D2.2: Report on the analysis of opportunities, obstacles and needs of the stakeholder groups in RRI practices in Europe

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RRI Tools | Fostering Responsible Research and Innovation
1 Introduction

The Responsible Research and Innovation (RRI) toolkit project sets out to develop tools for five key stakeholder groups to encourage and support them in taking up the concepts and practices associated with RRI. These stakeholder groups are: policymakers (including funding agencies, regulators, and executive); business/industry representatives (in-house or outsourced innovation departments and/or some R&I base); civil society organisations (CSOs, including foundations, associations, social movements, community-based organisations, charities, the media); researchers and innovators (affiliated with various institutions and organisations on different levels); and the education community (both formal and informal, from Ministry to school level).

In order to understand more about these stakeholders and the dynamics between them, the project organised a series of interactive one-day meetings across Europe. These meetings, which took place in 30 countries, brought together individuals from each stakeholder group, to discuss their understandings of RRI, what they say as the opportunities and obstacles in moving towards this approach and their ideas of practical measures to help the implementation of RRI.

This report presents the synthesis of the findings of these workshops. This insight will inform the RRI toolkit project’s future work, as we develop practical instruments and measures to support RRI. But in providing a comprehensive review of current thinking on key questions underpinning RRI across Europe, we also hope that the report will be of wider interest to colleagues interested in RRI and its implementation.

In this report we use the words “science” and “research”, and “scientists” and “researchers” interchangeably. We also recognise a wide definition of the term science to include technology, engineering and medicine, along with other areas that may be researched methodologically – the social sciences, humanities etc.
2 Summary of Findings

- The reports of the workshops identified a large number of opportunities being opened up as a result of adopting RRI practices, procedures and cultures.
- There is considerable overlap between stakeholder groups with regard to what they view as obstacles to RRI and opportunities afforded by RRI.
- In particular, lack of existing collaborations between stakeholders is seen as an important obstacle by nearly all groups, and the chance to establish new networks and partnerships as an important opportunity by all.
- There is a key need for a definition of RRI that is clear and common to all stakeholders, whilst at the same time bringing the concept to life for the different stakeholders
- While there is considerable overlap between stakeholder groups, some actions will also need to be stakeholder specific
- While most stakeholders have a reasonably clear understanding of public understanding/engagement, there is little knowledge about other aspects of RRI.
- There is a strong tendency for stakeholders to see the responsibility for RRI resting with stakeholders other than themselves

2.1 Stakeholder profiles

Stakeholder profiles were created to summarize the key opportunities, obstacles and actions identified by each of the stakeholder groups.
Opportunities, obstacles and needs analysis

Policy Makers

“RRI provides an opportunity to build greater trust in the science and innovation system”

89 policy makers attended workshops across 27 Hubs

Opportunities for RRI
* Involving the public can make more acceptable and accountable policy, research and innovation
* New partnerships
* Enhance competitiveness and creativity

Obstacles to RRI
* Policy making is inflexible and doesn’t necessarily involve the public
* Difficult to reach representative publics
* Too much focus on the short term

Actions identified by Policy Makers
* Enable collaboration between different stakeholders
* Review science practice and funding
* Develop training for research funders and managers on RRI
Opportunities, obstacles and needs analysis

Industry & Business

"RRI can help businesses gain access to new markets that would have otherwise remained invisible"

71 Representatives from Industry & Business attended workshops across 27 Hubs

Opportunities for RRI

* Increases competitiveness and creativity
* Generate new networks and partnerships
* Provides outcomes and products focused on the final user

Obstacles to RRI

* We can't do it on our own and we don't have the relationships
* RRI needs to be 'sold' to Industry & Business
* RRI shouldn't generate further bureaucracy

Actions identified by Industry & Business

* Enable collaboration between stakeholders
* Help finding new markets and models
* Remove any bureaucratic obstacles to RRI
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Civil Society Organisations

