Roma (Italy), FIT4RRI project coordination.

Several researchers from the consortium partners involved in WP1 (AIT, TEC, VTT) were present in the workshop with different roles (facilitation, moderation, time management and note-taking). This second workshop already followed the structure of three main blocks previously exposed at the beginning of this section: Project presentations, RRI and organizational change, and drivers and barriers around RRI. A major recap of the conclusions and shared lessons between participants is exposed here, around several topics discussed:

Theory of Change
It was suggested that when one is trying to conceptualize change, a specific framework and a view of change must be decided upon. In the search for a suitable theory of organizational change, there is a need to strike a balance with top-down and bottom-up approaches. It was also noted that one should be careful of **not putting**

too much responsibility of change towards individuals, as the idea of primarily individuals changing a system basically through consuming and voting is fundamentally a neoliberal one. This kind of view is also a reactive view, which can be contrasted by a view which sees industry and individuals as more proactive in creating futures. One problem with creating change is the availability of multiple tools, many of which are not useful or helpful, nor capable of demonstrating tangible change. Thus, the quality of the change process itself is important.
Furthermore, the availability of multiple standards and indicators is often seen as an existing burden so that RRI-related standards can be seen as just another hurdle for organizations. As a result, the focus should be on multi-stakeholder initiatives, which help to create tailor-made self-regulation and self-governance towards change. However, no organization alone can push a successful agenda or create an impact by themselves. **The motivation for change needs to be shared among many stakeholders in a multisector area.** RRI is fundamentally a whole value-chain and ecosystem approach.

Impact of Change
Quite often, the measurement of the sustainability of change initiatives requires much time. Furthermore, even promising initiatives and committees can be wiped out fairly quickly if they lack sustainable support. Some of the RRI keys, e.g. gender/diversity, might have quite established frameworks already in place that can hinder change. Therefore, **it is essential to identify the correct place to implement RRI in the organization**, e.g. competence and motivation of individuals. There are, however, promising examples of the integration of responsibility to various projects in RTO's, for example. This integration requires creating a 'middle-ground' position in order to have the backing of the leadership and a broader impact within an organization. The big question is, how do we successfully integrate our initiatives to organizations? One important factor is to create initiatives, which are 'lived' from the bottom-up in addition to having the top-level support. Top-down change without bottom-up 'appetite' for change is not enough. Furthermore, brand recognition and social acceptance can help to drive the adoption of RRI.

Needs & Contexts
It was noted that RRI guidelines alone do not have an impact. What RRI can provide is a room for individuals, groups and organizations to deliberate on responsibility issues, address individual needs and issues arising from their work. Thus, it is important to note that **RRI needs to be linked to real issues and needs within organizations for it to become sustainable.** Integration requires understanding the organizational and institutional context because there are no off-the-shelf solutions available due to the differences between, for example, industrial and academic contexts. The differences between contexts relate to, for example, different institutional settings and systemic incentives, or simply language used; for example, open access in academia and IPR in the industry.
Finally, it was discussed whether institutional context interventions in other institutions have affected our own institutions and should research team members act as objective facilitators of change or subjective agents of change.

6.3 Sounding Board Workshop (24/6/2020)

In addition to the virtual workshops, a sounding board workshop was also delivered a few weeks after the implementation of these telematic events. The objective of this Sounding Board meeting was oriented to have an expert contrast with the results of the previously organized workshops, confronting some of the findings obtained with the audience and guidance of experts as well as sharing concrete experiences and examples of RRI-related change. The level of support of the Sounding Board was also discussed. Some members suggested that the Sounding Board might support forums and labs due to similar experiences for expanding co-operation. This session was held on the 24th of June of 2020 from 9:00 AM CET to 12:00 AM CET. (3 hours). This virtual forum of the debate was held on Microsoft Teams digital platform, and the session was recorded for research purposes. All participants received relevant information prior the workshop such as the agenda, guidelines and tips for facilitating conversation during the event and an Informed Consent Form (ICF) that reflected the kind of data that was collected during the event and how it will be stored and analysed following General Data Protection Regulation (GDPR) guidelines.

The list of participants representing different projects and organizations for this second virtual workshop is listed as follows:

The list of participants representing different organizations for this Sounding Board virtual workshop have been anonymised for complying with GDPR requisites, but affiliation of experts involved are listed as follows:

- One representative from Fraunhofer ISI (Germany).
- One representative from Institute for Advanced Studies (Austria).
- One representative from University of Szeged (Hungary).
- One representative from University of Tampere (Finland)
- One representative from TNO (The Netherlands)

The virtual meeting also included the participation of several researchers coming from different partners of the consortium involved in WP1 (AIT, TEC, VTT, ESSRG and TU Delft). The event was also structured around three main blocks: a project introduction and two rounds of discussion with different topics with a break in the middle. The first round was organized around personal experiences, perspectives and factors that deter or facilitate RRI into organizational change. In contrast, the second one was oriented to explore sustainability dimension when dealing with organizational change and RRI. A major recap of the main recommendations and shared lessons by the experts are presented below in two big themes: **Success cases and failures** & **Change and Sustainability**. Between these two major topics, several subtopics were also discussed and listed here.

First round: Success cases and failures

Facilitating communication

Technological applications can be proposed as a new approach to facilitate communication with multiple stakeholders. Applications can be used in addition to traditional virtual forums to spread information outside a specific forum.

Important factors of explaining success and failure
It was widely agreed that changing organizations is a very different approach than being active in RRI research. Changing organizations were experienced extremely difficult. At least three essential factors of RRI-related change were identified. The first success factor emerged from similar experiences of science shops. In order to address the issues of an organization, it was noticed the **importance of motivating the stakeholder**. However, it was noted that the strong success factor goes beyond personal commitment; it involves **finding a strong stakeholder outside the organization, who can make claims on behalf of the organization.** The **readiness and willingness for organizational change** were also identified as important factors for change. The implementation of RRI should begin with the **in-depth analysis of the organization**, how it is working, and whether it is ready for the change. It was pondered that the RRI-related change may not be applied if the organization is not genuinely ready and willing to commit to it. Thus, knowing more about the inner motivation of change facilitates the integration of RRI into the organization. Moreover, it was discussed that change needs a piece of luck. In order to succeed, it is crucial **to meet people who are enthusiastic about making a change** in their organization.

The contradictions of RRI-related change
It was widely emphasized that the RRI-related organizational change is tightly connected to underlying contradictions and tensions within organizations. One of the main tensions was identified as the impact of incentives on sustainable change. It was agreed that **organizations must go beyond the incentives and invest their efforts and money to attain sustainable change**. Nevertheless, it was perceived within rich and powerful organizations, that they are not advocating RRI.

Promoting RRI to organizations
These contradictions led to essential questions of RRI-related change. How should we 'sell' RRI to organizations? How are we going to formulate and integrate our narrative with RRI? There were two approaches to answer these questions. The first approach was seeing **RRI as a movement**. From this perspective, RRI was illustrated as an advocacy movement that democratizes science and technology while changing current power relations. To foster an RRI-related movement, the empowerment of certain actors and political tactics is needed to gain power and space. Another perspective was framing **RRI in a negative light**. The argument proposed that highlighting the negative side of irresponsibility could help organizations to see the benefits of implementing RRI in the long run. If we only promote the positive side of RRI, the organizations do not identify how irresponsibility will affect them in the future. The **reputation risk** was identified **as a good driver of change**.

How to make a change that lasts?
It was recognized that sustainable change seems to go beyond the project and money. The crucial part of achieving change was identified as **integrating and finding a narrative that makes people move**. In that sense, sustainability is also strongly **driven by excellence**. Experts must drive change in organizations.

Second round - Change and Sustainability.

What is sustainability?
Sustainability was described as something that cannot easily be undone later by stakeholders. Thus, the important issue for **sustainable change is to find a balance between different actors**. In the project design stage, it is essential to pay attention to the balance of power relations and interests of different actors. In the worst case, some actors are being empowered without the project. It was also noted that power relations within the big organization might influence to enthusiasm to support and implement the RRI Project. The RRI project may even perceive resistance inside the powerful organization.

Noticing the sustainable change
It was agreed that the sustainability of change is hard to notice. In the future, RRI would be integrated into our routines that we can even say that it is disappeared. Nevertheless, implementing indicators were experienced as a good way to manage change. For example, in the Jerri project, the indicators were experienced almost as a revolution in organizational leadership. The Jerri project was able to **integrate RRI indicators into KPIs**, which affected the organization's reporting practices.
Furthermore, it was suggested that indicators could be implemented at many different levels of indicators, for example, to the **actor level**, and even to the **individual level**. For noticing and promoting the sustainability of change, the definition of RRI was highlighted. There are multiple views of RRI within organizations, which may lead us to a situation where there are competing claims about change. Thus, **it is important to be clearly understood what the meaning of RRI is**. Otherwise, we may find ourselves in a situation where there are multiple understandings of RRI to run a contrary view.

Implementing RRI-related change
Finally, it was discussed about the implementation of RRI-related change. Two recommendations were gathered from the discussion. The first recommendation concerned the integration of RRI. It was agreed that the best way to proceed with RRI is to **integrate it into the normal way of doing things**. This way of proceeding may bring success while working with organizations and even with other actors. Another recommendation concerned the competence of ethics. The importance of **ethical expertise was emphasized**. It was suggested that the ethical competence level could be understood as a broader semantic area.

7. STOCKTAKING SYNTHESIS

After presenting in the text the different findings that the WP1 research team has gathered throughout the three main components of this deliverable (literature review, project stocktaking and virtual workshops, we would like to present in this section a synthesis that can be used by the rest of the different researchers of CoChange project at different WP´s. In this sense, the objective of this section is to summarize, compress and articulate a stocktaking synthesis that can be mainly used for informing WP2 and WP3, as well as for the different partners.

To present this stocktaking synthesis, we have opted for adopting a structure based on **two major drivers** that can facilitate the adoption of RRI (**societal challenges and distribution of responsibilities in R&D ecosystems**), **five pillars** that sum up the empirical evidence gathered around RRI and organizational change (**adapting the process to the degree of institutionalization, ecosystem & context, organizational theory, culture, communication and trust, and metrics and indicators**), and **two windows of opportunity** for implementing RRI at the institutional level (**reorientation of RIS3 strategies, and RRI as institutional learning**). We have opted for this structure as we consider that this synthesis also needs from a context where it can be placed and contextualized and with some directions where it can be steered and mobilized. We also backed up this structure with the findings coming from the literature review, where a considerable amount of papers already identified these elements (see section 3), but also from the findings that have been collected from the project stocktaking and the virtual workshops. We believe that this approach can be useful for the rest of project members when dealing with this deliverable but also when they approach their respective organizations and acting on the organizational landscape to present value proposals for introducing RRI and upscaling the concept across several organizational levels.

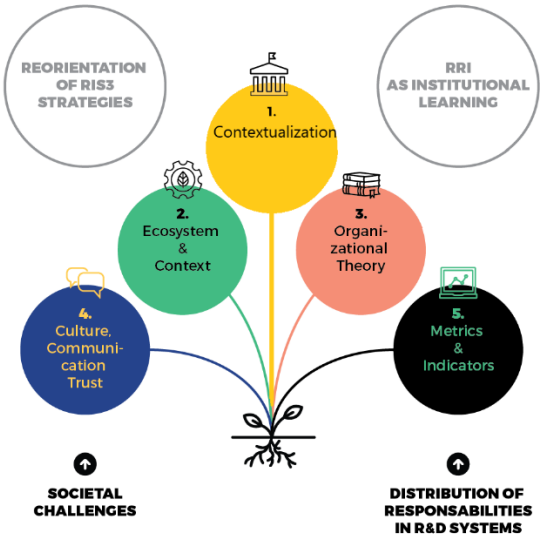

Figure 5: Five pillars, drivers and windows of opportunity (own made)

7.1 Major drivers for adopting RRI at the institutional level

As we have stated previously, **we consider that the two main drivers that facilitate the adoption of RRI in organizational contexts are societal challenges and the distribution of responsibilities between stakeholders in research and innovation** (Douglas, 2003; Kaltenbrunner, 2020; Kuhlmann and Rip, 2018; Ribeiro et al., 2017; Rip, 2014; Schot and Steinmueller, 2018; Uyarra et al., 2019; Zwart et al., 2014)These two concepts can act as major forces of change towards RRI institutionalization as society demands new approaches from STI to the pressing problems of our time as well as it demands new collaborations between different stakeholders and actors that have not usually worked together previously.

We can see those drivers very clearly in current problems that society face such as climate change or inequality where new collaborations have been established for redistributing responsibilities collectively but also to envisage together for new solutions to these problems. In this sense, the COVID-19 crisis has also sparked these kinds of collaborations in many sectors of society for fighting the pandemic. Some examples of these have been the makers' collectivities that have designed, manufactured and provided face shields for medical workers[3] or the car companies that have entirely changed their manufacturing lines for producing assisted ventilators[4].

These two examples illustrate how unexpected collaborations between different actors can provide solutions for the pressing problems of our time and how involving different stakeholders in R&D processes can lead to shared responsibility in the development of innovations and research outputs. **We tend to think that these two major drivers that were also emerging before the pandemic can be strengthened after the pandemic for reinvigorating STI policies.**

7.2 Pillars for promoting RRI from an organizational perspective

Regarding the **five pillars** that we have identified about RRI and organizational change, we speak mainly about organizational factors promoting uptake of RRI that can facilitate the adoption of RRI at an institutional level. These are:

- **Contextualization**
- **Ecosystem**
- **Organizational theory**
- **Metrics and indicators**
- **Communication, culture and trust**

[3] See for instance https://www.urbanmfg.org/project/makerspaces-in-action/
[4] Check https://www.theverge.com/2020/4/15/21222219/general-motors-ventec-ventilators-ford-tesla-coronavirus-covid-19

1. Contextualization

The implementation of RRI should be based on institutional self-understanding and should take into consideration the structures, rules, and values of the target organization/institutional field; The targets, processes and policies need to be adapted to fit the context

One of the most common themes that emerged from the conducted analysis takes care of how the change process needs to be adapted to the degree of RRI institutionalization. The case studies analysed in the project stocktaking describe the strong understanding of how institutional framing, as well as political and institutional dimensions, are needed in these kinds of processes. As a pre-requisite, **a deep institutionalization of RRI practices into organizational routines/culture requires an understanding of the institutions themselves.**

Many projects defend the idea that these processes require of reflexivity on the normative orientation and the institutional values on which RRI activities are anchored (RRI Practice or JERRI, among others). The implementation of RRI should be based on institutional self-assessments and should take into consideration the structures, rules, contexts, values, etc., of the institution.
In order to sustainably develop and pursue RRI processes, potential obstacles need to be identified and addressed before starting the process (such as NUCLEUS claim). The mobilization towards RRI of internal actors should be based on the assessment of their orientation to change. To this end, it is necessary to check if initiatives related to RRI have been already implemented in each organization (Starbios or PRISMA stress these aspects).

It is thus important to recognize how organizations can perceive RRI differently.
A successful RRI approach requires crafting policies, regulations, strategies, and organizational goals that are aligned towards RRI and organizational change as well as it can rely on adapted change-management processes at the policy-and governmental level of each institution (NUCLEUS advocates for this approach).
In order to address the issues of an organization, a certain amount of engagement is required. The different contexts, problem definitions and needs that organizations, as well as individuals have, should be further emphasized.
Some points of attention highlighted when setting **governance processes** are:

- Choose the governance setting model primarily based on feasibility considerations.
- Activate the governance setting process, establishing a team which is substantially and institutionally capable of activating the governance setting process.
- Ensure the transparency, inclusiveness and visibility of the governance setting process.
- Make RRI part of the “business” from the beginning.
- Formulate of long-term organizational goals.
- Establish a clear vision and objectives.
- Balance consensus and dissent.
- Manage expectations.
- Involve the top-level management of the organization.

RRI leadership is, therefore, another important factor for encouraging the uptake of RRI. In this sense, the leadership commitment and its support are deeply discussed in projects together with the role of change agents. The roles and governance arrangements of institutional context and the RRI practices of specific organizations and individuals are inter-related (RRI Practice or New HoRRIzon highlight this). The balance of power and appropriate governance mechanisms are seen as key factors when implementing RRI in organizations. RRI needs to better recognize the question of power and different interests in order to change ways of doing things on a practical level. The importance of combining both top-down and bottom-up governance approaches is recognized widely, and some projects enhance both approaches for implementing institutional change.

RRI demands a lot of effort which needs to be supported by adequate resources. The efforts invested into RRI are usually feared to be taken away from addressing other challenges and that institutionalizing RRI can mean imposing an additional bureaucratic structure on them (NUCLEUS and JERRI stress this). **Providing the right incentives** is seen as crucial as the lack of them is identified as a major barrier to RRI implementation.

It is widely recommended that the institutional contexts have to consider the incentives and adequate resources as well as the motivations of actors, recognitory or social acceptance that can drive the adoption of RRI.

RRI is itself a process and it is seen as a creative and **adaptative learning process**. (Like RRI Practice, PRISMA or JERRI emphasize). A trusting environment, building capacity and spaces for experimentation emerge as success factors to join efforts in shared collective innovation spaces.

2. Ecosystem

Understanding of the network relationships and dependencies of organizations where it is embedded (ecosystem): Backgrounds, goals and the interest of collaborators, stakeholders and rivals matter

Reading across the listed RRI projects, some generic observations can be highlighted with regards to the importance of the ecosystem and context. There is a strong need on **RRI** that **requires an understanding of its framing and its context of implementation**. Here, cultural, political and institutional dimensions gain major attention (Jacob 2013). The ecosystem understanding is seen as a useful concept to considerate and make visible (complex) relationships in networks of actors where the governance framework could be identified as a key element in either facilitating or hindering the process.

Context matters and it is important to include backgrounds, goals and the interest of stakeholders before establishing an RRI-process and make sure to develop a shared understanding of backgrounds, interests and expectations. Tailoring the involvement of external stakeholders and being aware of their socio-cultural differences is really important.

The discussion about broaden the **concept of excellence** and impact is also recurrent in many projects and it is highlighted that RRI should be embedded and integrated into quality definition and evaluations at national and EU levels (several projects such as RRI Practice or New HoRRIzon stress this).It is commonly emphasized that the RRI community should not frame itself in neoliberal language (van Oudheusden, 2014; Wong, 2016), because the value of RRI cannot be properly articulated through the neoliberal discourse. RRI is seen more than just another business case.

Aligning the interests of stakeholders who represent social needs also requires democratic alignment of the goals or missions of the innovation collaboration. Traditional innovation ecosystems, even when experimenting with open formats, have a strong economic/market drive for innovation that may hinder or outright obstruct the eye level engagement of some of the potentially relevant actors in the innovation ecosystem (such as Riconfigure claims).

3. Organizational theory

Theoretical/empirically studied framework of organizational theory is usually necessity for a successful implementation; Change agents should understand organizational dynamics and processes from various perspectives to navigate in the "sea of change".

In the context of the EC research policy environment, **structural change refers to profound modifications of higher education institutions and research organizations to pursue defined policy objectives.** The log-frame/ theory of change approach has proved to be a valuable tool to think about how different factors may 'contribute' to the impact of interventions and to begin identifying possible outcomes and impacts of interventions. **Theoretical framework of organizational theory is required for a successful implementation as it has been argued by many project representatives that participated in the virtual workshops**.
For instance, one of the critical backbones of the JERRI project was structured around the notion of deep institutionalization and the need of previously deinstitutionalized previous discourses that can hamper the adoption of RRI practices.

Promoting RRI in research organizations need a solid theoretical background on how change happens at organizational level and how it can be facilitated, assisted, promoted, supported, monitored and assessed. This knowledge should lie in change agents or institutional entrepreneurs that have the power of action and the ability to introduce changes into the organization as well as to inspire others or to leverage decision makers at the institution.

This knowledge is also of great importance when dealing with tensions, imbalances and challenges that transformative changes can elicit at any time of the process. These "pioneers of change" should be well informed and equipped from a theoretical point of view as these processes are usually long, complex and with many interests at stake.
Creativity is also of importance here as it can be a valuable skill when dealing with no clear exit situations and for avoiding discussions and dilemmas that can obscure or obstacle the RRI intervention.

4. Metrics and indicators

Anticipation and measurement of impacts of RRI support its uptake; KPIs, integrated assessment frameworks etc. may make visible benefits and create incentives for the uptake.

The lack of a systematized framework for **impact measurement**, and the prominence of qualitative approaches might act as a barrier, according to several projects (see stocktaking). In this sense, **one big problem with RRI is how to measure it and show its impact**, specifically related to change. Some projects such as MoRRI and Super MoRRI, as well as PRISMA have tried to provide new kind of KPIs for monitoring change towards the RRI adoption.
Another factor that is at stake is the permanent conflict with the current incentive schemes and KPIs that national evaluation agencies deploy over research institutions such as JCR indexed articles, patents or commercial-oriented research projects that involves IP issues (Ferretti et al., 2018; Hardeman et al., 2013).

It is important to note that **the impacts of RRI should not be measured in a traditional way**, but rather through visions of possible **future impacts**, as many of the **impacts are not measurable within the duration of the funded projects**. The legacy of the change has to be considered as well as its effective implementation. Anticipating the trends of change and its effects towards the organization is also seen as a success factor for avoiding traumatic transformations.
The RRI-related change needs to find an integrating narrative that makes people move. Thus, the benefits of RRI must be visualized outside the research community of RRI. From a practical point of view, this can be achieved by making its impacts visible through indicators that can be periodically monitored. **This can help to measure how the organization is changing and how it is generating a positive impact on the social context where it is embedded.** For sure, change sustainability is also an important dimension here and these indicators, as well as the aim of change, should be aligned with the socio-cultural norms, values and procedures of the institutions.

5. Culture, communication and trust

Open communication and dissemination of RRI is important to increase awareness of RRI and avoid resistance: It is no plot, but transparent practice to help practitioners to improve the effectiveness and value of their work. A trust creating, capacity building and experimentation supporting environment enhance uptake as adaptive and creative learning process.

The RRI community should provide consolidated lessons on RRI in order to convince the public, research community and policy makers on the benefits of RRI. To this extent, **it is of utmost importance to raise awareness for the concept of RRI but to be open for grassroots definitions** (Ribeiro et al., 2017; Rip, 2014).
It is also important to facilitate and to encourage the development of associations for RRI between different organizations, lobbing of different networks, personal motivations of pilot participants, the generic interest of society and different

collectivities on RRI. This can help the exchange of information, resources and tools about RRI as well as the establishment of a community of practice (internally and externally) around the concept.

When dealing with communication formats about RRI, it is also highly recommended to use a multitude of ways to disseminate the possibilities, messages and results of RRI projects, as this is a critical factor for facilitating communication at organisations but also for avoiding possible resistances about the concept. It is also stressed in the majority of projects analysed that messages for **companies and research organizations should be clearly differentiated** and customized to the different publics (Dreyer et al., 2017; Nazarko and Melnikas, 2019). **We also argue that when speaking with research managers and researchers that differences should be also emphasized** (Carrier and Gartzlaff, 2020; Grimpe et al., 2020)

7.3 Windows of opportunity for RRI institutionalization

Last, we also speak about two windows of opportunity that have been identified during this exercise and can be used during the next years for advancing in the implementation of RRI in different organizational contexts. **Here we stress the reorientation of RIS3 strategies that will be taking place during the next years due to the recent agreement of the EU and its priorities in the Multiannual Financial Framework (MFF), and RRI as an element of institutional learning.**
The first one stems directly from the large discussions that have been held at the core of the EC and among the Member States. These negotiations were concluded on 21st of July and after four days of negotiations, where EU leaders agreed on a record-high of €1.82 trillion long-term budget including a temporary recovery instrument, Next Generation EU, based on the Commission proposal of 27 May 2020. This agreement also enabled that the EC to borrow funds on the markets and use them to finance the recovery of Member States after the pandemic for the first time in history (European Council, 2020). What it is really important about this agreement is that pivots around three headings:

1- Single market, innovation and digital
2- Cohesion, resilience and values
3- Natural resources and environment

The three seem to be of high relevance through the lenses of RRI as well as that they are highly intertwined between each other as they include concepts and values that are prominent in the discourse of RRI such as governance, sustainability, responsiveness risk or anticipation (Burget et al., 2017; Guston, 2014; Owen et al., 2012; Owen and Pansera, 2019; Stilgoe et al., 2013). However, the main reason for staring at these three priorities through the lenses of RRI is that they will be exerting a great influence during the next decade in the current RIS3 strategies that have been delivered by EU regions (McCann and Ortega-Argilés, 2015; Uyarra et al., 2019). As we have explained before, RIS3 strategies are a pre-requisite for receiving funds for regional development and this new recovery plan aligned with these top 3 priorities will create vibrant conditions for updating current RIS3 strategies to these headings. In this sense, the **RRI paradigm has a unique opportunity to effectively be**

implemented in many STI regional policies during the 2021-27 period and throughout the three headings.

In addition, RRI can also offer new prospects and opportunities for many R&D institutions during the next decade. As many transformations can be envisaged during this period due to the new requisites, conditions and requirements that will stem from this major policy framework that has emerged due to the COVID-19 crisis as well as the growing relevance of other societal challenges such as climate change, institutional learning will be of great importance. Soft skills such as communication, creativity, critical thinking, sustainability or responsibility will gain traction, but also in institutional contexts as growing demand for collaboration between stakeholders will be pushed in these contexts. **That is why RRI can be positioned as a tool that can facilitate institutional learning into the organization and their different levels but also in their limits and their relations for improving their collective and individual capabilities.**

8. CONCLUDING REMARKS

During this deliverable, we have tried to capture, analyse and synthesize significant experiences of EU funded projects that have dealt with RRI and organizational change, as well as capturing other learnings and knowledge coming from the academic literature and well-known international experts in the domain. We have presented some of the findings that have been gathered during this exercise and during the very first steps of the Co-Change project.

As it has been emphasized, several remaining challenges need to be addressed for facilitating the mainstreaming of the RRI concept into the organizational landscape of RPOs and RFOs. In this document, we have provided several clues and insights that can facilitate this transition to a more open, participatory and societally sensitive research and innovation.

However, **we acknowledged that these transformations could not happen in the short run if adequate resources and indicators are put in place to facilitate this transition.** In this sense, the COVID-19 crisis has been revealed as a magnificent driver for promoting openness, collaboration, transparency, innovative governance and public engagement among others into the traditional way that research and innovation is done. We hope that this crisis can also trigger the resources, knowledge, political will and cooperation spirit that is necessary for facilitating the institutionalization of RRI in RPOs and RFOs in the next years.

What is at stake is not only the transformation of the R&D system towards a more societal challenge approach but also an **opportunity to promote a more intense and close dialogue in science-society interactions tradition**.

In this sense, some of the points that can be highlighted for the practical implementation of RRI that might be helpful for the project are:

1) Firstly, RRI requires a deep understanding and contextualization of the organizations themselves for a successful implementation. The implementation should be based on institutional assessment and consideration of psychological and contextual knowledge of organizations.
Psychological knowledge (or information) includes motivation, expectations and competence among stakeholders and individuals in a multisector ecosystem. Besides the psychological knowledge, the successful implementation needs a context-dependent knowledge (or information) of organizations. The contextual knowledge includes issues, such as understanding institutional context regarding background, structures, organizational goals, values, policies, and strategies in order to adapt RRI at the right level of each institution.

2) Secondly, RRI implementation should be linked to ongoing practices, business needs, and relevant socio-political conversations within organizations. The clear vision and objectives of RRI might help by emphasizing the importance of learning-by-doing in implementation. The value of ethics comes by putting it to practice on a concrete organizational level.

3) Thirdly, RRI must recognize the leadership on a practical level regarding the question of power and interest between the actors on the coalition. To build a stable and lasting coalition, the organizations must pay attention to the balance of power relations.

4) Fourthly, The RRI-related change needs to find an integrating narrative that makes people move. Thus, the benefits of RRI must be visualized outside the research community of RRI. From a practical point of view, this can be achieved by making its impacts visible through indicators.

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Annex 1: Projects table

1. JERRI

Acronym:	JERRI
Full name	Joining Efforts for Responsible Research and Innovation
Grant agreement ID	709747
Lifespan	01/06/2016-31/05/2019 (finished)
Website	https://www.jerri-project.eu/jerri/index.php
Coordinator	Fraunhofer ISI

What is the objective of the project in a nutshell?
Joining Efforts for RRI (JERRI) aims to contribute to deeply institutionalizing practices and attitudes of Responsible Research and Innovation (RRI) in the European Research Area (ERA). For this purpose, JERRI orchestrated a deep RRI transition process within the two largest European Research and Technology Organizations (RTOs), the German Fraunhofer-Gesellschaft and the Netherlands Organization for Applied Scientific Research TNO. The process is conceptualized as an intense mutual learning process between the two organizations, a wider circle of RTOs, and stakeholders across Europe. Thus, JERRI will exploit the unique mediating function of RTOs to catalyse RRI transition processes in industry, society and policy across the European research and innovation landscape (abstract).

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?
JERRI has a dedicated deliverable (D10.3) to provide recommendations for RRI goal development in other research organizations. The list of ten recommendations comprises: 1. Adapting the process to the degree of institutionalization 2. Tailoring the involvement of external stakeholders 3. Involving change agents 4. Balancing consensus and dissent 5. Formulating of long-term organizational goals / Smart goals 6. Detecting and using windows of opportunity 7. Accounting for the organizational fit of the topic 8. Balancing holistic versus specific perspectives 9. Balancing freedom versus impact 10. Managing expectations	

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?

The context of the project has been narrowed to two RTOs: TNO and Fraunhofer. Both of these research organizations have gone through a dedicated process for setting goals within and across the RRI five keys in interaction with internal and external stakeholders. Both RTO´s have defined their own plans according to their particularities and needs and have explored what are their main barriers and drivers for RRI (D4.1, D5.1).	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
The JERRI project has relied in a process that has been conceptualized as an intense mutual learning process between two organizations (TNO and FhG), a wider circle of RTOs and other stakeholders across Europe. In this sense, JERRI exploited the unique mediating function of RTOs to catalyse RRI transition processes in industry, society and policy across the European research and innovation landscape (D1.2, D10.2).	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
JERRI project defined concrete pilot activities in both RTOs for initiating the change process towards the goals previously settled. After the pilots were carried out, consortium jointly reflected on the lessons learned and developed a tentative list of issue to be taken into account when engaging in similar processes as a basis for discussion with other RTOs (JERRI cards).	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
JERRI conducted a detailed analysis of barriers and drivers in both organizations that were involved in the pilots, TNO and FhG (D4.1 and D5.1), for each of the five RRI keys. Among the barriers we can find the lack of incentives for RRI, the lack of responsible moral codes, silo mentalities, contradictory policies (excellence vs relevant activities), as well as the lack of adequate resources for RRI. The main drivers identified in these two deliverables are around flexibility, autonomy, openness and other values that are promoted in these two RTOs. Barriers and drivers are usually framed as challenges and opportunities at different levels (individual, intraorganizational and interorganizational levels). In the development of its theoretical model is also raised the importance of maintaining a balance between institutionalization and deinstitutionalization as explanatory forces on how change can be perceived and followed up in research organizations (D10.3).	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**

JERRI has focused in five RRI keys: ethics, public engagement, gender equality, science education and open access. It is not clear why “governance” has been out of the RRI embedding processes conducted in both RTOs, but it seems that some power relations where at stake with the pilots delivered at the project. JERRI has promoted the institutionalization of RRI throughout its pilots, but this process will last much more that the lifespan of the project itself (JERRI cards, D10.3).

2. I AM RRI

Acronym:	**I AM RRI**
Full name	Webs of Innovation Value Chains of Additive Manufacturing under Consideration of RRI
Grant agreement ID	788361
Lifespan	01/05/2018-30/04/2021 (on-going)
Website	https://www.iamrri.eu/
Coordinator	Montanuniversitaet Leoben
What is the objective of the project in a nutshell?	
IA M RRI investigates webs of innovation value chains in additive manufacturing and identifies openings for RRI. The aim is to develop a complex agent-based model of additive manufacturing innovation value chains and their associated processes, that can be directed towards RRI at all levels.	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
No project recommendations have been offered yet by I AM RRI as these tasks have not been carried out at the moment of this analysis. However, some effects of RRI have been identified in economic, social and strategic impacts, as well as some openings in the three steps of the innovation value chains of additive manufacturing: idea generation, idea development and innovation diffusion (D2.4 and D4.1).	
Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**
I AM RRI aims to explore the particularities of AM innovation value chains and their intersections with other innovation value chains. Additive manufacturing is not a sole technology but a particular group of technologies that is being diffused and favoured by the growing digitization of the industry (D2.1).	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**

The challenge of I AM RRI is to investigate the AM innovation network in order to model the dynamics of its complex web of innovation value chains and to identify and implement openings for RRI in two domains (automotive and medical) throughout several case studies (real-time cases and retrospective cases).	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
IAMRRI comprise three main building blocks (abstract and D4.1): An agent-based model that describes the dynamics of interactions in additive manufacturing networks of innovation value chains, including openings for RRI. Combination of AM use-cases for identifying RRI openings. Development of future AM scenarios with the participation of relevant stakeholders throughout participatory Workshops.	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
The complexity and number of actors that form the innovation value chains around AM technologies seem to be a considerable barrier for disseminating and embedding RRI. At the same time, this fragmentation of actors also demands significant concertation effort of actors to favour innovation development and diffusion. In this sense, RRI can be a suitable and flexible vehicle that can be operationalized by these actors in their innovation processes (D6.1, D2.4).	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
I AM RRI seems to anchor to the normative vision of the EC in terms of RRI. I AM RRI have identified some openings for the RRI keys in the three steps of the innovation value chain, but at the same time has not provided empirical data that can advance the work towards the identification of these openings (D2.3, D2.4)). The identification of the openings for RRI and their take up in the numerical model as well as in the value systems of the participating organizations is a major challenge in the development of the work process of all WPs. After analysing the available literature and obtaining insights from the consortium partners, two key definitions of possible RRI openings have emerged: Openings as a failure to address sufficiently any of the six key areas. In a strict sense, RRI is a defined “contract” between science and society on different intersection areas: Open access, Gender, Governance, Ethics, Science Education, Public Engagement. Openings in a prospective responsibility towards society, where stakeholders have the opportunity to undertake an honest effort to achieve the “right” social impact. In a broad sense, RRI promotes responsibility towards society and its beliefs, structures, norms, and values.	

3. LIV.IN

Acronym:	LIV.IN
Full name	Implementing RRI through co-creation of smart futures with industry and citizens
Grant agreement ID	787991
Lifespan	01/05/2018-30/04/2021 (on-going)
Website	https://www.living-innovation.net
Coordinator	Institute for Managing Sustainability at Vienna University of Economics and Business

What is the objective of the project in a nutshell?

LIV:IN aims to co-create more responsible approaches to innovation with major industry leaders from the ICT sector (abstract).

In the LIV:IN project, major industry leaders from the ICT sector join forces to co-create more responsible approaches to innovation for the first time. LIV:IN builds on the premise that recognition of the value of RRI among industry is necessary for achieving the aim of the call "to progress further in integrating RRI in industrial contexts". The project follows an opportunity-oriented approach in order to:

1. Activate industry leaders, experts and citizens to experiment with responsible ways of co-creating innovations;
2. Build capacity for RRI implementation and develop tools that are applicable across industry sectors; and
3. Transform attitudes towards RRI from risk to opportunity.

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?

The project has not provided yet recommendations as it is still running on, and it will be ending around the spring of 2021. However, it has conducted a stocktaking phase dealing with RRI and CSR and which critical factors need to be considered when dealing with multi-stakeholder initiatives (D1.1). These factors are:

- **Good communication** & Listening to members (emphasis on the importance of communicating in an open and transparent way and of sharing information with their members in a coherent and clear manner)
- **Commitment and support of top management** (new staff to promote initiatives)
- **Balance of power** and adequate resources (appropriate governance mechanisms)
- **Trust** (It had to be built between the partners and It´s not a by-product but the essence itself of the initiative)
- **Clear vision and objectives** (not sure how to achieve that vision but a purpose for the initiative to exist)

- **Selecting the right partners** (understanding reasons and needs to join the initiative)
- **Evolve, adapt and stay up to date** (listen to priorities of members)
- **Image and reputation** (branding and positive image)

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?

LIV:IN is demonstrating the added value of RRI in the area of smart future living. It has carefully selected this application area because it directly impacts the lives of citizens (societal relevance) but also constitutes a major emerging market (business opportunity).

It also has relied in a community platform not only for communicating research findings, but also allowing the audience to engage, ask questions, interact, develop joint activities, and take these discussions back to their own environments and localities (D1.2).

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

LIV:IN aims to co-create more responsible approaches to innovation with major industry leaders from the ICT sector.

The LIV_IN project strives to become a flagship initiative for Responsible Innovation in industry. For this purpose, the project allows companies to experience the benefits of lead user innovation and citizen co-creation and demonstrates the feasibility and benefits of RRI in fields that are key to industry leadership on a global scale. In period one, LIV_IN has produced the virtual and physical spaces where this can happen in an atmosphere of trust and exploration. In addition, LIV_IN has delivered a first set of exploitable results that will be the basis of communication, dissemination and exploitation activities starting in period two. In addition, LIV_IN has taken steps to expand the knowledge base on effective tools for negotiating the social value and acceptability of emerging innovations, which will accelerate uptake and support mainstreaming of RRI in industry (cordis results).

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

LIV:IN project includes four key features that will significantly enhance the quality of the proposed coordination and support activities:

1. Six LIV:IN Labs and a virtual community of practice will constitute the central spaces for experimentation with integrating RRI in industry, and, consequently, the development of new approaches to innovation.
2. The application and continuous improvement of RRI tools in these spaces will contribute to capacity-building among industry and citizens alike.
3. Embedded audio-visual storytelling will be the main vehicle for disseminating results and for shifting attitudes towards RRI from risk to opportunity.

4. Continuous dialogue with earlier and present initiatives in the areas of RRI, CSR and open innovation will ensure the transferability of project results across industry sectors.

Ultimately, LIV:IN is guided by its vision to become a flagship initiative for effective integration of RRI in industry (Cordis abstract).

The core of the project is around the implementation of the virtual community of practice as several deliverables are guiding this development from a technical and methodological point of view (D1.2, D2.1). In this sense, several guidelines are provided dealing with the 4 RRI dimensions and the critical factors exposed in multi-stakeholder initiatives (D1.1.)

Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
LIV:IN project has not yet produce an analysis of barriers or drivers into the implementation of the project or their living labs at the moment of this analysis. It has produced an analysis of critical factors related with multi-stakeholder initiatives (recommendations section).	

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
LIV:IN project pays special attention to RRI and CSR as well as their different meanings and overlapping's with other established concepts such as sustainability (D1.1). Co-creation also plays an important role when RRI needs to be operationalized at the living labs (D4.1)	

4. RESPONSIBLE INDUSTRY

Acronym:	**RESPONSIBLE INDUSTRY**
Full name	Responsible Research and Innovation in Business and Industry in the Domain of ICT for, Health, Demographic Change and Wellbeing
Grant agreement ID	609817
Lifespan	01/02/2014-31/07/2017 (finished)
Website	http://www.responsible-industry.eu/
Coordinator	De Montfort University

What is the objective of the project in a nutshell?	
Responsible-Industry designed an **Exemplar Implementation Plan of RRI in Industry** to demonstrate how industry can work productively together with societal actors and integrate principles and methodologies of RRI into research and innovation processes. The implementation plan has focused on the grand challenge of health, demographic change and wellbeing. More specifically the project has focused on the role that research and innovation in ICT can play in addressing this challenge. Responsible-Industry has guided interactive discussions between leading industry partners, established RRI experts, policy advisors and CSOs to drive the research and innovation process with the principles of RRI in mind (abstract).	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
Responsible-Industry has a dedicated paper to policy recommendations that steam directly from the findings of the project. These recommendations are structured around three clear messages (recommendations): 1. **Raise awareness.** Policymakers should continue to raise awareness of RRI in industry as an umbrella concept and with special attention to its fewer known principles. This should be consistent through all the EC´s points of dialogue with industry, giving due attention to the differing levels of knowledge of RRI among large corporates and SMEs. 2. **Engage industry**. Policymakers and public funders should champion RRI on the basis of its commercial value as well as its social value - and engage continuously with executives in different roles to change their thinking and work towards adoption into culture and strategy. 3. **Optimize regulation and promote voluntary codes.** Policymakers should work with both specific regulatory change and the promotion of voluntary codes of conduct to advance RRI.	
Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**
Responsible-Industry has been operationalizing an RRI implementation plan focused in the grand challenge of health, demographic change and wellbeing and the role that ICT can play in addressing this challenge (RRI benefits). In this sense, the project has identified several high ethical concerns that ICT technologies focused on aging possess (thanks to a Delphi study): Transmission of data to a third party ((e.g. transmission of personal data from the user's smartphone to e-service portals) /Technologies for data management, such as Data Storage and Data analysis (e.g. cloud computing)/ Real time monitoring of the user lifestyle through "sensing systems" (e.g. environmental sensors for surveillance applications at home)/ Brain-computer interfaces "Reasoning systems" for medical data analysis (e.g. detection of trend anomalies in vital signs to alert caregivers or family members)/ "Reasoning systems" for privacy-sensitive data analysis (e.g. noise analysis for activity recognition)/ "Action	

enabling technologies" (e.g. automatic control through actuators, artificial muscles)/ Machine to machine "communication systems" (e.g. transmission of medical data from the user smartphone to care management portals)/ Human-Machine interaction (e.g. robotics)/ Social Networking Techniques (e.g. location based social networks)/ Health monitoring through "sensing systems" (e.g. wearable or implantable sensors for daily monitoring of physiological parameters).

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

The project has created and pushed forward a framework that recognizes the positive impacts that RRI offers to companies. It has also promoted RRI as an answer to the demand arising from society that safety, desirability, acceptability and quality should be the basis of the design and realization of research and innovation products.

The narrative of change has pivoted around the idea that RRI can generate numerous benefits for companies, as well as enhancing company´s medium-term competitiveness/profitability. Among the benefits are (RRI benefits):

- Strengthening links with customers and end users
- Enhancing the company's reputation
- Decreasing business risks and unintended consequences
- Strengthening public trust in the safety of products
- Increasing acceptability of products
- Adopting an environmentally friendly profile

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

The project has deployed several building blocks during its workplan. These have been (cordis results)

- Synthesis of current discourses on RRI in the industrial context, based on an extensive literature review, 30 in-depth interviews with industry thought leaders, 5 bottom-up case studies and 2 Horizon Scanning reports.
- Investigation, through practical cases and in-depth dialogue with stakeholders (industry, CSOs, policy makers and emerging global stakeholders), of processes, challenges and opportunities leading to responsible innovation along specific value chains of products and applications.
- International Delphi Study of RRI in industry involving 130-150 stakeholders and an international Multi-Stakeholder workshop.
- Development of a detailed implementation plan to be tested in at least 4 pilot projects.
- Reflection on the viability of the implementation plan, supported by least 15 industry-driven focus groups.
- Development of models of RRI in industry as a basis of specific recommendations to be disseminated to the various stakeholders through an Exemplar Implementation Plan of RRI in Industry.

Barriers and drivers for change	What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?

Several barriers have been identified during the project implementation. These are:

- Perceived need for additional resources arising from RRI compliance activities and corresponding impact on profit to shareholders and delayed time-to-market of new products and services.
- Complexity of securing adoption of RRI into company strategy and business processes: lack of clarity within companies about who should take the lead so there is a need for senior management "buy-in".
- Insufficient education and training among industry executives, scientists, engineers and designers in ethics of research and innovation.

- At the same time, **several drivers** have been identified to foster the embracement of RRI in health industry:

- If all products are similar, then evidence of attention to societal or environmental concerns would provide a competitive edge amongst consumers or public sector buyers.
- The need to work with companies' marketing, CSR and R&D divisions as well as senior management to get RRI onto the agenda internally - so that the whole company takes ownership.
- Proponents of RRI need to talk about it from the social value or human benefit standpoint: some companies and executives are more receptive to this reasoning than others. The implementation of the plan in ICT companies has only been able to promote awareness about the concept. However, the project also seemed to help trigger the reflection between companies' managers about how RRI can strength their value proposal.

RRI meanings	Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?

Responsible-Industry promoted the six RRI keys of the normative vision of the EC and it focused on promoting societally desirable innovations. At the same time, the project has also provided some valuable lessons about the awareness of RRI between different groups:

- Awareness of RRI principles is higher among tech companies working in the health and ageing sector because they make products and services that are of direct relevance to patients and older persons
- There is a strong overlap of RRI with other concepts such as sustainable development and corporate citizenship, which can lead to duplication of regulatory guidance and voluntary codes
- Most executives are more familiar with the principles of RRI than the umbrella concept itself. SME executives are generally less aware than their peers in large corporates

- Industry executives are most sensitized to user involvement and ethics (especially around personal data): they pay less attention to open access, gender inclusivity, and science education or foresight

However, it seems clear that the adoption of RRI related practices will need the support of publicly funded initiatives.

5. REELER

Acronym:	**REELER**
Full name	Responsible Ethical Learning with Robotics
Grant agreement ID	731726
Lifespan	01/01/2017-31/12/2019 (finished)
Website	https://reeler.eu/
Coordinator	Aarhus University
What is the objective of the project in a nutshell?	
REELER aims to align roboticists' visions of a future with robots with empirically based knowledge of human needs and societal concerns. REELER is a highly interdisciplinary H2020-project involving 4 European partners from the fields of anthropology, learning, robotics, philosophy, and economy. The project has a multidisciplinary profile, that assure collaboration, comprehension and acceptance of SSH research-based knowledge about distributed responsibility, ethical and societal issues relating to robotics. The aim is to produce powerful instruments to foster networking between traditional robotics disciplines and new research fields, like Science and Technology Studies (STS) in order to exploit potentialities of future robotics projects (abstract).	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
REELER confirms that society needs political action that gives voice to the realities and concerns of affected stakeholders. Since there are limits to the degree of awareness, that it can be expected from robot makers and since affected stakeholders cannot force their voice into the inner circle, the project suggests a two-pronged strategy. These two recommendations are recapped in a policy recommendations paper as well as in another policy brief: 1. Develop and disseminate tools that enhance robot developers' (engineers, mostly) awareness of what is to be gained from collaborating with and taking end-users	

and affected stakeholders' perspectives into account early in the development phase.
2. Develop alignment experts as a new profession, where people are educated in methods of aligning the views and visions of robot makers and affected stakeholders. Alignment experts can also give voice to distantly affected stakeholders, when relevant.

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?

REELER project has been operating into the robotics industry, which is a very closed environment. Development of robots occurs in a small circle of robot developers (mainly engineers), facilitators (advisors, lawyers, grant donors), and application experts or employees of robotics companies - in brief robot makers. Robot makers know and understand each other's motives for developing realistic robots, but they lack a realistic understanding of the people who have to use robots or are influenced by them. Robot developments often begin with identifying technical problems to be solved with new technical solutions, rather than identifying problems experienced by people in everyday life. The actual end-users may be asked to test the robot in its final stages, but otherwise knowledge of peoples' everyday lives is presented by spokespersons, as when a hospital manager speaks for the cleaning staff expected to operate the cleaning robot. Although ethics is part of engineering education curricula, REELER research shows it does not sufficiently raise robot developers' awareness of how their robots may affect people in real life. Robot developers remain good at developing technical solutions, but not at identifying people's needs and concerns (extracted from the policy brief).

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

REELER project has lied in an ethnographical approach that has been coined as the "Human Proximity Model", which depicts collaborative relations and distances between those who make robots and those who use or are affected by robots. The model is also prescriptive as it presents REELER's suggestion of introducing "Alignment Experts" in this collaboration.