84 Representatives from Civil Society Organisations attended workshops across 27 Hubs

“RRI taps into a desire in society for a change towards better conditions and innovations”

Opportunities for RRI

* Involve new, more diverse, publics resulting in more informed and engaged citizens
* Enable more open communication between science and society
* Generate new networks and partnerships

Obstacles for RRI

* We can’t do it on our own and we don’t have the relationships
* Information and communication about RRI and science needs improvement
* Limited resources in small organisations

Actions identified by Civil Society Organisations

* Further and formalise public involvement
* Improve science communication
* Include RRI in organisational structures and strategies
Researchers

Opportunities for RRI

* Generate new opportunities for individual researchers
* Coordinating existing RRI practices across research and innovation structures
* Generate new networks and partnerships

Obstacles to RRI

* Scientific culture rewards publications not RRI
* Science is unpredictable and academic freedom is important
* RRI shouldn’t generate more bureaucracy
* We can’t do it on our own and we don’t have the relationships

Actions identified by researchers

* Change the current research culture to be more in line with RRI
* Include RRI in training and education
* Review research funding and commissioning through a RRI framework

“RRI enables a broader way of defining ‘researchers’ and their role in society - we can’t separate the research from its impact”
## Education

84 Education representatives attended workshops across 27 Hubs.

“RRI provides an opportunity to influence different educational environments: schools, family, culture, etc.”

### Opportunities for RRI
- Generate new networks and partnerships
- Improve science education
- More inclusive and diverse engagement

### Obstacles to RRI
- We can't do it on our own and we don't have the relationships
- Time is scarce
- Systems and attitudes can be difficult to change

### Actions identified by Education
- Change the curriculum to include and reflect RRI
- Train teachers on RRI
- Build a community of practice
3 Background

3.1 About RRI

Responsible Research and Innovation is about making science with society and for society. This means aligning the outcomes of research with the values of society. It is a wide umbrella term that brings together different aspects of the relationship between science and innovation with society: ethics, gender equality, open access, public engagement, and science education. It is a key concept under Horizon 2020, the EU’s Framework Programme for Research and Innovation 2014-2020, with the main aspects of RRI adopted as cross-cutting issues in this programme.

One of the early tasks of the toolkit project has been to study the literature on RRI to get a clear overview of what can be distilled from current definitions. Based upon this, RRI tools has developed an initial working definition for RRI that specifies both outcomes and process requirements for responsible research and innovation. In this definition, **RRI outcomes** can be separated into learning outcomes (**engaged publics, responsible actors** and **responsible institutions**), research & innovation outcomes (**ethically acceptable research and innovation, sustainable research and innovation and societally desirable research and innovation**) and societal outcomes (**solutions to grand challenges**).

In order to achieve the outcomes described above, the R&I process has to meet certain **process requirements**. We have identified eight requirements and divided them into four clusters. More information on the RRI working definition can be found in the RRI Tools Policy Brief on the state of the art on RRI and a working definition of RRI.
3.2 The Toolkit project

Funded under the Framework Programme FP7 (2007-2013), RRI Tools has been set up to develop a set of digital resources to advocate, train, disseminate and implement RRI under Horizon 2020.

RRI Tools is a multidisciplinary consortium consisting of 26 institutions led by "la Caixa" Foundation in Spain (further details and a full list of consortium members are given in the Appendix). Nineteen RRI hubs have been created to provide coverage to 30 countries in the European Research Area, extending across the length and breadth of Europe. These hubs are responsible for training in the use of these tools, advocating policy makers at national and regional level, and spreading the concept of RRI. The ultimate goal is to build a European community of practice that draws together the people and organisations that are active in this new vision of scientific and social development, and that can use and continuously contribute to the RRI Toolkit.