REELER recommends introducing alignment experts as a new profession in robot and AI development as a measure that can help avoid disappointments, create better foundations for legislations, open the eyes of robot developers for directly affected stakeholders and adjust their imaginaries of affected stakeholders and end-users in general. REELER sees alignment experts as one of the new professions foreseen by economists to arise in an increasingly roboticide society. This new profession would be placed at the crossroad between RRI and SSH. Their competences should emphasize skills in ethnography, economics, and technology, and would have, as a core expertise, the ability to align different groups of people in order to create ethical and responsible robots and AI. They would be trained to identify robot makers and affected stakeholders' diverging motives and find solutions before it is too late in the development process.

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

REELER project established a roadmap for responsible and ethical learning in robotics focused in 4 main points:

- Ethical guidelines for Human Proximity Levels.
- Prescriptions for how to include the voice of new types of users and affected stakeholders through Mini-Publics.
- Assumptions in robotics through socio-drama.
- Agent-based simulations of the REELER research for policymaking.

It also has delivered five awareness-raising tools (accessible on: www.responsiblerobotics.eu) to help robot makers expand collaborations beyond their robotic inner circle. These tools must raise awareness of own normativity in design work and how insufficient collaboration with actual users in the development phase can lead to robots that, when ready for market, turn out not to fit the body size of the end-users, e.g. patients, or are uncomfortable for staff (e.g. nurses) to work with. These five tools are:

- REELER Toolbox gives a chance to explore specific issues of problems in robot development from a stakeholder-informed perspective.
- BuildBot is a board game that allows players to reflect on responsible robotics by selecting design features that fulfil needs expressed by different stakeholders (affected stakeholders, policy makers, robot buyers).
- Mini-Publics provide a forum for knowledge transfer and debate among experts and the general public. Participants are invited to learn about and discuss particular issues pertaining to a given topic.
- Action Methods contain both established and new explorations into drama as an awareness-raising tool.
- Human Proximity Model. An analytical tool for understanding roles and relations in robot development.

Barriers and drivers for change	What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?

REELER project has mapped out 5 main problems in the robotics industry. These are:

- A closed robotic environment. Development of robots occurs in a small circle of robot developers (mainly engineers), facilitators (advisors, lawyers, grant donors), and application experts or employees.
- A normative design processes. Because robots are developed in the inner circle and from primarily technologically driven definitions of problems, robot designs are based on what is already familiar and normal to robot makers.
- Overlooking consequences. Robots rarely capture the diversity and complexity of affected stakeholders' actual lives, because thorough studies of the situated context are not made.

- Overlooking stakeholders. REELER has identified a wider group of people than the imagined end-users, and we argue it is relevant to consider this overarching group of affected stakeholders when funding and designing robots.
- Believing imaginaries. Marketing of commercial robots and popular news media influence how people perceive robots.

To overcome these problems, REELER recommends awareness-raising tools to help robot makers expand collaborations beyond the robotic inner circle. These tools can be used by robot developers, facilitators, and application experts and must raise awareness of own normativity in design work and how insufficient collaboration with actual users in the development phase can lead to robots that, when ready for market, turn out not to fit the body size of the end-users (e.g. patients), or are uncomfortable for staff (e.g. nurses) to work with.

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
REELER project has focused in three keys of the normative vision of RRI; ethics, public engagement and, gender equality. At the same time, it also has promoted the adoption of the 4 RRI dimensions: Anticipation, Reflexivity, Inclusion and Responsiveness.	

6. NewHoRRIzon

Acronym:	**NewHoRRIzon**
Full name	Excellence in science and innovation for Europe by adopting the concept of Responsible Research and Innovation
Grant agreement ID	741402
Lifespan	01/05/2017-31/04/2021 (on-going)
Website	https://newhorrizon.eu/
Coordinator	Institute for Advanced Studies Vienna.
What is the objective of the project in a nutshell?	
NH aims at further integrating the goals of RRI in the R&I systems on national and international levels. To achieve this goal, NH applies the concept of Social Labs and builds a transnational RRI network for stimulating co-creation with multiple stakeholders and learning across H2020 sections. The main objectives are: 1. To foster the integration of RRI into European, national and local Research and Innovation practice and funding 2. To organize 19 Social Labs and co-create pilot actions and activities and develop narratives and storylines based on the experience from these pilots	

3. To develop and disseminate a concept of Societal Readiness of Technology (= Societal Readiness Levels) 4. To raise awareness on Responsible Research and Innovation and mainstream RRI best practices and NewHoRRIzon results 5. To provide results on how to better integrate RRI into the next European Framework Programme 6. To create a RRI Network including the national funding agencies and develop a RRI community starting with a RRI Ambassadors programme	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
NewHoRRIzon has provided a clear diagnosis (D1.3, D3.1, D4.1 and 5.1) on the low up taking of RRI in H2020 due to overly conservative evaluation of impact section at proposals, a limited inclusion of publics and stakeholders and a general little progress of the EC to advance commitments to RRI. At the same time, the project has also contributed to promote the acceptance of RRI to a significant number of stakeholders across H2020. At the moment, NewHoRRIzon has delivered two policy briefs that gather some recommendations based on the findings of the project. These are: 1. To include in the orientations document on Horizon Europe, provided by the EC: a) a specific call for stronger integration of European citizens into the production of knowledge, technology, and impact by means of adequate participatory or representative approaches, where appropriate, in order to make such integration part of the evaluation criteria for proposals, and b) guidelines for the integration of all R&I stakeholder groups (researchers, citizens, policy makers, business, third sector organizations, etc.) into the R&I process, in order to better align desired outcomes with the values, needs and expectations of European peoples 2. To include in the grant requirements for research proposal submission under Horizon Europe a section in Part B that stipulates, in addition to 'Ethics', the inclusion of a PDF supplement, generated with the NewHoRRIzon online Societal-Readiness (SR) Thinking Tool, addressing project-specific RRI-related questions and reflections. 3. To include in the grant requirements for research proposal submission under Horizon Europe the request to incorporate RRI specific actions in the submissions' tasks, deliverables, milestones, and budgets. 4. To include in research proposal evaluation process under Horizon Europe a specific set of RRI-related criteria relevant for the R&I domain, as well as include RRI expertise in evaluation panels in order to ensure that RRI specific actions are adequately considered in submissions and projects to be awarded. 5. As part of the European Commission's Research Executive Agency, establishment of a policy advocacy and expertise centre dedicated to mainstreaming RRI in order to ensure RRI policy integration and delivery in the research supervision process.	

These recommendations are steaming from the observation that the main obstacle for the RRI integration lies in the policy integration strategy itself. RRI framework seems to be not clear to those who are the intended users; and this lack of conceptual clarity hinders the effective operationalization of RRI in research practice. In sum, researchers are not challenged to incorporate RRI during the design and drafting of their research proposals and they do not employ RRI specific actions and activities to systematically integrate societal needs, expectations, and values into their research when seeking funding.	
Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**
The project has been framed into the 19 subsections of H2020, exploring how RRI is operationalized into these specific subsections of the FP8. From the very beginning NewHoRRIzon has implemented a diagnosis on how RRI is operationalized in the different subsections and a strategy to promote RRI acceptance throughout the development of pilot actions throughout the Social Lab approach. It is necessary to stress that participants of SLs have been co-creating their own ideas of change with other participants at the labs, with other peers and with other representatives of other organizations. In this sense, pilot actions have had very different impacts in organizations, networks, etc. The process of change has been focused in iterative process conducted mainly throughout the 3 workshops that have happened into the SL.	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
The narrative of NewHoRRIzon has been mainly focused in the importance of science, research, and innovation for promoting for smart, sustainable, and inclusive growth in the EU. At the same time, it has stressed how the EC supports research and innovation that upholds EU values of inclusiveness and democratic politics and how RRI has become one of the pillars for thriving this throughout H2020. To accompany the process, NewHoRRIzon has also pivoted around the SL methodology for delivering pilot actions that can provide a greater impact about change in the 19 subsections of H2020.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
NewHoRRIzon has pivoted around different building blocks. The main one has been the Social Lab methodology and its associated Pilot Actions, but other blocks, such as the SRL Thinking Tool and the narratives of change have helped in a significant manner towards its implementation.	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**

The main barriers that have been faced by the project are the ones that have been found in the diagnosis, such as lack of clear incentives for researchers, lack of interest, lack of RRI requirements, opposing cultures of “good science” and others. Drivers for change have been mainly associated to the development of associations for RRI between different organizations, lobbing of different networks, personal motivations of pilot participants, generic interest of society and different collectivises on RRI and others.

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
NewHoRRIzon has been focused in 5 keys of the RRI EC vision: ethics, public engagement, gender equality, science education and open access. Governance has been left behind at the same time that the EC has detached from its original proposition. The project has also addressed the 4 dimensions of RRI, and it included inclusiveness, anticipation, openness, and responsiveness mainly throughout the SRL Thinking Tool.	

7. RRI PRACTICE

Acronym:	**RRI PRACTICE**
Full name	RRI PRACTICE
Grant agreement ID	709637
Lifespan	01/09/2016-31/08/2019 (finished)
Website	https://www.rri-practice.eu/
Coordinator	Oslo Metropolitan University
What is the objective of the project in a nutshell?	
RRI PRACTICE project aims 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. The project provided a comprehensive overview of the status and implementation of RRI in 7 European and 5 non-European countries and across 23 research funding and performing organisations. Along with findings from detailed organisational case studies, the project also delivers a comparison of the RRI keys and dimensions (cordis).	

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?

The project has provided reports form the background for in-depth comparative analyses of different aspects of the RRI constructs and – combined with organisational theory – detailed analysis of effective implementation of RRI in research conducting and funding organisations.

There is a dedicated **report about the lessons learned on successfully implementing RRI in research organizations (D 17.6 handbook for organizations),** some of the highlighted aspects are: organizational change relies on available infrastructure and the matching of policies, structures, and incentives.; central coordination unit with direct reference to the top management/ Crafting policies, regulations, strategies, and organizational goals that are aligned with RRI/ importance of incentives and create guidelines and organizational routines to promote RRI/Work with the environment / RRI champions to be effective, they must either be in top-level positions with a capacity to drive initiatives in their respective organizations.

RRI Practice produced a **set of policy recommendations aimed to support the European Commission (EC) and national policymakers to strengthen RRI** (D 16.2):

9. Change the **incentive regime** to promote an organisational culture for RRI. Organisations should incentivise behaviours configured around RRI principles and then **monitor and reward staff** for these behaviours, making it attractive to engage in RRI related activities. Indicators linked to research evaluation and career progression instruments in the research system (e.g. related to publications and winning external funding) currently function as significant barriers to RRI and need to be re-assessed. Policy instruments are needed.
10. Broaden the concept **of excellence and impact.** RRI should be embedded and integrated into **quality definition and evaluations** at national and EU levels.
11. **Build capacity and a culture** for RRI through training and resourcing. Most research performing organisations would welcome **training** material and support for RRI related training.
12. Support RRI as a **creative and adaptive learning** process. RTOs (Research and Technology Organisations) are not the same as Universities in terms of their remit, ratio of private to public funding and configuration. RRI implementation needs to be sensitive to these contexts and needs to draw on a manifold of actors in the organisational environments in order to build RRI coalition. The ability to experiment, make contributions however small, take risks, learn from failure and be creative in novel and innovative ways is key.

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?
According to the project, RRI has several framings and RRI related initiatives are widespread in Europe and beyond. However, initiatives are still fragmented, and awareness of the concept is generally low. Work needs to be done before RRI is recognised as a concept that offers traction in non-European contexts and research initiatives. There is a lack of standardised methodologies that would be required to produce comparative results, and partly because these initiatives are themselves quite new. The project wanted to advance in the European and global awareness of RRI, support its implementation in practice and provide a solid empirical knowledge base on RRI implementation (cordis).	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
In this project, organisations involved are analysed from an institutionalist perspective in which organisational structures, cultures and environments interact in diverse ways that impact on the way in which RRI can be implemented. The identified institutional and organisational RRI-related practices demonstrate the richness and flexibility of the ways the RRI keys can be implemented in practice depending on the national and organisational context.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
The project has deployed several building blocks during its workplan. These have been: (cordis results) - National mapping (including documents and interviews) in order to understand the national policies and institutions in which organisations are embedded. National policy briefs (D17.4) - Review of how institutions worked with RRI related aspects, and developed actions plans (Outlooks) in a co-creative process, concluding in national case study deliverables and comparative analysis focusing on general lessons on barriers and drivers, and on the influence of national and organisational structures and cultures on the implementation of RRI practices.(D15.1 implementing RRI). Identification of good practices and the development of strategies for broader implementation of RRI (D 17.6 RRI Handbook for Organisations).	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
D16.4 frames the general process recommendations for a reflective RRI review in multi-partner, international projects. In this deliverable project learned towards identifying tensions, such as: - different interpretations of the core research concept.	

- combining societal impact with the need for rigor in research. - negotiating the demand for inclusion of societal stakeholders in research. - balancing the need for flexibility with the requirement of clear and consistent research protocols. integrating particular formulations of policy areas, including the five EC policy keys, in research projects.

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The project uses the 'reflective RRI review' method, comparative analysis of the five EC keys of RRI locating these within broader, evolving discourses on RRI. The project acknowledges that the RRI concept in itself can be interpreted differently. Some understand RRI primarily as the EC RRI policy keys (ethics, science education, public engagement, gender equality, open access), while others highlight also the 'AIRR dimensions' (anticipation, inclusion, reflexivity and responsiveness).combination of the EC conception of RRI as the policy keys or thematic and the academic conception of RRI as the AIRR framework (Stilgoe, Owen and Macnaghten 2013). A more encompassing description of the keys and the process dimensions can be found in the organisational analyses presented in the RRI Practice project Deliverable 15.2.	

8. EQUAL-IST

Acronym:	**EQUAL-IST**
Full name	Gender Equality Plans for Information Sciences and Technology Research Institutions.
Grant agreement ID	710549
Lifespan	01/06/2016-31/05/2019 (finished)
Website	https://equal-ist.eu/
Coordinator	Versatile Innovations
What is the objective of the project in a nutshell?	
EQUAL-IST aims at introducing structural changes to enhance gender equality within Information Systems and Technology Research institutions, which have been demonstrated to be among the research sectors most affected by gender inequalities at all levels. The project aims at supporting seven RPOs from Northern, Southern and Central European countries plus a CSI country, in developing and implementing Gender Equality Action Plans. All the 7 RPOs of the EQUAL-IST consortium were at a starting stage in the setting up of GEPs.	

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?

According to the lessons learned within the EQUAL-IST Project, structural change for gender equality needs to be realistically presented as a middle-long term goal which is in need of taking immediate and consistent steps and measures to be constantly monitored. Recommendations to research institutions that in tend to implement GEPs as a tool for achieving structural change are:

- Engagement and consensus towards gender equality policies shall be communicated
- Trainings on integrating the gender dimension into research content, as, especially in ICT
- Actions addressing the (gender) bias in recruitment procedures
- Indicators related to GEP sustainability and perform periodic monitoring
- Gender-disaggregated statistics
- Value collaboration with the following external stakeholders: (i) girls as perspective enrolled students and (ii) national high-level stakeholders as the agents driving GEP legitimacy and acceptance.

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?

The point of departure for all partners in EQUAL-IST project was the acknowledgement of women under representation among academic staff being more severe in ICT/IST studies, and the same for the ratio of girls among enrolled students, with gender stereotypes very frequently named as roots of cultural and social constructions. ICT/IST is considered to be strongly biased and contributing to change it is identified as one of the main priorities of actions to be put in place through Gender Equality Plans.

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

According to the project the policy tools promoting institutional change reflect the gender mainstreaming perspective and are referred to as structural change, this is a progress beyond the idea that women need to be framed or granted special support as the underrepresented sex. Gender balance in research organizations is considered as a key step for ensuring research excellence and quality and inclusive-sustain able innovation.

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

The project combines gender mainstreaming and positive actions on 3 main levels: HR practices and management processes, research design and delivery, student services and institutional communication. For addressing and solving issues of

horizontal and vertical segregation in research and administrative careers, work life balance, gender neutral-blind approaches to IST research, gender gaps in students' enrolment, the project operates at the same time on organizational structures, discourses and behaviours. The project has developed the following materials:

- Gender Equality Plan development methodology (D.3.3).
- 6 Gender Equality Plans (GEPs) designed and implemented. National mini reports (D2.2)
- Toolkit targeted at Research Organizations with a focus on ICT and IST (online).
- Gender Audit methodology (to analyse the status of gender equality at each involved RPO) (D2.3, D 2.4).
- Capacity Building Sessions presenting the methodological guidelines for internal gender audit within IST research organizations and facilitating their adoption and customization by the EQUAL-IST RPOs.
- Crowdsourcing platform "CrowdEquality" to collect ideas and trigger interesting discussions about the emerging challenges (online).

Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**

EQUAL-IST stresses that one of the critical issues highlighted by the existing literature on structural change for gender equality refers to the tensions and negotiations between the trans formative goal of gender equality policies and the multiple ways they can be re-assumed and incorporated into existing policies and institutional goals. Institutional change can happen via small steps by exploiting existing discursive opportunities, or it can be overtly resisted and seen as a destabilizing factor for the status quo and existing power structures.

One of the most critical phases to start a process of structural change for gender equality in a research institution is represented by the internal assessment of gender inequalities that allows to identify the main gender bias at the institutional level and may provide inputs to the design of the required measures and actions to enhance gender equality.

- Challenges related to gender equality and diversity were identified during the internal gender audit are:

- difficulty engaging staff members and students.
- lack of interest in the topic
- gender equality seems not fully understood to be relevant to STEM and ICT/IST 'denial' type of resistance, as a tendency to equality is a fact

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**

The project promotes the gender key, RRI is promoted residually.

9. RICONFIGURE

Acronym:	RICONFICURE
Full name	Reconfiguring Research and Innovation Constellations
Grant agreement ID	788047
Lifespan	01/05/2018-30/04/2021 (on-going)
Website	http://riconfigure.eu/
Coordinator	Danish Board of Technology Foundation

What is the objective of the project in a nutshell?

RICONFIGURE project wants to enable the diversification of constellations, institutions and actors in research and innovation (R&I). The project centres on stakeholder engagement in four social labs. In these labs, actors from research, industry, the public sector, and civil society explore how each of them can and do initiate and navigate cross-sectoral collaboration in R&I.

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?

At the moment of this analysis, RICONFIGURE has delivered a policy brief that gather some recommendations based on the findings of the project. These are:

- Policy makers should strengthen appropriate **funding mechanisms** that assist Civil Society Organizations (CSOs) in receiving appropriate rewards when entering QH collaborations.
- Actors of the fourth helix ('civil society') **often lack the funding** to enter into QH collaborations that provide innovation rewards in later stages of the process.
- **Metrics and indicators** should be provided for practitioners to measure success of QH collaborations in terms of its democratic and social impact.
- Compendia of **'best practices' of QH collaborations**, as well as their methods, are required to help set up efficient governance structures, operational processes and modes of addressing internal conflicts. Effective methodologies support the active participation of CSOs within QH collaborations to promote a multidimensional view of innovation.
- QH collaborations are **democratic when they involve all actors**, or representatives thereof, in each level of the innovation process.
- Most QH collaborations emerge around joint efforts in **shared collective innovation spaces** (virtual or physical). Their specific challenges or missions affect the ways in which the four helices innovate together and may conflict with the interests of some actors involved.
- **Aligning the interests of stakeholders** who represent social needs also requires democratic alignment of the goals or missions of the innovation collaboration.

Traditional innovation ecosystems, even when experimenting with open formats, have a strong economic/market drive for innovation that may hinder or outright obstruct the eye level engagement of some of the potentially relevant actors in the innovation ecosystem.	
Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**
Existing institutions and actors in the knowledge economy are playing new roles and entering into new constellations. The challenge they face is that new constellations and new roles in innovation are conceptualized, strategized and practiced in highly diverse ways depending on the outlooks of different types of actors, which creates as much confusion as inspiration. There are different strands of research and policy literature that centre on such new constellations agree on the value of increased integration between R&I and society but disagree on the nature of that value. In this sense, RICONFIGURE project wants to get a better understanding of collaborations in R&D between the following four sectors of society: industry, academia, policy and civil society. These collaborations are referred to as quadruple helix collaborations (QHCs). In these collaborations, the participation of civil society is of particular interest because both theory and practice have suggested that civil society is, more so than other helixes, absent from R&D.	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
The change of R&I governance frameworks at multiple levels by providing evidence on how such frameworks may hinder or help new R&I constellations and by providing dialogue- and learning-opportunities to policymakers. The project wants to get evidence on how R&I governance frameworks may hinder or help new R&I constellations and by providing dialogue- and learning-opportunities to policymakers. To realign the innovation thinking to address social needs. Innovating with, by and for the people through Quadruple Helix Innovation.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
The project is interacting with real-life cases of QHC through social labs, on the one hand, to obtain a better understanding of QHCs and specifically the presence of civil society in QHCs and, on the other hand, to help the QHC foster the interaction and inclusion of all helixes into the R&D process. A social lab methodology manual for facilitation of Quadruple Helix Collaborations between industry, academia, policy and citizens has been produced. According to the social lab philosophy (Hassan, 2014, pp. 78-90). D 1.2 Social Lab Methodology.	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**

RICONFIGURE will produce a model of QH-collaboration practices characterizing key success factors as well as challenges for effective QH-collaboration, but at the moment of this analysis, this is still in process.	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The project pays special attention to RRI, but in a manner that integrates with broader issues of open collaboration in R&I and governance support for such collaboration. The RiConfigure social labs are driven by the philosophy of responsible research and innovation (RRI) where stakeholder inclusion is associated with more robust innovation products and a better understanding of the risks and benefits associated with these products.	

10. SISCODE

Acronym:	**SISCODE**
Full name	Society in Innovation and Science through CODEsign
Grant agreement ID	788217
Lifespan	01/05/2018-30/04/2021 (on-going)
Website	https://siscodeproject.eu/
Coordinator	Politecnico di Milano
What is the objective of the project in a nutshell?	
SISCODE aims stimulating the use of co-creation methodologies in policy design, using bottom-design-driven methodologies to pollinate Responsible Research and Innovation, and Science Technology and Innovation Policies. 10 co-creation labs spread around Europe worked with design-driven approaches to co-create, generating real life knowledge, to test new and more open ways in conceiving policies that reconnects policy design with grassroots initiatives and citizens.	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
The SIOSCODE project D4.2, chapter 6, sums up the lessons learnt from the comparative analysis in 7 areas: • **Structure and governance** Developing and working in a 'protective space', being networked, and having top-level political support are instrumental to the success and positive impact.	

- **Sustainability and budget**

Public funding sources appear important for labs subsistence and autonomy in the short-term, or for the launch of specific initiative, in long-term sustainability other aspects are capable to make the difference.

- **Skills & Team**

Labs mapped claim for a multidisciplinary approach that quite often is obtained through the enrolment of temporary external experts o professionals

- **Impact Measurement**

Positioning the Lab as an in-house service. The lack of a systematized Framework for impact measurement, and the prevalently qualitative approach kept, might act as a barrier

- **Stakeholder engagement**

Innovation labs or teams should include specific competences for ecosystem activation at both project and strategic level

Supporting policy makers to access these solutions can trigger learning mechanisms that can support them in the redesign of policies.

- **Relation politics & Policies**

in order to avoid uncertainty that depends on the influence of political change on the lab activity (and existence) a strong process of legitimation should occur. Strategy for long term sustainability.

Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**

The fast advancements in science and technology are posing the urgent need to ensure that science, technology and innovation outcomes and policies become closer to the values, needs and expectations of society. This may be achieved through the adoption of responsible research and innovation principles. The early engagement of actors is facing many challenges, and PE (public engagement) rarely goes beyond the stage of consultation o understand co-creation as a bottom-up and design-driven phenomenon that is flourishing in Europe (in fab labs, living labs, social innovations, smart cities, communities and regions). The project wants to analyse favourable conditions that support its effective introduction, scalability and replication; and to use this knowledge to cross-fertilise RRI practices and policies.

Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**

Experimentation and a view to operationalise co-creation as an approach that can make research and innovation more responsible. The strategies from design provide a tangible approach for governments to explore new models of governance. The main hypothesis of the SISCODE project is that prototypes could correspond to the bridges that will allow co-creation process to go from ideation to implementation and vice-versa in an iterative way.

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

The conceptual framework of the project is based on the anthology" Design for Policy" (2014) edited by Christian Bason (PhD and CEO of the Danish Design Centre).

The project provides guidance on how to concretely achieve responsible research and innovation through the experimentation of a set of co-creation methodologies, which is meant to make them applicable in real-life settings and suited for scalability and replication in diverse contexts. Co-creation - intended as a bottom-up process in which citizens work together with the other actors to co-design and co-produce the solutions they need at the interplay of state, private sector and civil society - has been identified as a possible approach to public engagement able to make research and innovation more responsible.

SISCODE has produced a toolkit for designing the co-creation journey (D3.1): Fab Labs, Living Labs, Science Museums, built to bring labs in a common approach of co-creation based on RRI, customisation and reflexivity.

Barriers and drivers for change	What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?

The co-creation process is highly dependent on the way to engage, develop and sustain the "ecosystems of stakeholders", "the local community", "and the partners of the project". D 3.2 is envisioning solutions and policies, lessons learnt (page 151):

The learnings about the co-creation process, techniques, tools and methods took shape in a heterogeneous way in-between lab. impact is more noticeable with Labs who experience such approaches for the first time.

- Individuals are the main sources of changes in the organisation
- The different efforts to connect labs between each other and disseminate design tools and methods through a toolbox, collective physical and online meetings as well as regular monitoring tools allow to establish a stable and frequent system of contacts between labs themselves and endeavour the interaction between labs and the support partners.
- By testing tools in the reality, it can happen that they can work or not according to the local context where they are used, and adjustments are made constantly as local knowledge is developed.
- Co-design is not just about selecting the more suitable tool, it is about building collective moments.
- The lab's journey is a pretty long co-creation process. This enhances the importance of soft management as labs are running their experiments under uncertainty, time dependencies, facing complex ecosystems and societal challenges.

RRI meanings	Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?
The project is trying to verify is that the adoption of co-creation processes in research and innovation can be a way to concretely operationalize Responsible Research and Innovation (RRI), by engaging citizens and other actors and stakeholders in a fruitful interaction with researchers and innovators, so engagement is the main analysed key. An effort was made to align the effective gaps encountered in RRI approaches appealing to deal with societal challenge complexity, stakeholder engagement and a better tangibility of actions (D3.1)	

11. EFFORTI

Acronym:	EFFORTI
Full name	Evaluation Framework for Promoting Gender Equality in Research
Grant agreement ID	710470
Lifespan	01/06/2016-31/05/2019 (finished)
Website	https://www.efforti.eu/
Coordinator	Fraunhofer ISI
What is the objective of the project in a nutshell?	
EFFORTI seeks to analyse and model the influence of measures to promote gender equality on research and innovation outputs and on establishing more responsible and responsive RTDI (research, technology, development, innovation) systems. The consortium consists of six partners representing a wide arrange of different institutional types, namely contract research organizations, universities, NGO and a company.	
Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?
According to the project, the context factors do influence output, outcome and impact of gender equality initiatives – therefore they should be considered in the design and evaluation of such measures. (D4.4 Collection of GPs and lessons learned). There are many context factors that might influence: • Expert interviews are a very good source to identify relevant context factors. • The context is always very specific for each measure, so it cannot be entirely represented on a meta-level.	

- Contextual factors in three areas should be considered when evaluating gender equality policies in RTDI: Innovation system, Gender equality, Gender equality in RTDI
- The log-frame/ theory of change approach has proved to be a valuable tool to think about how different factors may 'contribute' to the impact of interventions and to begin identifying possible R&I outcomes and impacts of gender equality interventions.
- The I-O-O-I approach is useful to structure thinking in the evaluation logic, but it is important to emphasise the non-linearity of inputs from an intervention over processes to actual and measurable types of R&I effects.
- In relation to the very slow pace of structural change, the most ill-placed, its' impacts can and should be observed in a short period of time and its success is directly measurable.

National evaluation cultures. Interventions 'contributed' to the outcomes and impact of the intervention in combination with a complex array of contextual contributory factors.

Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**

The projects 'objective is to clarify the interactions between the design and implementation of gender equality interventions and the expected and achieved results in research and innovation contexts.

Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**

A better integration of women into the research and innovation system as well as considering gender aspects in research and innovation projects has a significant impact on the methodology and on the quality and relevance of research and innovation results. The novel contribution of EFFORTI to evaluation practice is that its framework will not only allow to assess the attainment of gender equality targets in a narrow sense but rather effects on research and innovation results in general.

Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**

The project combines the evaluation of gender equality policies with the most recent approaches of RTDI evaluation in order to make the best use of mutual exchange and learning. Specifically, to figure out the links between initiatives aiming to promote gender equality - through three main gender objectives (more women in R&D, women in leadership positions and integration of a gender dimension in research content and curricula) - and a variety of impacts on research and innovation.

The validation work revolved around the Theory of Change approach. Analytical framework of EFFORTI is the I–O–O–I (Inputs, Outputs, Outcomes, and Impact) model.

The project has generated the following tools:

- Toolbox 2.0 is a holistic and comprehensive tool that you to document and analyse how gender equality (GE) related interventions contribute to the achievement of gender equality objectives. The tool supports practitioners in their day-to-day practice, directly influence the embedding of GE and underpin a learning programme for the design, implementation and evaluation of GE measures.

Concrete lessons, good practices principles and related guidelines, enhanced awareness and capabilities across the research and innovation systems of designing, implementing and evaluating GE measures.

Barriers and drivers for change	What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?

The project collects the common facilitating and hindering factors in D 4.2 Implementation:

- **Governance framework.** The governance framework could be identified as a key element in either facilitating or hindering, where policy makers operate at the level of positive incentives. Funding practice to encourage research organisations to promote gender equality measures is important.
- **Top-management commitment**. Top-management commitment is a key facilitating (or lack of was a hindering) factor for the implementation and impact of the intervention. At the level of RPOs and companies, managers – must work top-down (not only bottom-up) by starting with hiring and changing the management culture as well as developing gender competence. Top management commitment can be demonstrated by the resources that are allocated to gender equality and the institutional structures for gender equality which may include a strong position.
- **Bottom-up**: participation and buy in bottom-up buy-in was also seen as an essential factor in interventions. Whilst autonomy is highlighted as important.
- **Promoted as Equal Opportunities or Positive Discrimination?** How gender equality interventions are promoted was seen to influence the success of the intervention.
- **Synergies with other initiatives**. The inclusion of gender issues linked to excellence in research at the EU level facilitates the willingness of research centres to introduce gender issues it also convinces those responsible for the need to incorporate gender equality measures.
- **Resources** as the major facilitating factor for a successful GE intervention in RTDI.
- **Gender competence, experience and knowledge**. Ideally, the thorough implementation of gender can lead to three impacts; firstly, giving gender a better standing in non-university research, secondly raising awareness for the relevance of gender in research and lastly, improving the quality of the research projects' results (Wroblewski, 2016, p27).
- **Transparency**, Targets Standards and Monitoring Formulating target values for the representation of female researchers and recommendations like developing a strategy on how to increase the representation of women in management/

leadership positions enhances the obligation and puts more pressure on the centres to actively promote gender equality. • **Attitudes:** interest and motivation to participate. The willingness and interest of staff members and the target group to participate is decisive. • **Sustainability** of the action

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The project promotes the gender key, RRI is promoted residually.	

12. GRRIP

Acronym:	**GRRIP**
Full name	Grounding RRI practices in research performing organizations
Grant agreement ID	820283
Lifespan	01/01/2019-31/12/2022 (on-going)
Website	http://grrip.eu/
Coordinator	University College Cork

What is the objective of the project in a nutshell?
GRRIP projects´ objective is to embed sustainable RRI practices in 4 research performing organisations (RPO) and 1 dual function RPO and research funding organisation (RPO/RFO) (total 5 RPO&RFO) in the Marine and Maritime (M&M) through Action Plans (AP) for institutional and cultural change. This will be accompanied by establishing a platform for engagement with the Quadruple Helix (QH) for each RPO&RFO, and a platform for mutual learning between the 5 RPO&RFOs and QHs. The second objective is to examine how funding bodies can positively influence and encourage academia towards Responsible Research & Innovation via its funding policies and interaction (cordis).

Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
At the time of this analysis no results available yet.	

Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**
M&M is a high priority for the EU. However, the M&M is seriously exposed to the non RRI alignment between Research and Innovation (R&I), societal actors and the	

environment, affecting its performance and competitiveness. This research sector is one of the most exposed to a risk of the loose connection between scientific research, societal actors and the environment, affecting its performance and competitiveness. Growth in Europe's maritime economy (often referred to as the Blue Economy), has the potential to meet pressing needs for energy, food and economic growth.

Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
Much work has been done on the concept RRI by EU projects in the 2000's. However, the bulk of the projects relating to institutional change for RPO&RFOs have focused on one of the five keys individually. Relatively few have focused on the current Topic's aim of Grounding RRI practices in the RPO&RFOs themselves as part of an integrated approach.	

Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
At the time of this analysis no results available yet.	

Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
At the time of this analysis no results available yet.	

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The project pays special attention to the 5 keys of RRI.	

13. NUCLEUS

Acronym:	**NUCLEUS**
Full name	New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions.
Grant agreement ID	664932.
Lifespan	01/09/2015-31/08/2019 (finished)
Website	http://www.nucleus-project.eu/
Coordinator	Rhine-Waal University of Applied Sciences

What is the objective of the project in a nutshell?	
NUCLEUS aim is 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 transdisciplinary project was to stimulate research and innovation which continuously reflects and responds to societal needs. NUCLEUS project tested the principles of RRI through real-time experiments in 10 research institutions across Europe, and in South Africa and China. NUCLEUS aimed to develop practical recommendations for research leadership teams on how to implement RRI in their institutions. The project also supported the activities of 20 Mobile Nuclei, one-off activities where participants in the consortium tested innovative approaches to reflect the concept of RRI in different contexts. The project aims to make the RRI approach accessible to stakeholders inside and outside academia. The project first analysed the challenges and obstacles to RRI in terms of structural, socio-cultural and individual barriers. Parallel to the study the NUCLEUS project developed RRI recommendations based on a process organized by conducting six field trips to the relevant domains. The results were integrated into an implementation roadmap.	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
NUCLEUS project has crystallized its recommendations in D3.6, in the following way: • **Work towards a shared understanding of RRI**. RRI is a multi-faceted concept that can be practiced in many ways. • **Analyse before you act**. The implementation of RRI should be based on institutional self-assessments. The “mapping of the RRI landscape” can also be used to measure the current level of support and/or understanding of RRI. • **Involve the governance level of your organisation**. A successful RRI approach requires change-management processes at the policy-and governmental level of each institution. • **Support and assist scientists**. Scientists who want to start RRI in multi-stakeholder engagement processes need support and assistance. Trainings in communication and two-way dialogue processes are needed. • **Create a trust before you raise expectations**. Relationship management is key before starting innovation processes with multiple stakeholders. A trust-building strategy needs to be conducted in dedicated platforms and forums, to establish relationships, manage expectations and foster on-going participation. • **Address obstacles before starting the process**. In order to sustainably develop and pursue RRI processes, potential obstacles need to be identified and addressed. • **Include backgrounds, goals and interest of stakeholders**. Before establishing an RRI-process, make sure to develop a shared understanding of backgrounds, interests and expectations of all partners.	

- **Motivate before you demand action**. Incentives are needed to encourage RRI in academic practice.
- **Do not impose RRI on every research approach in your institution**. RRI considerations should not block specific research lines upstream and should not initially promote a particular technology.
- **Be aware of the socio-cultural differences.**

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?

NUCLEUS tried to implement RRI into the governance and culture of universities. It did this not only through individual researchers but also via policy measures and recommendations at institutional, regional, governmental and EU levels. The idea of "Communities of Practice" offered a framework for implementing RRI thinking.

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

According to NUCLEUS project, productive relationships require open communication and respect for values, expectations and goals –and the relationship between research and society is no exception. Responsible Research and Innovation (RRI) is an approach to research that embraces these shared responsibilities throughout the entire process of knowledge and value creation. By engaging with stakeholders, research is expected to develop a better capacity for addressing the grand societal challenges in a more inclusive way." (Policy Brief 1)

Furthermore, they state that *"The NUCLEUS Approach enables research institutions to plan, conduct and evaluate interventions that are tailored to their specific characteristics and needs. It has been developed from the first phase of the project (comprising interdisciplinary studies, field trips and working groups) together with recommendations from other RRI projects and literature."*

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

The project is operationalized into a process of change they call "Action Framework" setting out *"7 Actions comprising a total of 63 elements which act both as indicators for the current level of RRI implementation and interventions to foster it"*. These are collected in Policy Brief 2. The actions are:

- Action 1: Develop RRI Institutional Capacity.
- Action 2: Build Institutional bridges between the research community, stakeholders and the general public
- Action 3: Catalyse ongoing debates about the role of science in society
- Action 4: Develop, nurture and support new forms of transdisciplinary research
- Action 5: Stimulate the responsibility of all actors involved in the process of research and innovation
- Action 6: Question and refine the prevailing notion of 'recipients' and 'agents'

- Action 7: Embed ongoing reflection and analysis into the RRI implementation process."

A key expectation of NUCLEUS project was that it would develop recommendations for higher education and research organisations on how to institutionalise, or 'embed' RRI in the culture and governance of these organisations. Ten universities and research institutes hosted an Embedded Nuclei. These were dedicated units working to establish RRI in the culture and structures of their institutions with support from project mentors. Twenty partners representing Universities, science festivals and museums acted as Mobile Nuclei. These partners integrated modular activities into existing events to support the uptake of RRI by a wider audience. (Lessons from the Implementation of RRI in Universities and Scientific Institutions" Brochure)

Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**

By interviewing leading researchers and research executives the project analysed barriers to RRI implementation. While in general the scientists welcomed science-society interaction, they found three kinds of obstacles to the implementation of RRI and they claimed, "need to be dealt with appropriately if RRI considerations are to be introduced broadly, collected in D3.5". These were:

- **Fundamental research.** "The usefulness of RRI is viewed by participants to be strongly dependent on the field at hand. In application-oriented sciences, input from outside of science is accepted, while the preference for fundamental research is for it to proceed freely and without intervention."
- **Loss of autonomy**. "Some scientists expressed their concern that non-scientists are not familiar enough with the is-sues in question to make a useful input possible. They rather feared that an uninformed public could distort fruitful avenues of research.
- **Expenditure required for RRI.** "Scientists emphasised that RRI demands a lot of effort which needs to be supported or offset by suit-able resources. The effort invested into RRI endeavours is feared to be taken away from addressing other challenges. In particular, researchers were afraid that institutionalising RRI would mean imposing an additional bureaucratic superstructure on them".

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**

The idea of NUCLEUS is that RRI is embedded within a responsive cluster of various domains: Public Policy, Public Engagement, Civil Society, Media and Economy. The project's working definition was based on that of the European Union: an approach where societal actors (researchers, citizens, policy makers, business, third sector organisations, etc.) work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of society.

14. FIT4RRI

Acronym:	FIT4RRI
Full name	Fostering Improved Training Tools for Responsible Research and Innovation
Grant agreement ID	741477
Lifespan	01/05/2017-30/04/2020 (finished)
Website	https://fit4rri.eu/
Coordinator	Universita degli studi di Roma la Sapienza

What is the objective of the project in a nutshell?
FIT4RRI project aims to enhance competencies and skills through an improvement of the training offering in RFPOs (Research Funding and Performing Organizations), and institutionally embed RRI and OS (Open Science) practices and approaches by promoting the diffusion of more advanced governance settings. Governance setting includes organisational practices, tools, arrangements and culture.

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?

FIT4RRI learnings are entangled to guiding three main processes to activate change, namely:

- interpreting RRI and OS;
- identifying and taking the basic decisions to activate the governance setting process; and
- activating, implementing and finalising such process to produce long-term institutional changes in research organisations.

- To support the implementation of above broader and more complex processes, FIT4RRI recommended altogether 21 more specific actions to help research organisations to implement RRI and OS. These are collected at the Guidelines on governance settings for responsible and open science (Executive summary, December 2019):

- To meet **changes in science**: 1) Mapping the main trends of change affecting one's research organization; 2) Fostering an internal debate on the changes occurring in science and the measures to address them; 3) Establishing tools for monitoring and anticipating the trends of change affecting the organization.
- To **understand a responsible and open science**: 4) Making an inventory of and assessing the actions and measures already in place or planned pertaining to RRI and OS; 5) Identifying people and resources already involved with or interested in

RRI and OS; 6) Raising awareness and disseminating knowledge on RRI and OS among leaders, managers and staff.

- To express the **RRI/OS profile** 7) Defining the RRI/OS profile for the organisation through an open decision-making process; 8) Documenting the decision-making process and its results to make them accessible to everyone; 9) Keeping a process-like view of the RRI/OS profile and following an open and step-by-step approach.
- To realistically choose **the governance setting**: 10) Choosing the governance setting model primarily because of feasibility considerations; 11) Scrutinising external resources to learn from; 12) Testing the governance setting before starting the process.
- To carefully **activate the governance setting process**: 13) Establishing a team which is substantially and institutionally capable to activate the governance setting process; 14) Ensuring the transparency, inclusiveness and visibility of the governance setting process; 15) Making RRI and OS part of the "core business" of the research organisation from the beginning.
- **Proactive and resilient implementation of the governance setting process**: 16) Activating negotiation processes within the organisation aimed at modifying current practices, rules, and views; 17) Looking for external backing and links to enhance the governance setting process; 18) Adopting an iterative approach in implementing the governance setting process.
- To **achieve embedded completion of the governance setting process**: 19) Carefully planning and implementing the changeover of RRI/OS from the governance setting to the structures of the organization; 20) Including RRI and Open science in the organisational standards and practices following a mainstreaming approach; 21) Creating social and communication spaces and procedures to maintain a high degree of participation in RRI and Open science.

Several lessons learnt were formulated in **the implementing** the experiments:

- Raising awareness before the start of the project may have led to more participants taking part.
- RRI is a flexible model, not a "one size fits all".
- Having end users of the monitoring system would have helped the researchers and innovators better understand what the public want from research and innovation and how it directly affects them.
- The joint reflection sessions were key to get everyone involved.
- Researchers were faced with issues and ideas that are not usually "on the table" in their professional life and work routines.
- Taylor-made training sessions on the selected pillars constituted an important awareness raising action.
- RRI is a way of doing R&D&I using a long-term perspective in terms of the kind of world we want to live in.

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?
According to the project, context of change is science and innovation activities of RFPOs. Dimensions of change are identified in matrix of (1) trigger for change, i.e. Internal-, external- and network-initiated change; (2) focus of change, i.e. social, normative and knowledge-oriented change.	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
RRI -related change may take and require different forms, but most of all is possible. RRI plays a role in managing the rapid changes affecting science and innovation. Benchmarking exercise tells that it is possible turn RRI from being a vague normative, prescriptive and quite abstract concept, practically unusable in itself, into a contextualised and self-tailored "RRI profile", allowing researchers, research institutions and the society at large to better manage the impacts of the occurring transition of science. In order to succeed, a transformational agent is needed, i.e., a group of people, either inside, outside or connected to the research organization, and who are also motivated and able to mobilise and orient people. To facilitate this process, a favourable non-prescriptive and supportive institutional and social framework is needed. The framework can be national or at organisation level and it should engage stakeholders to define their own RRI profile.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
The main method to foster change in FIT4RRI is training which includes training tools, actions and strategies. Training is a tool for promoting the diffusion of more advanced governance settings to foster the institutional embedment of RRI and OS in research organisations. Data has been compiled via benchmarking exercise of 43 (of total 302 identified) RRI-oriented advanced experiences. An “Advanced” in this context means, cases that are endowed with a capacity to generate and implement a governance setting.	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
Multiple challenges were identified in the project implementing the experiments. E.g. • Gaining ethical approval earlier may have led to earlier interactions with the stakeholders, enabling us to build better relationships • Building better relationships to better understand how to motivate the stakeholders to engage with all aspects of the project • There was a lack of awareness for ethics within the culture, this may have contributed to the low uptake of participants	

• Ensuring the focus group and workshop was more accessible by holding them in a different location may have enabled more participants to attend. **Technical challenges**, such as lack of common standards and systems inoperability. Also, organizational challenges were identified, like ownership and governance, and agreement on risks and mitigation about sharing burden.

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
RRI is integrated to the concept of open science. Cultural, practical, structural and procedural barriers in adopting RRI and OS are acknowledged. Concepts are seen difficult to apply as they are broad umbrella terms.	

15. STARBIOS 2

Acronym:	**STARBIOS 2**
Full name	Structural Transformation to Attain Responsible BIOSciences
Grant agreement ID	709517
Lifespan	01/05/2016-30/04/2020 (on-going)
Website	https://starbios2.eu/
Coordinator	Università degli studi di Roma Tor Vergata

What is the objective of the project in a nutshell?	
STARBIO 2 aims to activate and attain RRI-oriented structural change in six biosciences institutions. The experience produced within the action plans will be used to define guidelines and develop a model aimed at supporting RRI structural change in this field in Europe and worldwide. The outputs of the learning process will aim at providing recommendations on how to deal with resistances and barriers to the implementation of RRI in research institutions. In addition to six European bioscience institutions, STARBIO2 further aims to develop three APs in non-European entities (in Brazil, South Africa, United States), all active in the field of biosciences.	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
One of the main lessons learnt by STARBIOS2 is that there it is important to make realistic orientation to RRI, based on the awareness that RRI-related change is a process that implies that not all that is desirable can be implemented immediately. For example, it is better to concentrate on certain RRI keys, not all simultaneously.	

In order to practice RRI it is necessary to consider that the relations between science and society are changing. This can be defined as a transition that impacts the professional life of scientists. The scientific community must face these issues.

- The practice of RRI is a possible response to the need for addressing systematically the science and society relationship. The RRI 5+1 keys represent areas in the life of scientific communities where the problems of relations between science and society emerge.
- The practice of RRI is "Sector specific" because it has to be contextualized in the different scientific sectors. Each scientific sector, indeed, receives several specific inputs and requests of a societal nature and research results represent important elements for the innovation of social and economic life.
- RRI sector specificity should imply an open consideration of the critical developments this research sector is taking, and the challenges that it faces.
- The way in which RRI is contextualized depends on the specific characteristics that the biosciences sector takes in different countries or regions. There is no unique interpretation of how RRI is influenced by various scientific sectors.
- The "Principles of action" contained in the model are aimed at making possible the practice of RRI within specific research organisations. They are tools that can be used so that each organisation defines its own approach to the practice of RRI based on an interpretation of its own characteristics and of the context in which it operates.
- For self-reflection to contextualize RRI in own organization:
- In order to position an organisation within a network of relations it is necessary that an organisation reflects on its own relations and on the role it has in the biosciences sector, also in light of the most important challenges that the sector is facing; the results of such a reflection could be a basis of the definition of vision.
- The mobilization towards RRI of internal actors should be based on the assessment of their orientation to change. To this end, it is necessary to check if initiatives related to RRI have been already implemented in each organisation.
- The objectives to be reached for making possible the RRI practice and structural change must be defined through the consultation of internal actors. The 5+1 RRI keys represent a possible guide for this consultation (i.e., the actors are consulted on themes related to one or more of such keys).
- The action oriented to RRI and structural change has to be within the scope of what can be done by an individual research organisation. Particularly, the action and the changes to implement should be chosen based on this criterion and by implementing the "Principles of action".
- The definition of an Action Plan (AP) implies not only the consultation of the internal actors, but also the identification of the ways in which the changes generated have to be managed during the implementation of the AP.

Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**

In STARBIOS2, six biosciences institutions in Europe and three outside Europe. Focus is on action plans and internal changes in the organization. Focus on biomedical sciences is justified of its importance and potential risk of losing

connection to society which would be harmful for scientific research; therefore, biosciences are fields where RRI-oriented actions are needed the most. From being socially isolated and not properly addressing societal challenges, to being ethically contested, not supported by citizens, public authorities or economic players creates a lot of challenges to advancing scientific research.

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

STARBIOS2 narrative centralizes on the idea is that the practice of RRI in the biosciences should be supported also through changes that permeate research organisations in a durable way.

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

In this project, the building blocks for activating structural change are design, implementation, monitoring and evaluation of a four-year RRI Action Plan (AP) in each the 6 involved departments. The AP will be self-tailored: each of them will be conceived, designed and implemented by the institution involved and will consider the institutional, social and cultural context where it will be carried out. Actions are outlined to five sets of actions, respectively addressing the RRI 5 keys.

Practical experience is collected from the implementation of Action Plans carried out by the research organisations and from the mutual learning activity.

To activate RRI-oriented changes through a process based on the following steps:

- Activation of a Core Team and Extended Team to promote and implement the AP
- Implementation of a context analysis of the AP setting
- Definition of a detailed AP
- Mobilization of actors for change towards RRI
- Negotiation processes aimed at implementing the APs and addressing the emerging problems, conflicts and issues
- Production of structural impacts and reaction
- A Self-reflective exercise on the results being obtained and on the possible changes

Barriers and drivers for change	What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?

At the time of this analysis no results available yet. Final reports yet to be published

RRI meanings	Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?

STARBIO2 promoted all the RRI 5 keys and investigated these in different cases.

16. GRACE

Acronym:	GRACE
Full name	Grounding RRI Actions to Achieve Institutional Change in European Research Funding and Performing Organizations
Grant agreement ID	824521
Lifespan	01/01/2019-31/12/2021 (on-going)
Website	http://grace-rri.eu/
Coordinator	The European Science Foundation

What is the objective of the project in a nutshell?
GRACE project develops a set of specific grounding actions in six RPFOs that will be the basis for the development of these organization for the next 8 years. Aim is to produce a set of clearly identifiable institutional arrangements which are built on RFPO's (implementing partner) needs, expectations and specific characteristics. GRACE further aims to capitalise on the existing knowledge on RRI implementation via co-creation and mutual-learning processes provided by expert partners. For each RFPO, the GAs will be incorporated in an 8-year long "Roadmap towards RRI" to set a solid platform for attaining further institutional changes during the 'after GRACE' 5 year of the roadmap.

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?
The main tangible deliverables of the project are sustainable roadmaps that will result in RRI-oriented policy. At the time of this analysis no results available yet.	

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?
The Grounding Actions (GAs) aim for developing roadmap towards RRI (e.g. new organizational structures, rules, action plans, trainings etc.).	

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?
GRACE relies on the support offered by expert partners and the adoption of a mutual learning approach via workshops, periodic virtual meetings and frequent online exchanges. RFPOs are provided with guidance throughout the different stages of their institutional change and offered means for mutual learning.	

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?
At the time of this analysis no results available yet.	

Barriers and drivers for change	What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?
At the time of this analysis no results available yet.	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The project promoted all the RRI 5 keys and investigated these in different cases	

17. SUPER_MoRRI

Acronym:	SUPER_MoRRI
Full name	Scientific Understanding and Provision of an Enhanced and Robust Monitoring system for RRI
Grant agreement ID	824671
Lifespan	01/01/2019-31/12/2023 (on-going)
Website	https://www.super-morri.eu/super-morri/index.php
Coordinator	Fraunhofer ISI
What is the objective of the project in a nutshell?	
In order for the aspirations of RRI to be realised, robust tools must be developed for R&I policy and practice. These tools are in the focus of SUPER_MoRRI which continues the work of MoRRI, ensuring sustained data collection, curation, further assessment and refinement of previously developed indicators. SUPER_MoRRI complements EU-28 data by monitoring data from selected non-EU countries. SUPER_MoRRI will also examine the complex and diverse relationships between RRI policies and practices and their societal, democratic and economic benefits. These theoretical advances together with the continuous data stream into the project form the basis of the iterative learning processes needed to create a mature monitoring system with indicators and metrics that are robust, realistic, in themselves responsible, and easy to implement.	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
At the time of this analysis no results available yet, project ends in 2023.	

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?
SUPER_MoRRI addresses external environment by investigating relationships between RRI policies and practices in societal, democratic and economic contexts.	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
The focus is on monitoring research and innovation practices and institutions, to support those stakeholders interested in building a research and innovation system that better serves the needs of both science and society. SUPER_MoRRI envisages monitoring that goes well beyond what we might term 'RRI practices. SUPER_MoRRI follows a reflective and responsive approach to the monitoring framework that it develops. This requires a continued reflection upon the indicators and their appropriateness alongside continuous attention on the ways in which RRI is being institutionalized. Key principles in monitoring are responsible quantification and credible contextualization. This requires being tolerant of a conception of indicators and evaluation for learning, rather than solely monitoring or comparison. Project asks relevant question of If RRI is the solution, what is the problem? It provides three policy narratives (1) Modern science and technology (or research and innovation) is a two-edged sword that provides us with goods and benefits, but also mistrust and destroy; (2) science and technology as the locomotive force of a knowledge economy that is on tracks, going in the right direction and being promise of job creation and economic growth without proper participation of citizens; (3) the world of science, technology and society is a set of entangled networks that are in increasingly in need of mutual collaboration and communication.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
SUPER_MoRRI is developing indicators that are suitable for capturing RRI dimensions. Frameworks builds on the following two principles: • **Responsible quantification** that the monitoring framework will provide interested stakeholders with resources that can help them to plan and progress toward more responsible practices and strategies. The key is doing this in such a way that the data and information we provide is itself presented, and made interpretable, in appropriate ways. • **Credible contextualization** follows an idea that any indicators developed should, first, pass through a co-creation phase with potential users, and second, be accompanied by guidance on the degree of interpretive 'stickiness' of the indicator. By stickiness we mean the capacity of the indicator to support interpretations or generalisations beyond the immediate context of the indicators production. • In addition to building a monitoring framework, SUPER_MoRRI sets out a number of predominantly pattern studies that will generate new data for monitoring at different levels of organisation of research and innovation. To date studies are	

planned at the levels of researchers and their groups, research funders, researcher performing organisations and citizens, using combinations of secondary data and new data generated by SUPER MoRRI. Second, a set of exploratory studies focused on how processes and pathways can enhance responsibility in research and innovation will be performed.	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
At the time of this analysis no results available yet.	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The SUPER_MoRRI project is deeply committed to ensuring that the monitoring framework developed throughout the project is in line with recent recommendations and insights from research into science, technology, and innovation indicators. In SUPER_MoRRI, RRI is seen as a policy device which seeks to make a more just, inclusive, reflective, open, and responsive research and innovation (R&I) system.	

18. ORION

Acronym:	**ORION**
Full name	Open Responsible research and Innovation to further Outstanding knowledge.
Grant agreement ID	741527
Lifespan	01/05/2017-30/04/2021 (on-going)
Website	https://www.orion-openscience.eu/
Coordinator	Centre for Genomic Regulation
What is the objective of the project in a nutshell?	
The ORION project focuses on triggering evidence-based institutional, cultural and behavioural changes in RFPOs, targeting researchers, management staff and high-level leadership. Our long-term vision is to “embed” Open Science and Responsible Research and Innovation (RRI) principles (ethics, gender, governance, open access, public engagement, and science education) in RFPOs, in their policies, practices and processes to organize and do research. To achieve this, ORION will co-design and perform “co-creation experiments” with different groupings of RRI actors. The expected results and impacts of ORION are the following: 1) Enrich and improve the quality of existing training material on RRI and Open Science by producing novel open educational resources tailored to the needs of funders and junior scientists, through highly participatory methods.	

2) Increase general knowledge on RRI and Open Science practices by sharing experience about the different co-creation and open experiments across different disciplines. 3) Contribute to changes in RFPOs governance settings (including institutional changes and stakeholder behaviours) that are consistent with Open Science and RRI.

Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**

At the time of this analysis no results available yet.

Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**

In general, the context of change in ORION are institutional, cultural and behavioural changes in RFPOs. ORION takes the challenge of citizen science a step further and use this approach in fundamental research in life sciences and biomedicine, areas not yet well explored with CS projects.

Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**

The ultimate goal of ORION is to catalyse institutional and cultural changes to embed Open Science and RRI in the participating institutions and their key actors (high level management staff, researchers, administrators), and beyond the consortium, engaging other RFPOs, researchers, policy makers, science educators, patient associations, civil society organisations, and industry. The originality of ORION is that the context of change is fundamental research in life sciences and biomedicine, a field that often is more difficult to open up to different stakeholders, especially citizens in general.

Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**

ORION experiments will tackle three specific challenges of Open Science: (1) Opening up the research engine; (2) identifying risks and opportunities presented by disruptive technologies; (3) running multi-stakeholder projects in fundamental research. ORION will use these challenges as case studies to try out different co-design/co-creation methods, and engage unusual blends of actors, e.g. funders and citizens, or researchers, industry and citizens.

Methods employed in ORION are:

- National Stakeholder Workshops were designed to gather public opinion in the countries of the project partnering institutions (Czech Republic, Germany, United Kingdom, Spain, Sweden and Italy). Stakeholders consisted of members from across society, e.g. scientists, business leaders, policy makers, funding agency representatives, journalists, open science enthusiasts, and students.

• the ORION survey 1 focused on our three key challenge areas (opening up the research engine, disruptive technologies, citizen science. • the ORION survey 2 focused on understanding ideas, expectations and knowledge on Open Science within ORION institutions. One of these surveys attracted about 6,000 respondents. • Online and offline trainings in Open Science and RRI. This process has included a gap analysis of existing training in European Life Science institutes, pilot workshops for funders and researchers, and finally optimised workshops which offer a flexible yet consistent format across a range of contexts (full day, half-day, and conference slots).

Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
At the time of this analysis no results available yet.	

RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
ORION focuses more on Open Science (due to life science focus) than Responsible Research and Innovation (RRI) although these are integrated concepts in the project.	

19. SMART-Map

Acronym:	**SMART-Map**
Full name	RoadMAPs to Societal Mobilisation for the Advancement of Responsible Industrial Technologies
Grant agreement ID	710500
Lifespan	01/05/2016-31/10/2018 (finished)
Website	http://projectsmartmap.eu/
Coordinator	Aarhus University

What is the objective of the project in a nutshell?
The aim of SMART-map is to connect a wide range of industrial players with actors from research and civil society organisations and establish innovative formats of collaboration to jointly discuss, define and implement concrete roadmaps (SMART Maps) for the responsible development of technologies and services in three key time-changing fields. Based on the Societal Challenges of Horizon2020, SMART-map has addressed the areas of precision medicine, 3D printing in the biomedical field, and synthetic biology The SMART Map is a tool that helps businesses address issues of social and environmental responsibility they face in their innovation processes and guides industry in the implementation of RRI practices. The roadmaps were

constructed through “Industrial Dialogues” for the responsible development of technologies and services in the fields of precision medicine, synthetic biology and biomedicine.

Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**

Smart Map project has collected the main messages and project outcomes in D1.3. The report summarises the results by different target audiences, grouped into five categories identified during the stakeholder mapping exercise: industry, civil society organisations, policymakers, funders and the RRI academic community:
Some of the outcomes are:

- Encouraging open and transparent ways of engaging with the civil society and consumers.
- The Empowerment of citizens and stakeholders by providing them with the capacity and the possibility to influence technology solutions.
- The inclusion of vulnerable stakeholder groups through various participative multi-stakeholder processes.
- Building trust between actors by combining knowledge from different disciplines, promoting transparency in organizations and focusing on questions related to data access and control.

RRI can be improved by embedding it directly into the industrial sector. This is done by responding and focusing on the concrete and specific needs of the actors by tackling critical issues and exploring solutions through RRI principles and tools. RRI practices can be promoted by implementing framework conditions, standards and incentives. The promotion of responsibility practices requires learning from various successful RRI related initiatives in the field of new technologies. Moreover, collaboration among various stakeholders and investment in RRI communities, be they virtual or physical, is important. RRI needs to be seen in alliance with other responsibility approaches and practices such as Corporate Social Responsibility.

The project conducted its own evaluation in Deliverable (D 7.2) Final Report, which concluded that the project has succeeded in achieving its primary objective: to successfully co-design and prototype RRI ‘tools’, from which different tools were “piloted” in order to create three SMART-Map roadmaps. Additionally, the consolidation and stabilization of the RRI discourse throughout the project was clear; the broad meaning of RRI was established as a “settled and un-contentious” term. The positive impact on a larger scale and longer timeframe was achieved through the volunteer participants. The engagement of these SMART-Map “champions” provided the project with “impactful step-change”, reflexive learning processes at the level of individuals, creating a higher level of care for the wider societal considerations in addition to “multiplied scale-up impact and legacy”. However, the hypothesis of the existence of the Responsible Innovation ecosystems was found to be false. RRI ecosystems did not exists because RRI had not reached a collective level of acceptance. As a result, it was difficult to recruit people to the Industrial Dialogues

and RRI uptake was thus driven by the so-called “Coalitions of the Willing”, committed people who engaged in RRI.	
Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**
The goal is to set up RRI-driven ecosystem, where diverse form of interactions is happening between different actors around the innovation process.	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
In addition to the creation of the pilots and roadmaps, the SMART-Map -project aimed for a more lasting effect beyond the lifespan of the actual project. The project aimed for transformative change by creating RRI related scale-up impact, scale-up and systematic multiplier effects as outcomes of the sharing and applying the project materials, training and learning. Another approach was to transform RRI into a standard and certification as a mark of quality.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
SMART-Map roadmaps. The SMART Map is a tool that helps businesses address issues of social and environmental responsibility they face in their innovation processes. It is based on the Responsible Research Innovation (RRI) approach promoted by the European Commission and it provides different stakeholders with practical suggestions on how to promote and put into practice these principles. The SMART Map proposes a route that guides industry from different scenarios towards the implementation of RRI practices and their potential benefits for companies, through a series of suggested actions and concrete examples collected during a pilot	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
In Deliverable (D 7.2) Final Report the **drivers** for the uptake of RRI are mentioned: For the industrial companies, RRI can seem to be a way to create a market-niche, a differentiation, in the competition for market share. RRI has reputational benefit for companies. It is a way to present and image of a “morally and ethically responsible firm which values integrity and authenticity”. **Factors supporting** change: - Lack of ecosystem functions meant that it was difficult to recruit people to the Industrial Dialogues. - The change was “channelled” through the base of only a few engaged and committed participants, the so-called “Coalitions of the Willing”. - Only a few of the original contacts stayed on with the project to the end.	

Among the Industrial Dialogues, there was a clear dividing barrier between the industries “market logic” and the “societal good logic” of the civil society organizations.	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
A ‘Baseline’ position regarding the understanding and interpretation of RRI has been established in the project. The baseline aimed to differentiate between the participants’ de facto, “bottom-up”, understanding of RRI, and the participants’ understanding of RRI after the introduction of the “top-down” policy framework of RRI as defined by the European Commission. This differentiation was done in order to pin down any changes in the actors’ (Industry, Academia, Civil Society, Funders, and Regulatory & Political) understanding, views and awareness of RRI during the project. The project advocated for incorporating anticipatory, reflexive and participative methods into the training of researchers and innovation actors	

20. RRI TOOLS

Acronym:	**RRI TOOLS**
Full name	RRI Tools- a project to foster Responsible Research and Innovation for society, with society
Grant agreement ID	612393
Lifespan	01/01/2016-31/10/2018 (finished)
Website	https://www.rri-tools.eu/es/homepage
Coordinator	La Caixa Banking Foundation
What is the objective of the project in a nutshell?	
This project develops and use a Training and Dissemination Toolkit on Responsible Research and Innovation (RRI). The toolkit has been addressed and designed by all the stakeholders of the Research and Innovation (RI) chain of value, including Researchers, Civil Society, Industry and Education but will specially focus on Policy Makers in order to impact significantly in the future governance of RI. The Consortium contained a 26 multi-stakeholder group of institutions with experience in different key components of RRI. The RRI Toolkit an innovative and creative set of tools comprising practical digital resources and actions aimed at raising awareness, training, disseminating and implementing RRI. The project aimed to be collaborative and inclusive in itself in order to increase creativity and shared ownership of the process. The ultimate goal was to bring into being a European community of practice that draws together researchers, civil society, educators, industry, and policy makers to use and continuously contribute to the RRI Toolkit.	

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?

Societal Learning is identified as a key outcome of the project. Societal learning can be further divided into fields of learning for learning, learning for governance and learning for action. The other possible and/or actual learning outcomes of the project activities are listed below:

- The ability to explain the concept of RRI;
- The ability to identify the opportunities of RRI and argue the case for its usefulness as an approach;
- The ability to identify and tackle potential obstacles and barriers in implementing RRI;
- The ability to implement RRI and map out its influence and consequences;
- The ability to map out the involvement of stakeholders in the delivery of RRI;
- The ability to use the RRI Toolkit in support of RRI goals.

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?

Bridging the gap between Science and Society has been a challenge for decades. Today, there is evidence that we need to involve wider society in decisions about the form and direction of research and innovation to contribute to a smart, inclusive and sustainable growth of our societies. RRI TOOLS has helped to transform Research and Innovation in Europe into a process targeted at the grand challenges of our time (science for society) where deliberation and reflection are coupled with action (science with society).

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

In order for RRI to be implemented in practice, there needs to be changes in the mentalities and behaviour of actors, people and organizations. Creating an overarching vision for change can help in achieving change by making the change relatable in people's minds. The idea is to stimulate and inspire the reshaping of R&I activities instead of a limited, top-down, bureaucratic approach

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

The main objective of the RRI Tools project was to develop a Toolkit which enabled the spreading of awareness of RRI amongst R&I stakeholders and to train them to use and disseminate RRI practices throughout Europe. The Toolkit has aimed to help stakeholders in the learning process towards becoming an autonomous practitioner of RRI through the easy access and easy to use resources provided in the Toolkit.

RRI tools project aimed to develop and tailor tools for disseminating, training, implementing and practicing RRI in Europe. This aim was reached by organizing workshops, creating policy briefs and most importantly by creating an extensive database in order to formulate good practice standards and present virtual showcases for RRI. The project investigated “real world” experiences with RRI in order to formulate an accurate working definition of RRI out of the various diverse practices on the field. The point was to learn from steps already taken by others on the field by drawing lessons from them. Furthermore, the RRI Tools training and advocacy programmes were designed to build a community that is knowledgeable about RRI that could enlarge the community by advocating and arguing for it in various forums. According to the project’s own evaluation, the training and advocacy program was generally successful.

Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**

The project produced a catalogue of good RRI practices in D1.4 which collects the drivers and barrier to uptake the RRI and are summed below:

The drivers for the uptake of RRI:

- Involving the public increases the acceptability and accountability of R&I
- New and more open communication between science and society
- New and more opportunities for actors
- New and more diversity and inclusivity
- Improved science, education and innovation
- The chance to establish new networks and partnerships
- Enhanced competitiveness and creativity
- Outcomes and products better focused on the end user
- Enhanced democracy
- The possibility for learning

Barriers for the uptake of RRI:

- Policymaking is inflexible and does not always involve the public
- Tendency to see the responsibility for RRI resting with somebody else than themselves
- Too much focus on the short term
- Difficulties in reaching representative publics
- Difficulties of changing culture, systems and attitudes
- Difficulties in selling RRI to industry and businesses
- Lack of/or limited existing collaborations between stakeholders
- Lack of/or limited relationships and competences in RRI
- Lack of/or limited time and resources
- Lack of/or limited skills and knowledge
- Concerns about increase in bureaucracy

• The unpredictability of science • Scientific culture rewards publications not RRI • Economic pressures	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The EC's six key components are present in the project. In addition, the core values of RRI identified in the project are: • democratic values regarding participation and power, • social and moral values regarding the care for the future of our planet and its people, • individual and institutional values of open-mindedness or receptiveness to change. Processual principles, as diversity and inclusion; anticipation and reflection; openness and transparency and responsiveness and adaptive change have also been included.	

21. GONANO

Acronym:	**GONANO**
Full name	Governing Nanotechnologies through societal engagement
Grant agreement ID	768622
Lifespan	01/09/2017-31/07/2020 (on-going)
Website	http://gonano-project.eu/
Coordinator	Danish Board of Technology Foundation
What is the objective of the project in a nutshell?	
The main objective of GoNano is to improve the responsiveness of research & innovation processes to public values and concerns. The project builds on previous projects in public engagement and new technologies to develop a pilot project in each of the nanotechnology research areas 'Health', 'Energy' and 'Food'. The pilot projects will engage citizens with researchers, professional users, civil society organisations, industry, and policy makers in a continuous process of deliberative workshops and online consultations to co-create concrete suggestions for future nanotechnologies. GoNano will build a broad community of 'change agents' for integrating an 'RRI way' of working on research and innovation, and it will develop and disseminate an RRI business case to align public values, needs and concerns with industry' for profit ambition. GoNano believes that its interactive and open approach to: developing the nanotechnology product suggestion; writing policy recommendation and building an RRI business case; informing and educating about nanotechnology as well as the value of co-creation will build trust and mutual understanding among all the stakeholders, including public and private stakeholders and citizens.	

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?
In the Evaluation Report of the outcomes (D4.3) it is mentioned that the Mutual Learning is one of the main goals in the project and it is also a concrete outcome of the project. Another the key outcome from the co-creation exercises has been the creation of mutual trust between people and between organizations. This outcome was reached via interactions and negotiations. Furthermore, the early engagement of stakeholders and alignment of values was enhanced through the project. Additionally, the responsiveness of the R&I systems has been also increased as was the public understanding of nanotechnology.	
Context of change	**What is the context where the project has been framed? What kind of particularities have affected its implementation?**
GoNano builds on the basic assumption that several types of knowledge are needed to define sustainability, acceptability, and desirability of nanotechnologies, as well as the belief that online and offline engagement activities must be combined with a creative approach to dissemination and communication to ensure continued interest and engagement in the debate on nanotechnologies future application	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
GoNano explored opportunities and barriers for co-creation in the three different thematic areas (food, health and energy), combining face-to-face citizen consultations, stakeholder workshops and online citizen consultations.5 To measure impacts of the co-creation process and its line of activities, a set of key performance indicators was formulated in the project proposal.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
GoNano has explored opportunities and barriers for co-creation in the three different thematic areas (food, health and energy), combining face-to-face citizen consultations, stakeholder workshops and online citizen consultations. To measure impacts of the co-creation process and its line of activities, a set of key performance indicators was formulated in the project proposal	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**

The Evaluation Report of the outcomes (D4.3) highlights the role of the actors supporting change and some drivers and barriers:

- The proposed change in the project was implemented through co-creation and mutual learning.
- Change in the project was to be preferably enacted in a bottom-up approach in order to decrease the significance of pre-set assumptions.
- A top-down co-creation process was also implemented with invited engagement methods because of the problems posed by the highly complex field of nanotechnology to grassroots initiatives.
- The role of a facilitator in bringing together the various groups of stakeholders was crucial.
- Taking citizens' values and needs as a starting point for co-creation required a longer process and lead to few actionable outcomes.
- In contrast, approaching co-creation through a specific problem-owner could speed-up the co-creation process but can also be in contradiction to the goal of taking into account the perspectives and values of the citizens.

The Drivers for the uptake of RRI: Stakeholders saw the benefits of getting to know each other and learning from each other's perspectives. Overall, both citizens and other stakeholders agreed that bringing them together added value and insight to considerations regarding the design of applications. It was seen that co-creation contributed to the acceptability of nanotechnology innovations and gives insights in what is desirable or not.

The Barriers for the uptake of RRI: There are difficulties in connecting the input from the citizens towards the professionals. In practical terms, it is not clear how one could apply the broader societal considerations to research and innovation activities and practices in a meaningful way. Furthermore, a trade-off exists between inclusiveness and specificity: giving all the stakeholder perspectives an equal weight can harm the formation of clear actions and goals. On the other hand, choosing only one or few perspectives creates partiality and exclusiveness.