3.3 Rationale for and running of the RRI Tools workshops

In order to consult stakeholders on their needs and aspirations for RRI, each of the RRI hubs hosted at least one stakeholder workshop during October/November 2014. These workshops explored the perceptions of the RRI process requirements and RRI outcomes amongst different stakeholders, gathering feedback on the project’s working definition of RRI, as well as identified emerging needs and actions of the stakeholders involved in RRI. The aim of this consultation workshop was to receive ideas of potential tools for the RRI Toolkit, gain an overview of the differences across stakeholder groups and EU countries, and set the foundation for building an RRI Community of Practice (CoP) across Europe.

The workshop protocol was designed as part of WP2 by ECSITE, ZSI and UCL (1). The protocol was documented in a clear guide, which each hub was asked to follow, such that the same workshop was run in 22 different European countries.

The workshops were highly interactive. Equal representation of each stakeholder group was important, and so that no one group dominated, hubs were given recruitment quotas for
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each stakeholder group – a minimum of three per group. They were also asked to aim for gender balance across the workshop.

Throughout the workshop, the outcomes of discussions were recorded in observer’s notes, on flip charts, which were photographed, and on feedback forms. Each hub digested these outputs and used them as the basis for filling in a feedback template, which was sent back to UCL for analysis.

The workshops were attended by 411 stakeholders: 52% male and 48% female. In the recruitment of participants, hub coordinators aimed for an equal attendance of each of the identified stakeholder groups. This was largely achieved, as can be seen in the figure below, with representatives from Industry and Business reported as being most difficult to recruit by hub coordinators.

![Workshop attendees by stakeholder group](image)

**Figure 1 Stakeholder by percentage of total attendees**
3.4 Current literature on opportunities, obstacles and needs

While the concept of RRI is relatively new, many of the ideas within it are not. Researchers across Europe have been asked to engage with the public and to let them help shape the course of their research for more than a decade, for instance. WP1 of the RRI project is collecting examples of promising practices in these areas, but what lessons can be learned from the academic literature about stakeholders’ perceptions of the opportunities and obstacles of the activities that make up RRI?

a. Opportunities

It is important to note that many of the opportunities ascribed to activities such as public engagement are normative rather than empirical.

Looking at the existing literature however, for policymakers, a number of opportunities appear to be offered through public engagement, open government, adaptive management and anticipatory approaches. Citizen participation is often equated with more democracy, better accountability and more effective policy decisions (2;3). For policy, involving wider perspectives early can enable failures in governance and regulation of a technology to be addressed the early stages of development (4). Widening the evidence base also has the potential to put some, alternative issues on the table (5).

For researchers, involving the public in discussions about science and technology at the earliest stages is seen to enable science to more closely reflect the wishes of society, thus helping build trust in science and science governance (6;7). Opportunities are also seen to come from open science, which could provide better access to collaborative tools and platforms, and help make knowledge production more productive by encouraging researchers to work together (8). Addressing a ‘largely unconscious bias’ in scientific research, which is in part due to the large proportion of male researchers across scientific fields, by integrating gender-sensitive methodologies and explicitly recognising the potential for gender bias in research and innovation activities also offers the opportunity to improve scientific research and innovation (9).
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In the **business sector**, business growth has been found to be directly related to the extent of firms service innovation as well as the diversity of that innovation, with external and internal openness being key parts of that (10). Building upon that point, there is also evidence that integrating gender analyses into innovation generates the opportunity for both avoiding financial loss and expanding markets by targeting new users through gender-sensitive products (9).

For **education**, the UK’s National Coordinating Centre for Public Engagement (http://www.publicengagement.ac.uk/explore-it/why-it-important/benefits-engagement) argues that involving the public can enrich the institution’s research, teaching and learning; help institutions to demonstrate accountability in a climate of increasing scrutiny; strengthen and enrich the university’s brand and identity, and increase public appreciation and support for higher education and for research. The RRI could also provide an opportunity to incorporate a gender lens to understanding how women and men experience career progression differently, as well as developing appropriate tools to support these differentiated needs (11).