RRI meanings	Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?

All of the five RRI keys were included in the KPI's of the project; ethics, societal engagement, gender equality, open access/science and science education. Sustainability and social justice were also included in the KPI's.

Although the processual principles of RRI were not directly addressed in the materials, Inclusion of and Responsiveness to society were implicitly part of the project. The principles of Anticipation were also present in the project, as there was discussion on the setting up of an anticipatory regulatory framework for nanotechnology.

22. BigPicnic

Acronym:	BigPicnic
Full name	Big Questions - engaging the public with Responsible Research and Innovation on Food Security
Grant agreement ID	710780
Lifespan	01/05/2016-30/04/2019 (finished)
Website	https://www.bigpicnic.net/
Coordinator	Botanic Gardens Conservation International

What is the objective of the project in a nutshell?

BigPicnic aims to generate debate, by bringing together the public, scientists, policymakers and industry to help address the global challenge of food security. The project involves organisations such as botanic gardens, universities, a science shop, an institute for art, science and technology, and an international NGO. Participatory events will be co-created with local people, to generate dialogue and build greater understanding of food security issues. The project builds, through the co-creation approach and public debate, public understanding of food security issues and enables adults and young people across Europe and in Africa to debate and articulate their views on Responsible Research and Innovation (RRI) in this field to their peers, scientists and policy makers.

Project learnings & recommendations	What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?

The project created bridges and dialogue between various stakeholders and fostered a mutual understanding to generate public dialogue about food and food security to support future Responsible Research and Innovation (RRI) related to these ideas. The results from the BigPicnic Management Board, 2019 collects the public views and recommendations for RRI on food security:

- Highlighting the importance of cultural and social values attributed to food.
- The project activities gave voice to people on RRI and enabled them to discuss and articulate their views on RRI in this field to the public, scientists and policymakers.
- The project engaged with communities and developed public activities, raised awareness and generated public dialogue. The BigPicnic activities empowered people to work in new ways and created shared ownership, identified new practices and influenced behaviours.
- The project generated recommendations based on the expertise of the broad range of stakeholders.
- Provided new ways to promote RRI related practices and approaches to a variety of topics.
- Collaborative visions for future.

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?
Ensuring the availability of and access to enough safe and nutritious food is a key priority that impacts all EU citizens and Horizon 2020 has therefore identified food security as one of the major challenges to be addressed.	
Narrative of change	**What is the message that the project is promoting? What is the language that accompany the project?**
In BigPicnic, the long-term aim of co-creation is to create change by influencing the behaviour of stakeholders. The behavioural change in BigPicnic builds on the creation of a movement, which encourages people to make informed changes through their own thinking and supports them in their own environment. Co-creation is thus a sustainable way to create change by enabling commitment to a cause. Designing an enabling environment for the creation of a movement is an iterative bottom up process facilitated by a change agent. There are five stages to the start a movement methodology (D5.1 Toolkit: • Opening the mind to explore the context of the topic. • Exploring the enabling environment exploration in or to get a sense of what is possible. • Exploring stakeholders and audiences for choosing the right recruitments and strategies. • Involving various co-creators in order to create relevance for the audience and stakeholders. Enabling environment design for the support of the movement.	
Building blocks for change	**What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?**
Change has been channelled in the project through the so-called BigPicnic botanic gardens and science cafes. These activities created a mix of people who do did not necessarily know or work with each other. The idea was to create a shared ownership of change between these people. As a result, BigPicnic worked with local stakeholders to create these change venues.	
Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**
D2.1 Blueprint of toolkit for co-creation, mentions some of the drivers for the uptake of RRI: • Food security is a large-scale and multifaceted challenge facing the whole of society, which can be tackled sufficiently only by adopting RRI -type of practices. • There is no “one-size-fits-all” approach to co-creation. The process of co-creation is not linear but reflective and iterative, involving non-hierarchical structures and bottom up initiatives. For co-creation to be effective, an organization should have	

competence to facilitate bottom-up processes and provide the possibility to change the trajectory of the project or for the organization to adjust its structures.	
RRI meanings	**Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?**
The ECs´ keys are included in the project and inclusiveness in innovation is key processual principle of the project	

23. PRISMA

Acronym:	**PRISMA**
Full name	Piloting RRI in Industry: a roadmap for tranSforMAtive technologies
Grant agreement ID	710059
Lifespan	01/08/2016-31/07/2019 (finished)
Website	https://www.rri-prisma.eu/
Coordinator	Delft University of Technology
What is the objective of the project in a nutshell?	
The goal of the PRISMA-project is to draw specific lessons about how RRI can be implemented in industry, ranging from small enterprises to large corporations to consortia with universities. In practice, this has been done through the development and testing of a roadmap that helps industries to implement RRI in their innovation processes as a part of their CSR policy and the broad uptake of this roadmap by companies related to automated cars, internet technology, drones, biotechnology, synthetic biology, and nanotechnology. The final goal in the project was the definition of a RRI Roadmap setting a strategy, indicating a vision and specific actions for RRI implementation in product development. For this purpose, the project carried out eight RRI pilot projects in a real-world industry context. To establish the added value of the RRI approach and the gender dimension in and for industry, the project assessed the pilot projects on a number of product and process RRI dimensions and compare the score of the pilots on the relevant RRI dimensions with the score of similar projects in the same companies in which the RRI approach has not been followed.	
Project learnings & recommendations	**What are the main recommendations that the project is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the project is pushing these messages?**
The PRISMA Roadmap to Integrate Responsible Research and Innovation (RRI) in Industrial Strategies establishes the Guidelines to Innovate Responsibly and some outcomes that can be highlighted are:	

1. Strengthened relations and trust with and between stakeholders;
2. Reconcile opposing views and bridge opposing values;
3. Creation of new values;
4. Anticipate potential regulatory change;
5. Increase product quality, desirability and acceptability;
6. Create values and increase the social value and impact of R&D;
7. Build corporate image and reputation;
8. Comply with qualified norms and standards;
9. Facilitate the access to financial support;
10. Improved product sustainability, safety and reliability;
11. Address uncertainties, prevent and mitigate risks;
12. Motivated workers;
13. 13. Alignment with user needs and stakeholder values

Context of change	What is the context where the project has been framed? What kind of particularities have affected its implementation?

Continued experimentation with RRI in industry is still needed in order to overcome barriers to RRI. Companies need to go through their own experimental and learning process in implementing RRI, because RRI in industry cannot be implemented by one-size-fits-all tools.

Narrative of change	What is the message that the project is promoting? What is the language that accompany the project?

The most important thing is that companies innovate in a responsible way; not that they call their efforts “RRI” or not. It is best to start with the existing practices and to identify ways in which they already meet some of its aspirations. The drivers for RRI are present in many cases and they just need to be facilitated and deepened. Language of values, such as safety, sustainability and fairness, can be applied to do justice to the ideas behind RRI. Overall, the conclusions of the project with respect to lessons learned in implementing RRI to industry, were the following:

1) Continued experimentation with RRI in industry: Companies need to go through their own experimental and learning process in implementing RRI.
2) Cooperative efforts: Efforts should be directed at the level of individual companies, as well at the level of industry branches and value chains.
3) Need for RRI support: Companies usually lack RRI expertise.
4) Top management commitment and leadership are a pre-requisite for RRI implementation.

Building blocks for change	What tools have been used by the project? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?

In PRISMA project two different methods/strategies for the application of RRI actions into the pilot companies were applied:

1. The approach of ‘external support’: By providing external advice and consultancy to the company during the design of its specific RRI roadmap. In this approach, the RRI is mainly applied by the company itself and external support is offered by

one of the consortium partners. An advantage of this approach might be that the company itself takes responsibility for its RRI policy; a disadvantage might be that the company lacks the resources (time, knowledge, expertise) to carry out the work.

2. The approach of 'embedded ethicist'. By having an embedded ethicist within the company co-operating with the different organization's functions. Embedded ethicists aim at what has been described as "co-operative co-shaping" of technology. This approach has the potential downside that it may be yet more demanding upon the technologists' time, and the potential advantage that it facilitates more dynamic and deeper reflection on the issues that are raised.

Barriers and drivers for change	**What barriers have been faced by the implementation of the project? Which drivers have helped during its lifespan?**

PRISMA D3.3 collects the lessons from the pilots and some drivers and barriers can be identified:

The **drivers** for RRI in industry in the PRISMA project are the following:

- The willingness to do good
- License to operate
- Commercial gain
- Improved competitive advantage
- Improved reputation and corporate image
- Improve the chances at being funded by meeting funding requirements
- Building trust and legitimacy
- The value added of RRI is to broaden the scope of technology assessments

Barriers and challenges for RRI uptake:

- Unclear added value of RRI
- Tension with commercial interests.
- Lack of resources and capacities for RRI
- Limited influence of single companies
- RRI language is perceived as academic and full of jargon
- RRI tends to be highly dependent upon professional relationships
- Lack of organizational resources to organize stakeholder involvement.
- Stakeholders may not be interested or motivated to engage in stakeholder involvement.
- Certain information is sensitive or kept secret for commercial reasons.

Due to trust issues, engagement with stakeholders can be impossible or unproductive.

RRI meanings	Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?
PRISMA RRI Roadmap explores integration of responsibility aspects all along the R&I value chain: ex ante, *in itinere* and *ex post*, and it is inspired by: anticipation, inclusiveness, responsiveness The Normative issues that arose in the pilots were: sustainability, privacy; data ownership; transparency and open access; public engagement; and distribution of risk and harm.	

Annex 2: Publication Review Table

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
Name of the article and DOI	*What is the objective of the article in a nutshell?*	*What are the main recommendations that the article is offering to policy makers, practitioners, stakeholders, companies, scientists, etc.? What are their main findings? Why the article is pushing these messages? (WS)*	*What is the context where the article has been framed? What kind of particularities have affected its implementation ? (WS)*	*What is the message that the article is promoting? What is the language that accompany the article? (WS)*	*What tools have been used by the article? Which kind of methods have been employed? Which elements have been at the value proposal for promoting change?*	*What barriers have been faced by the implementation of the study? Which drivers have helped during the lifespan?*	*Which RRI keys have been promoted? Which RRI dimensions? What bridges have been established between RRI and other umbrella terms? What meanings have been conferred or added to RRI? What critiques to RRI have been faced?*

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
RRI: implementation as learning - https://doi.org/10.1080/23299460.2019.1603570	The paper illustrated a new conceptualization of RRI. RRI was approached through social learning. The aim was to evaluate technopolis documents of RRI and analyse the role of RCN in supporting RRI.	Conclusion: The paper showed that RRI could be conceptualized as learning. RCN underlines RRI as learning. The study found that it is useful to have a clear conceptual framework of RRI because it supports the learning process. In the case of RCN, it means the combination of conceptualization and learning is useful. How much can learning-oriented implementation processes shape the concept of RRI? Additionally, the article encourages other research	The purpose of the study was to investigate the funding organization RCN`s approach to RRI. The RCN is the funding organization with a societal actor role in the field of science and society. (RCN= the research council of Norway)	Key message: If RRI is understood as learning, it could not be implemented as a specific tool or method in organization However, it is not clear what constitutes the desired effect of learning in the sense of organizational change. The paper also emphasized the	Two methods were applied in this article. -The literature review consisted of technopolis evaluation documents of RRI. -A focus group interview was about RRI practices in the RCN`s programs.	Drivers of RRI implementation: - open and experimental organization from a learning perspective - the most effective way to introduce and implement RRI is to make researchers and program management to consider the AIRR dimensions in their calls and proposals Barriers of RRI implementation: -Lack of communication and a clear	RRI has at least four conceptualizations: 1.a fundamental reconfiguration of the relation between science and society 2. an AIRR approach 3. a set of policy agendas defined by the EC (including gender equality, open access, science education, public engagement, and ethics) 4. RRI as social learning The social learning perspective is inherently involved as part of RRI The conceptualization of

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
		programs to implement RRI.		organizational aspect of RRI. The organizational aspect underlines the environmental context and interactions within organizations.		understanding of RRI. -RRI is described in proposals and calls, but the practical implementation and impact on the research project are missing.	learning raises the questions of implementation.
Review of RRI tools project - https://doi.org/10.1080/23299460.2017.1359482	This article had a twofold meaning. First, it created a shared space as an online portal of educational resources (online RRI project tool portal)	Based on their review, RRI differs from traditional approaches (CSR). RRI makes innovation processes more reflexive and try to understand what is needed for social responsibility. Conclusions:	The project was funded under EU's seventh Framework Programme (2007-2013). The core idea was the concept of a community practice	They emphasized outward-facing engagement to innovation, and the importance of considering what effective	Two methods were applied in this article. First, the project consortium had a dialogue with different stakeholders. Based on this dialogue with different	Barriers of RRI: -Lack of practice and training in RRI perspectives and practices across EU -The risk of using RRI just to meet pre-	The article highlights various perspectives and experts of RRI. RRI key concept (anticipation, reflexivity, inclusion, and responsiveness) was identified. At the heart of RRI should be ethical

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
	Second, it reviewed the published RRI tools. The target was to build a new culture of responsible innovation. The objectives of the online RRI project tool were as follows: - educate about the aspect of RRI - foster the use of RRI across EU - provide ease access to RRI resources	It also seems RRI has succeeded in creating questions of structure, process, and innovation politics from the point of view, how engagement is done. At the same time, the project succeeded in shaping practices in the meaning of RRI principles. They presented that RRI should be used in a different context in different ways, not only in a familiar way. This requires the consideration of RRI tools.	developed by Lave and Wenger, 1991. This means that a diverse group has a shared space of activity, promoting the process of collective learning. Thus, the examples of RRI practices, tools, and resources were gathered collectively by members The portal also offered a self-reflection tool, which might help to analyze how their	engagement is and how the effects can be achieved in an institutional context. They also promoted an idea of a social contract while developing a new culture beyond different stakeholders. RRI is seen as the founder of this new societal contract in	stakeholders, an ethos of RRI was developed. Second, a review of perspectives on RRI across Europe was conducted. The review focused on the material on the RRI Tools portal.	defined criteria is high. This can be eliminated if RRI itself is anticipative, reflexive, and inclusive.	and political significance. In technoscientific societies, the RRI needs expansion of democratic influence rather than the production and experimentation.

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
	- help to recognize the gaps between theory and practices -identify future research needs -Share and upload materials collectively - build a new culture of responsible innovation - develop new ways of reflecting the goals of RRI		research or technology reflects the ethos of RRI.	various institutions. Citizen participation beyond academia and industry is central to creating a new social contract between society and science.			
Synthesizing an implementation framework for	This article developed a practical framework for RRI,	They formed a new framework based on the idea of combining process dimensions and RRI dimensions.	The focus was more on conceptual than on empirical work.	Earlier studies have developed an enormous	For each qualifier, an overview of the reasons to apply (rationale),	The project did not perceive any specific barriers in implementation.	The article claims that in the field of RRI is unclear how RRI qualities/dimensions relate to one

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
responsible research and innovation - https://doi.org/10.1080/23299460.2019.1676685	that can be operationalized in research and innovation practice. The objective of the framework was to review five process qualifiers of RRI (transparency, inclusion, reflexivity, anticipation, and responsiveness) and three product qualifiers (societal relevance, market competitiveness, and	RRI should be understood as the relationship between key RRI dimensions (transparency, inclusion, anticipation, and responsiveness) and three process dimensions to produce and deliver responsible products from societal perspective. This relation may help to operationalize RRI in practice and avoid using RRI as a short-cut without actual impact. They suggested productive combinations of these RRI dimensions.	The literature review was founded on policy papers, EU project proposals, and academic articles on RRI that appeared between 2011 and 2016 to identify common qualifiers of RRI.	amount of RRI criteria. Hardly any of the frameworks defined under which conditions responsible processes may or may not lead to responsible products. The authors promote that understanding the relationships among qualifiers should be central.	and the strategies to implement (implementation) was given. Each RRI dimensions and their interrelations were visually displayed Qualifiers were derived using the following process: First, qualifiers were distributed over process and product criteria Second, the process		another. All dimensions of RRI must be integrated, although these might conflict. The unclear concept of RRI sets barriers to the implementation of RRI in practice and promote ways to develop products without having seemingly responsibly to change the product in response to societal perspectives. In the article, this is referred to as short-cuts in RRI dimensions.

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
	scientific quality.) based on the literature published between 2011 and 2016. The aim was to synthesize factors (qualifiers) that indicate quality in responsible processes and products.				criteria were further grouped according to the process dimensions described by Owen, Bessant, and Heintz (2013) Finally, the developed framework was compared to other RRI frameworks.		
Unscripted Responsible Research and Innovation: Adaptive	This paper aims to explore factors relating to the creation of adaptive space to gain insights into	The study reports that when organizing for adaptive space, it is essential to realize that dynamic, collective action iteratively goes through three temporal stages: -	The case study was framed in juvenile justice institutions. The aim was to explore the collaboration between researchers	The article promotes the metaphor of improvisational theatre to clarify the absence of preexisting	Data were collected using multiple qualitative methods: observations of group meetings and site visits,	The context of the case study affected implementation, but further barriers or drivers were not identified.	RRI practices can be distinguished into three categories: (1) learning, (2) governance, and (3) action. The transition of learning and governance into

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
space creation by an emerging RRI practice concerning juvenile justice interventions - DOI: 10.1186/s40504-018-0066-1	how RRI practices can be performed in practice. Adaptive spaces can be advantageous for organizing collaborative practices.	negotiations of joint expectations, - commitments for future actions, - and executions of these commitments. This study explores the way how adaptive space can be created also informally without concrete end goals. The study reported factors maintain adaptive space: " 1) be flexible 2) keep the action moving 3) put the relationship in central ". These can be explicated in behavioural guidelines or personal attitudes.	and substance abuse, juvenile offenders (practitioners).	narrative and goals/principles of collaboration. Improvisational theatre may promote the creation of adaptive space and narrative of change in collaborations.	informal conversations, and semi-structured interviews. Data analysis was based on the principles and models of improvisation by Ring and Van de Ven (1994)	In general, the collaboration was favorably compared to other previous research projects in collaboration with juvenile offenders.	a phase of the action is experienced severe. The authors propose that the metaphor of improvisation also provides a new tool for RRI. (In Improvisational theatre, players are free to determine their roles and change roles to encourage collective activity.)

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
Responsible Innovation: A Complementary View from Industry with Proposals for Bridging Different Perspectives - https://doi.org/10.3390/su9101719	This article aims to complement the existing RRI frameworks by a literature review of RRI elements. The key objectives are how to integrate the RRI and business industry and what kind of framework should be established.	Industry, academia, and policymakers need to create opportunities for dialogue to clarify the relevant critical issues and challenges beyond the RRI. The paper conducted a list of ten issues that can be considered as elements of RRI to gain a higher impact on RRI within the business industry. The following elements might be beneficial to consider design thinking, innovation practices, consideration of CSR and CSV and sustainable finance in the RRI framework, the role of ethical	The context is between the academic world and the business world. The aim of describing element was to encourage dialogue of RRI.	The article emphasizes the existing gap between the perceptions of RRI between scientists and industry practitioners The dialogue between business and academia should be much stronger and more relevant to ensure significant impact.	The article was a literature review.	The article excludes barriers/drivers of change.	The article identified RRI dimensions (including anticipation, reflexivity, inclusion, and deliberation, and responsiveness) The authors critiqued current practices and definitions of RRI. The lack of explicit agreement or understanding of RRI neglect to have an impact. RRI also fails to observe parallel developments such as the debates on CSV and CSR, sustainable finance, or ethical leadership. Several shortcomings of the

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
		leadership, the concept of responsibility, and the role of agile in innovation facilitation.					RRI frameworks were identified: product development, management, market analysis, and consumer research. Furthermore, the article claims that moral responsibility is often left undefined in discussions on RRI
‘‘Broader Impacts’’ or ‘‘Responsible Research and Innovation’’? A Comparison of Two Criteria for Funding	The paper analysed the National Science foundation's (NFS) funding criteria against the European concept of RRI. The aim of the analysis was	As a result, they drew two conclusions from their analysis. First, RRI and broader impacts are two different criteria. RRI targets the achievement of societal benefit by providing a process with multiple actors. In contrast, the term broader impacts targets benefiting	The paper evaluated the funding criteria between the American National science foundation (NFS) criteria and the European definition of RRI. NFS is the primary	The message was that current funding criteria lack clarification and holistically ignore responsibility and sustainability. From	From a methodological point of view, the article consists of a literature review and concept analysis.	The article was based on a literature review.	The theoretical background was based on Von Schomberg's definition of RRI since this definition is aligned with the European research group. The article criticized and revised Von Schomberg's definition of RRI.

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
Research in Science and Engineering - https://doi.org/10.1007/s11948-013-9480-1	how RRI could be turned into a valuable funding criterion. The analysis was conducted by comparing an American funding criterion, "broader impacts," and Von Schomberg's definition of RRI. In their in-depth analysis, the funding criteria in three different research institutions: national health	science, technology, engineering, and mathematics. They argue that RRI promotes the idea that fundamental research must increase societal benefits to receive funding. Second, it is challenging to turn these two criteria into one funding guide. There is a need for guidance on funding criteria in specific detail. The description of the criterion should not be too detailed that the interpretation of criteria is possible. The paper recommends that general funding criteria are provided	source of federal research funds. After 1997, NFS replaced its funding criteria and created a new term "broader impacts" to illuminate the ambiguity and lack of clarification of old funding criteria. The broader impacts criterion was designed to serve a mission of NFS in proposals, but the term received criticism.	their point of view, the funding criteria must acknowledge their effects on society and research in general. The existing criteria must be clarified so that interpreting is ease. The paper promotes the idea that science has a purpose in itself without marketable outcome or impact.			They argued that Von Schomber's definition brings out five fundamental problems to be maximally valuable in the European context. 1) The definition of RRI emphasizes the innovation process and marketable products as an outcome of the research. 2) The definition of RRI eliminates the importance of scientific knowledge. While the term "broader impact" seeks to complement the advance of knowledge.3) RRI must always govern "marketable

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
	institutions (NIH), NASA, and The Bill and Melinda gates foundation, were evaluated.	with examples rather than a criterion or a general definition. Besides, all examples should include an additional warning that "including but not limited to." The more transparent criteria will help the funding agency to learn from proposals.	The criticism included that new criteria favour economically productive applied research—besides, the criterion promotes the need for fundamental research to repay the public investment.				products" while the market is only one of the distribution channels for innovations. 4) The word use "*societal desired"* innovations should be replaced by the term *societally desirable because* societally *desired* innovations do not necessarily lead to sustainability in society. *5)* The word use "our society" ignores the societies outside Europe. From their point of view, RRI is responsible for considering all societies. Their analysis identified the three most significant

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
							similarities between definitions of RRI and "broader impacts": 1) societal desirable 2) process 3) specific goals. The similarities between these two terms were remarkable, but the differences were even more significant. The differences can be summarized as follows: 1) RRI is primarily a process, and broader impacts refers to outcomes. 2) The transparency of the RRI process is limited to the end of the development process. 3) RRI is not designed to solve great pragmatic

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
							dilemmas. RRI targets end products' outcomes while broader impacts focus on by-products of the process. 4) Sustainability and ethical acceptability of research are not considered in any examples of broader impacts 5) Application criteria. NSF aggregates the actual broader impact on the whole of projects. In contrast, RRI requires a research and innovation process.
Company Strategies for Responsible	The article proposed a conceptual model for the RRI strategy	The framework differs from other RRI frameworks by the capacity of evaluation and the consideration	The objective of the framework was to evaluate the results of the	The theoretical background of the framework	The article was a literature review.	The article excludes barriers/drivers of change.	The authors claim that RRI needs more comprehensive and

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
Research and Innovation (RRI): A Conceptual Model - https://doi.org/10.3390/su9112045	of companies. The framework aims to evaluate companies regarding their innovation strategy and processes. In addition, it could help companies to link a company's RRI strategy to their business strategy context and achieve RRI outcomes. The novel component of the	of the company's external environment. The study recommends that the external environment (the context) should be considered because it influences the innovation settings. The framework consists of four main elements: context, strategic level, the operational level, and RRI outcomes.	previous PRISMA project. The PRISMA project focused on helping companies articulate an RRI strategy and make the business case for RRI based on the type of technology. The article promotes the idea that only a few companies/studies have an explicit RRI strategy.	is based on corporate social responsibility (CSR), and RRI strategy. The main difference between existing frameworks is that this framework includes the self-assessment of RRI outcomes through the definition of many RRI (KPIs). In the view of authors, self-assessment			integral view in a business context, especially the connection to the company's business strategy and its corporate social responsibility (CSR) strategy and activities, should be crystallized. They criticize that RRI as a concept is still unknown by the companies, and the implementation is infancy. The companies and private business industries are more familiar with the concept of corporate social responsibility (CSR) than RRI. The industry has also developed methods based on CSR.

Article	Objective	Learnings & recommendations	Context of change	Narrative of change	Building blocks for change	Factors supporting Barriers and drivers for change	RRI meanings
	framework is the assessment of RRI outcomes through the definition of several RRI KPIs.			helps companies to think about their value to society.			They argue that full RRI strategy will encompass four process dimensions of RRI: anticipation, inclusiveness, reflexivity, and responsiveness.
The practice and perceptions of RRI—A gender perspective - https://doi.org/10.1016/j.evalprogplan.2019.101717	This article highlights the importance of the gender dimension in RRI. Currently, gender experts are worried that the gender dimension would lose its significance among the other five key RRI areas.	As a result, their analysis reveals a significant difference between female and male researchers regarding their practice and perceptions of RRI; the existing differences were even more pronounced concerning gender competence. (For example, Female researchers engage and support more their female colleagues, and	Any attributable particularities were not identified.	The article advocates that gender-competence is an essential competence for each researcher in R&I. The gender competence refers the idea that chances in practice in R&I will be not be reached by	The study applied quantitative methods by conducting two massive surveys for two groups of researchers. The first group consists of the researchers who were funded by the EU within the last five years, and	Two questionnaires were primary sources of data collection, and the project did not perceive any specific barriers in implementation. In terms of gender equality, the study reports that commitment to gender equality is required to change the R&I	The article asserted that the gender dimension is undefined among the other six RRI pillars "keys"; gender equality (GE), science literacy and science education (SLSE), public engagement (PE), open access (OA), ethics (E) and governance (GOV). By adding the gender part of five key areas, the experts are worried

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	Two large scale surveys were conducted as a part of the EU-funded MoRRI project. The aim was to fill the gap of practices and perceptions of RRI among researchers in Europe. In surveys, the researchers were asked about their views on relevance, benefits, barriers, and handicaps of RRi in their research. It	communicate and disseminate their research results more frequently, whereas males are engaged more in their research industry) Gender competence proves to be the relevant distinguishing criterion, and gender-competent researchers are more frequently involved in other RRI activities. The survey illustrates that EC and EU-funded project has a crucial role in enhancing gender quality standards in R&I. Furthermore, the study reports that institutional environments may support practices of		an increasing number of women in R&I, preferably by strengthen gender competence among stakeholders. Furthermore, the article promotes effective policies to support gender equality. New policies can be developed by combining	the control group consists of researchers without the EU-funded project. To find participants, they used the EC CORDA EU database. As a result, the novel explanatory factor gender-competence was performed to investigate the differences in gender quality activities. Gender-	practices in institutions.	that the gender dimension would lose its significance. In the field of gender experts, the definition of the gender is seen as a three-dimensional construct: (1) increase female participation in all fields and at all hierarchical levels of science and research, (2) abolish structural career barriers for female researchers and (3) strengthen the gender dimension in research and teaching. In the article, RRI was an umbrella term, even though

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	also investigated whether institutional frameworks support the implementation of RRI activities and which socio-demographic characteristics impact RRI activities.	RRI. In practice, institutions with GEP are more inclined to support female researchers than those without such institutional incentives.		different RRI keys goals.	competence includes understanding of gender equality goals and gender aspects in research.		parallel terms, such as sustainability, transparency, and CSR, were specified.
The framing of innovation among European research funding actors: Assessing the potential for 'responsi	It examines how the concept of innovation is understood and used in policy implementation, with a particular focus upon 'food and	The cognitive framing suggests that innovation in the food and health domain is perceived to be focused on biosciences and marketable applications to the neglect of social sciences and broader public interest; that	The paper adopts cognitive framing (Borrás, 2002) as the theoretical lens, the current paper argues that through understanding the dominant	It is argued that cognitive framing towards innovation will partly inform the success of the RRI principles, as they are	A qualitative semi-structured interview with actors involved in the development of publicly funded research programmes	n/a	The main condition of innovation flexibility and interactions which are seen to closely related to responsiveness and inclusivity dimensions of RRI. Despite the recent focus on social innovation in

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ble research and innovation' in the food and health domain - https://doi.org/10.1016/j.foodpol.2016.04.004	health' science and research policy and funding. the cognitive. It focuses on framing of innovation that shapes decisions.	the ''innovation network" is primarily viewed as centred around scientific/ technical and industrial actors; and that the demand-pull dynamic is relevant to innovation in the area of food and health, despite having been relegated in contemporary thinking and policies around innovation. Overall, the cognitive framing of innovation is centralised on economic output. Furthermore, there was limited discussion about the inclusion of broader societal actors into interaction of industry and academia.	cognitive framings of the innovation process that variably situate innovation within different social actors (e.g. market, industry, researchers, or civil society), the potential for RRI can be assessed. In the paper, cognitive framing refers to the process of applying or expressing cognitive frames, which are stored in memory (Dewulf et al., 2009).	likely to affect the types of projects they fund to advance innovation. As cognitive frames are slow to change; one implication of this study is that the master-narrative of innovation as fueling economic growth may itself need to change in order for the project of RRI to progress; as things	with a food and health research component. Data were collected in Austria, Germany, Italy, Netherlands, Portugal, Scotland, Spain, and UK-wide. Altogether 55 interviews focused on publicly funded programmes.		European policy, few respondents mentioned it, suggesting that more work needs to be done to raise awareness of this among those involved in designing and deciding upon research funding in the food and health domain

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				stand, the strong link between innovation and economic growth seems to influence funders' framings of innovation more so than RRI.			
Assessment of science and technologies: Advising for and with responsibility - https://doi.org/10.1016/j.techs	Rethink the relationship between science & society and reform the current advisory institutions and assessment practices through the responsibility	There is a need to create platforms for broad dialogues where advisors from different backgrounds and disciplines can meet and discuss various problems. These assessment dialogues can advance the RRI agenda.	European policy context; the article was constructed as a part of a workshop related to responsible governance of STI and as a part of EST-Frame research project, which	RRI should be an open concept for interpretation as it affects the whole Science and Innovation System as well as the advisory & assessment	1. More interaction among and across institutions. 2. Create platforms for organized cross-disciplinary dialogues. 3. Adopt RRI practices as a part of the	Barriers: 1. Science has not traditionally performed well in terms of responsiveness and reflexivity. 2. The current institutional assessment system does not provide enough resources for RRI practices.	Responsiveness identified as the main dimension of RRI. Furthermore, In order for research to be responsible, it needs to address societal challenges, engage stakeholders in mutual learning processes, anticipate potential problems as well as

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oc.2014.12.004	and RRI discourse and discussions.		studied the assessment of emerging STI.	bodies of STI.	assessment process.	3. Some assessments require the handling of secrets, which cannot be made public. Drivers: 1. The recent change towards more reflexivity in science. 2. Existing orientation towards solving social challenges.	reflect on the available alternatives and respond accordingly. RRI bridges gaps between ELSA, TA and other anticipatory approaches.
Limits of decentered governance in science-society policies - https://doi.org/10.10	Addressing the practices of implementing science policies involving science-society	The article found that because of competing policy demands originating from New Public Management (NPM) and RRI in science governance, scientist is mainly accommodating RRI	The context of the findings is Norwegian bio- and nanotechnology where RRI is relatively well implemented in the funding programs of	RRI should remain an open concept that fits into many contexts. RRI is a way of democratica	1. Science-society policies should create conditions for new practices. 2. In order to develop ownership of	Barriers: 1. RRI is perceived as yet another demand on the individual scientist, rather than a counter-logic to NPM. 2. The existing challenges	Many scientists felt that they were already “doing RRI”. The main problem is that often a boundary, a barrier or a demarcation was maintained between the RRI part of a project and

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80/23299460.2019.1605483	relations, such as RRI.	practices, and not actually enacting them. Therefore, science-society policies should aim to create conditions for new practices to emerge in addition to the focus on individual responsible behavior.	the Research Council of Norway.	lly tackling the challenges posed by enabling sciences & technology in order to counter the depoliticizati on originating from NPM-oriented science governance.	RRI, science-society policies need to connect to the project and practice level of scientists. 3. RRI needs to address the current NPM-regime more explicitly, instead of focusing on individual projects.	related to competition, resources and time posed by the current academic life. 3. Translating RRI-criteria into practice is left to individual scientists and projects. Drivers: 1. Scientists already engage in bottom-up responsibility practices and solving grand challenges. 2. Scientist already want to be useful to the broader society.	the “actual” project. RRI-activity is thus often outsourced in a project. The main reasons for this was that many scientists feel that science should have considerable autonomy and do not see that there is a problem related to the social control of technology.

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Against the tide of depoliticization: the politics of research governance - https://doi.org/10.1332/030557316X14681503832036	Identifying opportunities against the depoliticization of research governance through RRI.	The study identified RRI as way to provide a focus for the politics related to the public value of R&I. The two factors affecting the process of politicizing research governance are: the actors acknowledgement of their societal responsibilities and the meaning given to RRI.	The case study is about a "typical" research-intensive University in the UK, oriented towards knowledge-exchange and technology transfers. Universities are seen as the focal point for the struggle between different meanings of RRI.	The study suggests that because the direction and purpose of science is not objective nor value free, science should always involve a political dimension. Therefore, politicization is not seen as a pejorative term, but as a process whereby established practices and	There were multiple strategies for implementing the politicization of research governance through RRI, such as: 1. Prepare for dialogue 2. Integrate RRI 3. Integrate a broad range of stakeholders. 4. Achieve cultural change.	Barriers: 1. Lack of knowledge about RRI-in-theory. 2. Lack of imagination of what RRI-in-practice could look like. Drivers: 1. Since the Global Financial Crisis, the dependence of society and states on the STI has grown as have the increasing demands on science to address and even solve societal challenges and needs.	The authors distinguish a major gap between RRI-in-theory and RRI-in-practice. The lack of empirical evidence of the translation of RRI theory to practice is also noted. The key tension identified in RRI is the one between interpretive flexibility of RRI and the need for a shared meaning of RRI. There is a need for concrete case studies that illuminate opportunities for shared understanding of RRI. The meaning of RRI in practice was identified as:

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				institutions are challenged and the value dimensions of public issues made more visible to public scrutiny.		2. There is a demand for a more participatory agenda-setting of research after the public rejection of GMO's for example; RRI as a way to avoid controversies.	1. Interdisciplinary involvement. 2. Public outreach. 3. Stakeholder involvement. 4. Training and education.

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The past and future of RRI - https://doi.org/10.1186/s40504-014-0017-4	Answering the question of how did RRI come about and what are the dynamics and implications of RRI for the future?	RRI is a social innovation, which opens up the existing division of moral labor and responsibility in scientific activity between actors and stakeholders. The paper argues for regular inquiries into the trajectory of current responsibility discourse and concepts such as RRI.	The discourse of responsibility in Europe currently and also in a broader historical context; referring to issues such as nanotechnology and the responsibilities in scientific activities related to the development of weapons.	RRI is a part of a broader and a longer debate about the evolving social contract of responsibilities between science and society vis-à-vis each other and the division of moral labor between the two. The development of RRI reinforces the trend towards more societal engagement in science.	1. Considering the division of moral labor: a tool to better understand the current and possible roles of scientists, lay people, citizens and consumers. 2. Different ethical & responsibility approaches: consequentialist ethics; inclusive governance; second-order ethics; and the social license to operate.	Barriers: 1. The existing division of moral labor often sees regulation as taking care of the social and ethical issues of scientific activities. 2. Public engagement activities are seen through the existing division of moral labor. Drivers: 1. RRI is a part of a longer evolution of the division of moral labor and the concept of responsibility. 2. RRI is a part of the current policy discourse	RRI is an attempt at social innovation. It means changing roles for the actors in STI and R&D; the impacts of technology are not outsourced just as a regulatory matter. RRI is about broader responsibilities, not just about risk, utilitarian ethics or containment. Scientists have an important responsibility to better assess the embedding of technology to society, while industrialists also have new responsibilities along the value-chain.

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						and benefits from the existing trend towards citizen engagement. 3. Promoters of emerging technologies acknowledge the need for social acceptance of technology.	
Responsible Research is not good science: Divergences inhibiting the enactment of RRI in Nanosafety -	Identifying different ways that nanosafety scientists relate to core RRI criteria, demonstrating both convergence and divergence in their views of RRI.	In order to translate RRI into practice, more attention needs to be put on the institutional and structural change, and more sensitivity needs to be geared to cultural and normative divergences. Furthermore, empirical feedback needs to be taken	Bio- and Nanotechnology project context. Background of the article is also in the challenges of earlier GMO crisis related to acceptance of technology.	RRI is a part of a broader quest to reimagine the relationship between science and democracy. RRI challenges the idea of science as independent	1. Evaluation of scientists based on not just publications but on public engagement as well. 2. Interdisciplinary “crash courses” for scientists to	Drivers: 1. Need for new science governance because of the uncertainties in emerging technology 2. Need to solve societal challenges Barriers:	There is no one definition of RRI, but many. The common strands among the many definitions are: 1. Ethical conduct. 2. Anticipating impacts and assessing alternatives. 3. Public outreach. 4. Critical reflection. 5. Transparency.

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https://doi.org/10.1007/s11569-017-0306-5		into account in order to reflect on the theories of RRI.		, expert-led and objective. Therefore, new strategies are needed to address the normative differences between scientific culture and the concept of RRI.	learn from other fields. 3. Long-term commitment for the implementation of RRI.	1. Strict division of moral labor between science and society. 2. For many scientist's good science and some features of RRI are in conflict with each other. 3. Some RRI principles challenge the freedom of science. 4. RRI is time-consuming and not rewarded by the current systems = RRI is yet another burden on the scientists.	6. Social utility. 7. Stakeholder collaboration. The emphasis in the implementation of RRI has been on the individual scientists. More attention needs to be put on the institutional implementation of RRI.

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Definitions and Conceptual Dimensions of Responsible Research and Innovation: A Literature Review - https://doi.org/10.1007/s11948-016-9782-1	Provide a discussion on the definitions and conceptual dimensions of RRI based on literature.	The article found that while the so-called administrative definitions of RRI are quoted widely in the RRI -literature, they are not often elaborated upon. The study identified four conceptual dimensions of RRI along with two more emerging dimensions.	The context for the article is the relevant RRI-related literature that is divided into administrative and academic definitions /meanings of RRI.	RRI aims at an early and democratic inclusion of stakeholders in order to anticipate the positive and negative impacts of R&I. Importantly, RRI shifts the focus of responsibility from outcomes to the process of responsibility. Implementing responsibility implies engagement and	1. RRI as a process or a design strategy of responsibility. 2. Code of Conducts. 3. Anticipatory governance methods. 4. Public dialogue.	Drivers: 1. New Innovation Policy of the EU, which sees innovation in a broader societal context. 2. Search for interactions between SSH and Hard Sciences. Barriers: 1. It is difficult to formalize RRI into a practical procedure. 2. Vagueness of RRI definitions and meanings.	The definition and different dimensions of RRI lack clarity: RRI can be defined as an administrative, top-down, policy concept; or as a more diverse academic concept. The analysis of the article found four existing dimensions of RRI: 1. Inclusion 2. Anticipation 3. Responsiveness 4. Reflexivity And two emerging ones: 5. Sustainability 6. Care

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				personal commitment.			
The distribution of ethical labor in the scientific community - https://doi.org/10.1080/23299460.2020.1724357	Proposing a classification of the members of the scientific community depending on their engagement with the collective activity of scientific enterprise	All scientist engages in ethical thinking, either explicitly or implicitly. The paper highlights the tension between the scientists who argue that science should be value-free, and those who argue that science should be value-laden. The paper classifies scientists into four categories based on their views and values: 1. Heroic scientists: value-free science 2. Golem-makers: science as a good.	The empirical data was collected as a part of H2020 funded RRI Practice - project.	The institutionalization of ethics should not be delegated outside the scientific community. It should come from within the community. However, not every scientist has to be an expert on ethics. Ethical labor	1. Training should be provided for junior scientists for them to understand their work in a broader context. 2. Tools should be provided for junior scientists for responsible conduct under uncertainty and controversy.	Drivers: 1. Scientists already engage in implicit ethical reflection. 2. Science is often seen as an act of pursuing something good for society. Barriers: 1. Outsourcing of ethics: ethics is not seen as a part of the scientist's job. 2. Ethics and RRI seen negatively as	There is a tension within ethics between the individual and the collective; between the individual focus on reflection and the focus on collective ethical labor.

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		3. Prometheans: pursuit of higher good. 4. Faustian: beyond good and evil.		is distributed among the scientific community, much like cognitive labor. As a result, responsible science can rely on the expertise of a minority of scientists carrying out the ethical labor.	3. Promoting individual reflection.	top-down bureaucracy. 3. Ethics is often seen as the brakes on innovation, when instead it should be seen as the “steering wheel” of innovation.	
Risk governance and ‘responsible research and innovation can be mutually	Addressing the difficulties of implementing RRI in practice by suggesting that the practice of Risk	The articles suggests that RG and RRI can be mutually supportive and that the processes of RG could be used as models for better RRI uptake and implementation	The context of the article are several studies and cases related to both RRI and RG. The cases are about technology development	RG and RRI can be mutually supportive as they share synergies in concepts of responsibility and	1. A guide to self-assess research from RRI&RG - point of view. 2. RG principles and approaches such as: Ex-ante risk	Drivers: 1. The need to assess and analyze the inherent uncertainties, risks and possibilities of technology development.	When seen from a RG perspective, RRI is about reconciling the socio-ethical concerns and the potential tangible benefits of emerging technologies. In RG, responsibility is

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supportive' - https://doi.org/10.1080/13669877.2019.1646311	Governance (RG) could be applied to better manage and implement RRI processes.		and related risks, benefits, regulatory compliance and responsibility.	fairness. Both approaches reflect the values of the society in order to guarantee the acceptability of decisions. The well-established RG processes can provide RRI with a model of processes that drive deliberations towards implementation. Conversely, RRI can function as compass for	analysis, precautionary principle etc. 3. RG-tools.	Barriers: 1. Conflicting values between stakeholders and actors. 2. RRI is Difficult to put to practice. 3. RRI has no legal, regulatory or standards basis.	seen as arising from a process of research and innovation. In order to fulfill the criteria of responsibility, the process needs to have room for experimentation, reflection n and learning by trial and error. Both RG and RRI share key concepts and dimensions, such as the product/process dimension and the cross-cutting dimensions of anticipation, reflexivity, deliberation and responsiveness.

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				RG by providing it with a normative goal.			
Responsible research and innovation in Germany–between sustainability and autonomy	In the German S&T community, the term RRI is virtually unknown outside EU projects although its constituent parts (inclusion, reflection, transparency and anticipation) are widely discussed as part of the debate on sustainability	RRI is not a functional term in Germany. Its ingredients are well known and, in some cases, even well legislated. As such, there is no need to change the understanding within the research community of responsibility in terms of the five RRI Keys.	There is a considerable debate in the country as to the meaning of responsibility in terms of sustainability and autonomy. Sustainability in Germany is discussed as a (new) research process that encompasses transparency, reflexivity, inclusiveness and anticipation, in other words, in terms of the original	There is a strong consensus among the stakeholders that researchers and research organisations have certain responsibilities with regard to society		It is clear from discussions with the representatives of the research community in Germany that the way RRI is formulated it has significant overlap with the concept of sustainability as it has been developed in the country	Although the RRI keys as promoted by the EC are not seen as useful concepts for the description of the term, the same is not true for the RRI Dimensions of Anticipation, Reflexivity and Inclusiveness (Stilgoe, Owen, and Macnagthen 2013).

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			conception of RRI				
Responsible Research Is Not Good Science: Divergences Inhibiting the Enactment of RRI in Nanosafety - https://doi.org/10.1080/23299460.2019.1603536	The paper describes an empirical study exploring the potential for RRI within nanosafety research in Norway and Denmark. It identifies three different ways nanosafety scientists relate to core RRI criteria, demonstrating areas of both convergence and divergence between their views and	The paper identified differences and challenges that demand critical reflection on both the appropriateness and applicability of RRI characteristics for enactment at the level of individual research scientists. Significant changes are therefore advocated as required if RRI, as currently imagined and promoted, is to become an integral mode of scientific culture.	External. Funding coming from national and EU projects.	In the article, it is described 7 common threads as defining features of RRI, which are used to inform the exploration of RRI within the practice of nanosafety research. Then, a brief historical overview of the relationship between RRI and nanotechnology is	The paper is based on a mixed methods approach. The method involved ethnographic participatory observation combined with semi-structured interviews and dedicated focus group discussions across 5 major nanotoxicology laboratories. 4 of the focus group discussions	The paper draws out several practical barriers and cultural differences that can impede the enactment of RRI. These constraints included barriers linked to time, funding, reward systems, training, expectations of scientific production and the moral division of labour. There is also a divergence in normative values between	The paper stress that to generate truly RRI, a recognition of the divergences between the current scientific culture and the theory of RRI is warranted. To advance RRI, further work on the practical barriers, cultural differences and normative divergences is required, especially to explore if these findings hold true beyond the nanosafety community. To achieve RRI, we have to develop not only strategies to address the practical barriers

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	those of academics and policymakers currently defining and working to promote RRI. The paper identifies a range of practical barriers and cultural differences that are creating such divergences and inhibiting the enactment of RRI within the particular site of research laboratories.			presented, as well as it is justified why nanosafety community is a relevant and interesting place to explore RRI in practice.	were conducted with nanosafety researchers from the major nanotoxicology laboratories in Norway, while the last was conducted with a group of nanotoxicologists working in Denmark.	what is being presented as RRI and what the scientists perceive as key characteristics of good science. The challenge in this final category of response is therefore not only that there are practical barriers to the performing elements of RRI in current scientific practice. The biggest challenge is rather that these characteristics diverge significantly from the norms	inhibiting the integration of RRI into scientific work but also strategies for working with the cultural and normative differences in play.