More widely, for **civil society**, public participation has been argued as a way of avoiding conflict and sidestepping the political deadlock that has led to partisan positions on significant issues in some countries (12). Open science is seen by many as a potential way to involve the public more in ‘making’ science. For instance, opening science could ‘extend membership of the research community to new public audiences’ (13). Democratic reasons are also put forward for open science – making knowledge accessible and freely available to everyone (8). Wajcman (2009) (14) acknowledges that equal employment opportunities may be a good in itself, but notes that drawing more women into science and innovation is also fundamentally about shaping the world we live in. By placing end users at the heart of R&I processes, gender concerns of RRI create the opportunity of putting the individual at the heart of R&I systems.
b. Obstacles and needs

For policymakers, the key issues appear to be in public engagement (PE) stitutional structures, resource issues and perceptions of expertise. Policy decisions involve a variety of criteria; diverse sources of information, limited time, and questions arise around what is practical (15). Activities such as PE take valuable resources from this process (16), extend the timeline of often-pressing decisions and need to be slotted into well-established and often-inflexible processes within institutions (17). There is also a concern that there might be negative consequences – involving the public in decision making might reduce the political legitimacy of the decision making process (18) (12), openness can leave evidence open to challenge (19), for example.

Competitive market pressures and production costs are key issues for business and industry. Firm-specific features – ‘internal obstacles’ (20) – that affect a company’s economic performance include resource constraints (time, budget) and operational inertia from past investments, including workforce training and machinery investments (21). Studies highlight the key role of supporting ‘pioneer spirits’ (22) to foster learning within a firm. The high upfront investment costs for new RRI processes and products where these involve a shift away from business-as-usual strategies, along with an underdeveloped market demand for RRI products, foster risk-averse attitudes. Indeed, market demand for ethical/responsible products and processes is compounded by a range of factors from the societal scale – including technological lock-in (23) (24) and general public distrust in commercial entities (25) (26) – to the individual scale – where concerns around bounded rationality emerge (27). Concerns around policy risk and bureaucratic complexity are common in the early stages of governance and regulation change, affecting business and industry’s ability to benefit from RRI.

CSO involvement in the R&I system is currently limited (28) and tends to be even less likely throughout the agenda-setting and commissioning phases. Limited resources are a central obstacle for CSO participation (28), although CSOs differ widely in size and capacity. This affects both the type of knowledge they have access to (academic journal subscriptions tend
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to be prohibitively high for small CSOs or unaffiliated independent researchers) (29) and the type of knowledge products they are able to generate. Public trust and CSO reputation are central to their success (30) (31), and the possibility for the public to view CSOs as somewhat ‘co-opted’ by large institutional interests affects the ability of some CSOs to collaborate with other institutional actors. Indeed, “CSOs need to be cautious that close relationships with major donors, whether government or business, do not lead to an undermining of public trust in them” (32). The way other R&I stakeholders perceive the knowledge generated by CSOs as less rigorous/scientific than peer-reviewed research affects both the possibilities for engagement with other actors (particularly business and researchers) and the credibility granted to CSOs operating within the R&I governance system (33). There remain concerns around who CSOs represent and how to integrate them within PE exercises designed for ‘pure’ publics (34) (31).

Outreach activities such as PE are time-intensive from the perspective of the individual scientist, particularly when formal scientific career development structures do not reward such activities. The perception by researchers that PE lies “beyond the scope of normal scientific activity” (34) echoes the related perception that PE does not contribute to ‘better’ research and a broader uncertainty about the objectives of outreach activities. This perception is in part due to a general lack of supporting infrastructure for outreach activities (training, integration in university curricula); researchers’ limited awareness about existing opportunities to engage with society (35) (36); and a general lack of clarity about whether individual scientists ‘should’ be responsible for PE (37). This ‘duty’ to communicate is particularly relevant when researchers who do engage with publics face the pressure of being appropriate science representatives, and the risk of becoming a target once they become ‘too’ visible in the public eye.