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						and values of 'good science'.	
Exploring the normative turn in regional innovation policy: responsibility and the quest for public value - https://doi.org/10.1080/09654313.2019.1609425	The aim is to position RRI as a basis for developing more spatially sensitive and responsive approaches to implementing innovation policy at a regional level. concept of (RRI) offers a potentially useful lens for re-casting the understanding of innovation related decision making.1. RRI by using	The article highlights two key points in the evolutions of innovation policy that need to take into account: greater societal challenge orientation and problematisation of 'failures'; and greater attention to the link between regional development and transformative change. There are interesting points of cross-fertilisation between RRI, public procurement regional innovation policy which help us understand the potential to overcome the	The ineffectiveness of traditional innovation policies in solving societal challenges such as poverty, ageing, climate change as well as problems of regional economic restructuring has motivated a recent 'normative turn' in innovation policy. (RRI) as a popular concept for	The article offers principles, drawing on RRI and public value as frameworks for guiding regional innovation policy. Using RRI as 'critical' lens, the article proposes a series of elements that position public procurement of innovation as a form of transformati	The article brought together three relatively disconnected strands of literature, namely responsible research and innovation, challenge and demand-oriented innovation policy approaches, evolutionary economic geography and place-based economic development approaches.	particular concern to the RRI agenda is how to ensure innovation is aligned with societal needs and responds to pressing societal challenges. Much of the work around RRI has been focussed on publicly funded R&D prioritized the analysis of innovation in technological terms rather than in terms of the type and, importantly, the	They apply RRI to assessing the opportunities and challenges of public procurement as an instrument of challenge oriented and transformative innovation policy, RRI can be operationalized through four key dimensions aimed to manage 'questions of uncertainty (in its multiple forms), purposes, motivations, social and political constitutions, trajectories and directions of

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	it as an analytical lens in a specific area of demand-side innovation policy: public procurement. 2.understanding of the opportunities and challenges of using public procurement as a policy instrument to argue that a bolder normative framework for the analysis of innovation policy in the context of	spatial blindness of new innovation policy rationales and promote responsibility in a new context of regional development. By reflecting more comprehensively on the innovation aspect of public procurement of innovation using tools like RRI, we can both significantly improve the understanding of the contexts in which it is more and less likely to be useful (and eventually support practitioners) and re-situate the debates within debates about public administration, public value, and public policy which	exploring the relationship between science, technology, innovation and society (Ribeiro, Smith, & Millar, 2017).	ve place-based innovation policy		direction of change produced by innovation. Inspired by Schumpeter, scholars have long tended to assume that, overall innovation automatically delivers public value, directly or indirectly.	innovation' (Stilgoe et al., 2013, p. 1570): They link the four principles of RRI defined by (Stilgoe et al., 2013): anticipation, inclusion, reflection and responsiveness to different phases of the public procurement process. Public procurement seen through the RRI lens

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	societal 'grand challenges' or 'mission-oriented innovation policy' must a) have a focus on creating public value; b) investigate how societal problems are framed; and c) assess the capabilities of different societal groups to engage in transformatio nal change.	will enable more critical, theoretical and context-sensitive critiques of this innovation policy instrument in action.					
Towards regional responsib le	This article develops a model for a regional	Adding geography to RRI First, the article addresses the	RRI and RIS3 are central concepts in the EU's	RIS3 and RRI approaches		Viewing RRI from a regional perspective,	Integration of responsible innovation and smart specialisation

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research and innovation? Integrating RRI and RIS3 in European innovation policy - https://doi.org/10.1093/scipol/scz029	responsible research and innovation (RRI) policy, integrating existing European Union policies on RRI, and on research and innovation strategies for smart specialisation (RIS3)	geographical dimension. Adding an RRI framework to smart specialization. There are limitations of this article in presenting a primarily conceptual argument, and clearly further research is required to explore the ways that regional RRI practices emerge or do not in particular places. There remains the need for a mechanism to articulate European public□values, and a willingness to allow economically less powerful places to express those values in a way to shape technological futures, if RRI is to achieve its regional potential.	innovation policy agenda, but there are tensions between the two approaches. The place-based approach inherent in RIS3 is missing from RRI, which has a fuzzy concept of geographical scale and is vulnerable to mismatches between the scale of innovations and of the associated governance networks	need be combined to generate any kind of approach to innovation that can drive both growth and build better societies. The two approaches are certainly complementary as each has the potential to address particular weaknesses □in the other.		there are a number of ambiguities which undermine its transposition from the macro-scale to the regional context. First, the RRI approach is not clear as to what is the 'society' for which an innovation should be desirable. Secondly, it is not clear about which 'societal actors' should be involved in governing research and innovation.	processes. RIS3 stages: Analysis, Governance Vision, Prioritisation, Policy mix, Monitoring and RRI dimensions: Anticipation, Reflexivity, Inclusion, Responsiveness. An integrated framework where four dimensions of RRI (anticipation, reflexivity, inclusion, and responsiveness) are applied to each stage of the RIS3 process. This helps to identify how the RIS3 process can be further developed into a responsible

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			involved in the process.			These ambiguities reflect that geography is lacking from the current understanding of RRI. The development of such policies in each region is ultimately subject to ordinary political and democratic processes reflecting more immediate concerns and interests of the actors involved. The definition of appropriate scales is also pertinent for the identification	innovation policy which integrates the broader perspectives of societal stakeholders into the development of innovation policies for European regions.

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						of stakeholders for the RRI process. Again, this is vaguely defined in the core RRI literature.	
Limits of decentred governance in science-society policies - https://doi.org/10.1080/23299460.2019.1605483	The article addresses the practices of implementing science policies that involve science-society relations, such as funding policies on ELSA and RRI.	The paper shows that the current way of requiring RRI to be an integral element of grant proposals risks estranging scientists, also because the concept of RRI remains unclear to them. Scientists may experience the very suggestion that they should do RRI as an implied allegation that their research is not responsible.	External (project funding coming from NCR)	Radical/Normative. Planned by policy. NCR as policy maker	Radical/Normative. Planned by policy. NCR as policy maker	"Talking the talk" but not "walking the walk". Scientists did not outrightly dismiss RRI demands, but they appropriated the established language in ways that contested the underlying strategies. Finding somebody 'to do the RRI' was a frequent coping strategy for	Successful science-society policies should not focus only on encouraging scientists to adopt responsible behaviours; rather, policies need to create possible conditions for new practices. The RRI discourse does not take hold because RRI does not help the scientific community with their problems; rather, it adds more tasks (academic capitalism and DIY RRI)

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						meeting RRI requirements in research proposals without integrating this more fully into the original proposal or into the research questions.	
A Mobilising Concept? Unpacking Academic Representations of Responsible Research and Innovation - https://doi.org/10.1007/s11948	This paper interrogates different academic understandings of RRI by systematically analyzing articulations of RRI with the aim of shedding light on some of its key elements. To do so, we reinterpret	Discussions of responsibilities in science and technology development have been pervasive since the late 1940s through developments in research ethics (Resnik 1998), as relating to environmental governance (Pellizzoni 2004), and through broader philosophical and	Literature search on the Web of Knowledge to retrieve articles dealing with the concept of RRI. Specific questions that guided this work are as follows: (a) What do authors claim as the main objectives of RRI?	Unpacking RRI. Taking a panoramic perspective across the sample, RRI can be seen to operate as an umbrella term in the academic literature that comprises a series of theoretical	In order to explore the RRI academic landscape in detail, four key dimensions of the concept are examined. As stated above, drawing on Owen et al. (2012) we look at (1) motivations	The 'novelty' of RRI seems to rest on four elements: first, its ability to reiterate long-standing yet often neglected claims about the need to consider the ethical and social aspects of research and innovation; second, as a means to re-	The results from this 'unpacking work' suggest that RRI, as articulated by academics, aspires to: (a) combine, adapt or appropriate theoretical and methodological elements of other approaches for the governance and assessment of science and technology;

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-016-9761-6	and mobilize Owen et al.'s (2012) categories to analyse a diverse body of literature that is related to or that seeks to inform RRI. This paper unpacks understandings of RRI across a multi-disciplinary body of peer-reviewed literature. Our analysis focuses on three key dimensions of RRI (motivations, theoretical	sociological analysis of the concept of responsibility (Jonas 1984; Glerup and Horst 2014). It is increasingly recognised that there are multiple and overlapping ways in which 'science' and scientific actors could proceed in socially responsible ways, for example: by ascribing to rigorous levels of research conduct; by providing solutions to societal problems and delivering (socially) useful outcomes; by reflecting on their motivations and methods; or by opening up knowledge production, through oversight and assessment, to a	(b) Which links to theories have been established or are informing RRI? (c) What methods and tools are authors proposing to operationalise RRI?	approaches and methods, and that cuts across different sectors	for developing RRI; (2) links to theory; and (3) translations into practice. We focus on these interlinked dimensions with the aim of illustrating the complexity of RRI	focus attention on the use of existing tools (for example, for ethical reflection, stakeholder engagement etc.) and examine the value and impact of these tools; third, to mobilise resources to develop new approaches; and finally, to engage actors that may be excluded from research, development and decision-making around emerging technologies. New discursive	(b) articulate approaches that were intended to deliver some sort of 'integration', e.g. socio-technical integration; and (c) involve multiple actors and institutions in its development and implementation. As much work seems to tie existing and well developed traditions of theory and practice to the concept, RRI's greatest potential may be to operate at the 'mid-range' between idiosyncratic and grand-unifying theories, as has been spiritedly pleaded for by some within STS (see

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	conceptualisations and translations into practice) that remain particularly opaque. A total of 48 publications were selected through a systematic literature search and their content was qualitatively analysed.	broad range of societal actors (Glerup and Horst 2014, p. 35).				tools such as RRI may help re-emphasise topics that communities of theory and practice such as STS, TA and ethics have long articulated, but that still struggle to gain political momentum and have a direct impact on practice. Of course, neither a reiteration of claims nor a discourse on integration alone will automatically produce change. At this point, critical	Wyatt and Balmer 2007).

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						and constructive reviews of what RRI has to offer—that has not yet been offered—and particularly of how exactly RRI is to be implemented in ways that do not undermine the rationales of such communities are needed. Important further work should explore, in specific detail, why we need RRI, what specific 'kind' of RRI is needed for which areas of science and technologies in	

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						which contexts, and why now?	
Responsible research and innovation: a systematic review of the literature and its applications to regional studies - https://doi.org/10.1080/09654313.2019.1625871	This study first conducts a systematic literature review of conceptual papers on RRI. It identifies themes and categorizes them into four domains: drivers, tools, outcomes and barriers. Second, these domains are applied to regional innovation studies. The paper	there is a lack of studies that have looked at both RRI and regional innovation studies together. RRI remains ambiguous. In practice, this makes it difficult to implement, particularly when it comes to regional development. Following the ongoing discussions around RRI and regional innovation studies, especially on cohesion and smart specialization, there is an opportunity for engaged pluralism (Clark et al., 2003; Fagerberg et al., 2013) between	Innovation should be about socioeconomic transformation of society, concerns have been raised about its negative externalities including growing disparities within and between regions. Arguably, Responsible Research and Innovation (RRI) offers a	Developments and emergence of RRI have implications for regional development. RRI brings to the fore the importance of governance of the innovation process, particularly the inclusion of stakeholders to allow both top-down and bottom-up processes as well as	Major themes on RRI-tools and description: engagement workshop/comprehensive analysis/collective experimentation/anticipation of risk/technology assessment/foresight/informed consent/governance by experimentation/participatory appraisal/online platform and sharing.	Major themes on RRI-drivers and description What drives RRI is engagement: public engagement/ stakeholder engagement/ upstream engagement/ transdisciplinary / possible alternative could be pre engagement, (te Kulve & Rip, 2011). Attitudes, behaviours and impacts of RRI practices in research and innovation activities: life cycle	None of the RRI studies focusing on regional dimensions. The studies on RRI are mainly based on the debate around sensitive technology innovation, there is a potential opportunity for both RRI and regional innovation studies to collectively contribute to combined advancement of theory and practice Followed the recommendation of Thorpe, Holt, MacPherson, and Pittaway (2005) to adhere strictly to the principles of

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	contributes to an increased understanding of RRI and its applications to sustainable regional development as well as how RRI and regional innovation studies can benefit from each other.	academic disciplines, innovation studies and regional studies. The article recommends the inclusion of broader stakeholders and societal actors while deciding and designing innovation policies and critically analysing the consequences of decision through anticipation. Future research should focus on active and productive engagement strategies to design engagement techniques in local, regional, national and global contexts. Whereas regional development strategies have a lot	potential solution but in theory, its conceptualization and operationalization remain ambiguous	the need for inclusive and sustainable development, specifically in the context of regional development.		thinking/attitude of prudence/ co-creation/ sustainability impact/ social progress/consensus. Major themes on RRI barriers: principle-based policy making/asymmetrical distribution of power/moral pluralism/over inclusiveness/ level of perceived responsibility/ conflicting interest.	transparency, clarity and broad coverage of the discussion of RRI in the study.

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		of instruments that entail elements of RRI thinking, the question remains how to change institutions in a way that will provide incentives for all actors involved to follow the ideas of RRI, which is a subject for future research.					
Operationalising Responsible Research and Innovation - tools for enterprises - https://doi.org/10.2478/emj-2019-0017	The aim of this paper is to propose a range of approaches that help operationalise RRI. The goal is to contribute to this effort by proposing several approaches to operationalisi	Operationalising the vision of RRI in a form of new priorities, evaluation criteria, corporate practices and governance arrangements will remain a major challenge for a long time. The article offers feasible approaches to implementing RRI in enterprises that should be further	There is a need to further develop methods and techniques that could make RRI a useful framework for conducting innovation activities, especially in the business environment. The RRI policy mix is far from	The article offers ideas for operationalising RRI at the organisational level	The approaches suggested by the author employ methods such as weighted indicators, maturity models and Scorecards.	RRI relate more to STI policy actors and public institutions rather than to industry (Grunwald, 2014). Distinction between normative and processual approach to RRI the variety of approaches to	The article offers feasible approaches to implementing RRI in enterPrises. The approaches concern either the product (economic viability, ethical acceptability, sustainability, social and environmental desirability) or the process

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	ng RRI for enterprises. It reviews the achievements of projects that aimed at developing RRI-related tools for enterprises and author's original concepts of RRI-related tools are proposed.	analysed and developed.: - Apply weighted responsibility criteria: by considering the issue of moral overload (van den Hoven et al., 2012) and enhancing Pavie's pro posal (Pavie et al., 2014). -Applying maturity models related to RRI that are focused on the process (anticipation, inclusion, reflexivity and responsiveness) -Applying RRI scorecards which are rating systems developed to facilitate improvement, comparison and reflection.	simple and institutionalisati on of RRI will not automatically lead to the emergence of a truly responsive, inclusive and reflexive approach to governing innovation (Genus and Iskandarova, 2018).			RRI it is necessary to delineate the boundaries of research field(s) that deal with RRI (Ceicyte, 2019). Fears that RRI may be a hampering and delaying factor in scientific progress and may weaken the innovation capabilities and the competitive capacity of national economies	(ethics as a design factor, moral responsibility, legal liability) dimensions of RRI (von Schomberg, 2013

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Responsible research and innovation in contrasting innovation environments: Socio-Technical Integration Research in Hungary and the Netherlands - https://doi.org/10.1016/j.techsoc.2017.09.003	This paper analyses Socio-Technical Integration Research (STIR) results and effectiveness in the wider context of the national innovation environments of Hungary and the Netherlands to suggest that the innovation environment can affect the success and effectiveness of approaches such as STIR.	Recommends that RRI approaches such as STIR be adapted to the innovation environment of the country concerned. verified empirically that STIR works differently in different innovation environments resulting in more interventions of the embedded humanist. This raise the need to modify STIR if we liked to implement it in innovation environments differing from the developed countries. Maslow's hierarchy of needs can help to understand individual motivation process. several other things reflecting that its	Socio-Technical Integration Research (STIR) is one of the first tools emerging from RRI research that is designed to help research, development and innovation actors practically implement key aspects of RRI in their daily work have demonstrated the possibility and utility of STIR. investigate whether the innovation	STIR Methodology https://www.rri-tools.eu/-/stir-socio-technical-integration-research-	the context of cul ture needs to be taken into consideration while speaking about RRI.	RRI itself is arguably based on democratic and liberal values (such as freedom, participation and equality), and on "Western ethics" "importance of understanding besides the notion of RRI itself how RRI tools and activities can work in different national environments. Willingness of researchers to join STIR discussing basic social, ethical and	Elements of RRI can be divided into four groups: role of society (society-orientedness, acceptance based on values, mutuality, and incorporation of stake holders); responsibility (society-orientedness, ethics, desire and sustainability); nature of the process (interactivity, transparency, multidisciplinary and consciousness); and results (society-orientedness, competitiveness and future-orientedness) very close to the

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		outcomes depend on numerous factors: length of the observation (12 or more weeks), cultural issues, educational differences, staff training, and discussion of ethics and values. These need further research and implementation of further STIR-projects	environment plays any role in the outcomes of the implementation of RRI practices, in this case STIR.			economic issues of science and technology is more familiar to scientists in developed countries -administrative issues and bureaucracy in Eastern Countries Hungarian examples of reflexive learning and changes in practice tend to be based on first-order reflexivity, which involves more efficiently accomplishing predetermined goals and values,	democratic and liberal values, but can be strange for non-democratic and non-liberal countries

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						rather than second-order reflexivity, which involves questioning predetermined goals and values	
The responsible learning organization. Can Senge (1990) teach organizations how to become responsible innovators? - https://doi.org/10.1108/TLO-	This study aims to investigate whether the learning organization, as envisioned by Peter Senge in The Fifth Discipline (1990), facilitates responsible innovation	The authors find significant complementarities between being a learning organization and practicing responsible innovation. Some of the practices and characteristics of a learning organization in the sense of Senge (1990) do not merely facilitate RRI, they are RRI by definition.	Smith et al. (2014) compared the literatures on learning and ethical organizations and found significant overlaps between the two concepts; for example, learning and ethical organizations alike are characterized by a culture and form of	The authors conclude that there may be significant non-economic advantages to be a learning organization, and that The Fifth Discipline may be more valuable for its ethical perspectives on the	The authors analyse the component characteristics of the learning organization as defined by Senge (1990) to identify any conceptual or causal connections to responsible research and innovation (RRI).	Not applicable.	Being a learning organization not only facilitates responsible innovation; to some extent, research and innovation activities carried out by a learning organization are responsible innovation, or something very close to it.

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11-2019-0164			leadership that encourage acceptance of new ideas, tolerance for disagreement and lessening of hierarchy. Verbos et al. (2007) proposed that a strong capacity for a learning organization is a necessary condition for being an ethical organization. As these citations indicate, ethics seems to be relevant to the learning organization, but there is	organization than as a prescription for how to achieve business success			

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			little consensus on how.				
Responsible research and innovation: hopes and fears in the scientific community in Europe - https://doi.org/10.1080/23299460.2019.1692571	In particular, we sought to identify reservations on and obstacles to RRI. We conducted interviews among some 80 researchers and research executives on their understanding of and their attitudes toward RRI. We identified a welcoming attitude regarding RRI in the scientific	Our study revealed a lot of good will in the scientific community to engage with RRI as a bottom-up process. On the contrary, judging from our data, there is plenty of room for implementing RRI. However, it should also be acknowledged that this needs to be done with caution so as not to backfire. In essence, scientists had qualms about the fruitfulness and feasibility of proposals from the wider audience and wanted to keep basic research, understood as the search for	We conducted qualitative interviews with over 50 researchers from different European countries and research fields. Their views were complemented and contrasted with the views of over 30 research executives, likewise from different European countries and institutions. The interviews were conducted in	Most of the researchers and research executives interviewed welcomed RRI in the double sense of interacting with society (both with stakeholders and the wider audience) and of selecting research topics according to social urgency. They were	The important role of administrators for RRI implementation becomes evident in researchers' complaints about missing institutional infrastructure and support (Hamlyn et al. 2015, 37; Smallman, Komme, and Faullimmel 2015, 17, 55; van Hove and Wickson 2017, 221). Still, their views are under-	We identified four kinds of reservations about RRI. The first and most broadly voiced source of reluctance was the felt loss of autonomy. The second and the third obstacle to implementing RRI procedures are connected to the appreciation of basic or epistemic research and the assumed difficulty of anticipating research outcome.	von Schomberg distinguishes between RRI as a procedure of participation and a product meeting certain standard. Product-oriented RRI means research proceeding on behalf of the people (or science for society), while process-oriented RRI is research conducted in a dialog with the people (or science with society).

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	community, but also worries that should be heeded in any effort to implement RRI. Concerns arise with respect to fears of ignorance and bias of societal agents, the loss of the autonomy of science, the neglect of basic research by RRI procedures, the difficulty to anticipate research outcomes	understanding, at their own discretion. Our results further entail that the barriers facing RRI vary between research contexts. While part of this resistance might be due to the fear of losing power and autonomy, their uncertainty about how to design the science-society relationship justly and effectively is of high significance. Conversely, society should lend its ear to researchers as well and take their concerns and worries seriously. RRI cannot successfully be introduced when resistance in the scientific community is strong. There is	2016 and 2017. Most of the interview partners were suggested by NUCLEUS consortium members and were from consortium partner universities.	eager to serve society and explained that societal challenges play an important role in shaping their research agenda. Some interview partners expressed reservations : they felt uncertain about how to implement RRI in practice or viewed RRI only as a fashionable	examined (Burchell 2015, 39) or not studied independentl y of the views of researchers. We included them in our sample to compare their views to those of researchers and to illuminate the barriers to RRI within the institutional context of research.	Findings suggest that RRI faces stronger resistance in basic than applied research fields. Third, many scientists consider it difficult to anticipate the future development of a research field and to assess its social impact. The fourth worry had to do with the expenditure required for RRI. In particular, researchers were afraid that institutionalizing RRI would	

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	and their social impact as well as the additional expenditure required by engaging with societal actors.	good will, and it should not be spoiled		policy concept with a short lifespan.		mean imposing an additional bureaucratic superstructure on them. RRI	
From collaborative to institutional reflexivity: calibrating responsibility in the funding process - https://www.researchgate.net/publication/341112885	We develop a bridging concept between individual and institutional reflexivity, which we call 'collaborative reflexivity'. Through collaborative reflexive processes, individual employees contribute to the entire organisation's	Figuratively speaking, funding staff move from the left end of the spectrum (individual reflexivity) to the right end (institutional reflexivity). Thus, the concept of collaborative reflexivity does not contradict but rather feeds into institutional reflexivity as understood by Wynne (1993) and others (e.g., Forsberg et al. 2015; Stilgoe et al. 2013). However,	We do find that institutional actors are reluctant to participate in public engagement activities. Most interviewees hold a strong opinion against allowing members of the general public to participate in decision-making around	In a way, our own empirical findings do not make the public deficit model go away as discussed by various authors. Our interviewees were also wary of public engagement. However, we find that	From 2011 to 2013 we conducted semi-structured interviews with 11 members of staff of the funding organisation who were responsible, at different levels of seniority, for managing the allocation and	Science-policy organisations are expected to be reflexive of their political influence on research and society. In this long-standing discourse on institutional reflexivity, formal organisations have largely been considered as a whole, and from a structural, or	We review the concept of reflexivity, demonstrating that the current discourse on institutional reflexivity implies a distinction between individual and systemic, or structural reflexivity, but leaves a gap of intersubjective and interaction-based reflexivity. In other words, our main finding I that an actor- and practice-

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	institutional reflexivity. Our findings help to better understand 'responsible' behaviour in funding processes, as part of the growing international movement of RRI	these authors have not paid attention to the level of individual attitudes and interactions. We found that an individual employee accomplishes collaborative reflexivity through interactions with their colleagues and other stakeholders, a process consisting of three basic steps, analytically: (1) acknowledging that one reaches the limits of one's existing knowledge (explicit and implicit); (2) responding to such irritations through consulting with colleagues and other stakeholders; (3) making efforts to change existing	funding priorities. The interviewees feel they have only a minor or secondary role to play in public engagement and none whatsoever in the assessment of potential harm. Various interviewees show an awareness of their own knowledge being limited, and they appear to use it with caution. Perhaps as a consequence of	they nevertheless do display reflexivity, namely 'collaborative reflexivity'. The notion of collaborative reflexivity provides a conceptual bridge between individual reflexivity and institutional reflexivity.	oversight of funding in a range of ICT research areas. The goal of the interviews was to find out how social and ethical challenges are identified, discussed and resolved within research projects that the funders were responsible for. Later, in late 2015 to early 2016, we had the opportunity to interview	systemic perspective, whereas much less is known about everyday organisational practices; how individual organisational members reflect on and act upon their own as well as their organisation's limits of knowledge and pre-commitments, if at all.	oriented perspective has largely been missing to date, with some exceptions (e.g.- Bellamy et al. 2013; Demers-Payette, Lehoux, & Daudelin 2016).

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		approaches accordingly: adjusting one's own and the organisation's subsequent actions, e.g. shape future funding schemes, and make funding decisions.	acknowledging the limits of their own knowledge, the managers we interviewed are active in consulting different stakeholders. Managers do shape governmental priorities through collaborations (e.g. workshops) with researchers.		again one of the earlier interviewees and two further funding administrators in the same funding organisation		