The literature on the education community is relatively scarce compared to the other stakeholders’, which can in part be accounted for by the large diversity within the education community classification. For informal learning institutions (museums, exhibitions, science centres) the key issue appears to be uncertainty about their role within the R&I system, particularly for those institutions that focus on making young people enthusiastic about
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Science (38). Some authors highlight the potential complementarity between universities and science shops, suggesting that current informal learning institutions (universities, schools) have a complementary role to play alongside formal education institutions (39).

4 Findings

A summary of the outcomes of each workshop was fed back to UCL in a short pro forma. On the basis of this, a manual cluster analysis, where feedback from workshop participants were grouped together, was carried out to identify the main themes emerging from the workshops. A number of overarching themes emerged across countries and stakeholders. In the section below, we describe these ‘overarching’ themes but also highlight any issues that stand out for particular stakeholders and countries. We then bring these together, to present a series of profiles, giving further details for each stakeholder group.

To begin, it is worth perhaps highlighting a comment made by a number of hubs that the concept of RRI is so new that many participants found it difficult to engage with the matter at more than a relatively superficial level. Others found that it remained an abstract concept, with participants being clear about what needs to be done, but unclear about who should take the actions, nor what actions they themselves should be responsible for. Note: in what follows we use verbatim quotations from the English versions of the hub meetings reports to illustrate the points being made and conclusions being reached.
4.1 Opportunities

4.1.1 Main clusters

Seven clusters relating to the possible opportunities from implementing RRI were identified by the workshops: bringing science and society closer; democratic benefits; improving innovation; improving the culture of science and scientific careers; learning; new opportunities from new networks; access to new funding sources.

Figure 4: Overview of issues identified as possible opportunities from implementing RRI – shown by relative size/importance
Opportunities, obstacles and needs analysis

The biggest clusters were bringing science and society closer, improving innovation and improving scientific culture.

Opportunity 1: Bringing Science and Society closer

- Two way dialogue and increased transparency to build trust and share responsibility

Bringing science and society closer was identified as a core opportunity, comprising the potential for building trust in the R&I system, explicitly creating ownership for R&I, sharing
responsibility across societal actors, and fostering more transparency and accountability within the RRI regime.

Building trust between science and society was seen as important, particularly in relation to a growing sentiment that this trust has been eroded in the past. RRI’s emphasis on diversity and inclusion, as well as its explicit ambition to engage with young citizens and future scientists was seen to help improve the image of science and innovation in society. RRI brings Science and Society closer, by highlighting the need for a two-way exchange between science and society and the possible contribution(s) of society in the way science is done, participants argued.

Workshops also noted the opportunity of widening our understanding of responsibility in the context of R&I, specifically by looking beyond the roles and responsibilities of individual researchers and scientists. Participants acknowledged that systems and incentive-structures offer powerful places for change. Further RRI was perceived as providing the opportunity for responsibility to be shared across stakeholders via open and iterative engagement processes from the early stages of the R&I process.

Related to the opportunity of extending responsibility across stakeholders was the opportunity for RRI to create a shared sense of ownership for RRI outcomes. Process requirements such as inclusion and participation enable societal actors to be more directly involved in the R&I system, thus enabling them to shape R&I paths.

Finally increased transparency was identified as a powerful opportunity to bring science and society closer, particularly where it increases accountability in the R&I process. Workshops noted the large potential role for the publication of all research results under RRI – positive and negative research results for example – and the sharing of more methodologies via reformed peer-review and open access systems of publication.

Quotes from workshops:

“Shared responsibility according to level of participation”
Opportunities, obstacles and needs analysis

All stakeholder groups, Germany

“Transparency of all results: publishing bad results/methodologies would create a more accurate evidence base for policy.”

Policymakers, UK

“Science centres provide neutral ground for meetings between stakeholders. Questions on values such as equality and sustainability come out on top when engaging with young people.”

CSO, Sweden

b. Avoiding controversy

By enabling closer collaboration between science and society and placing stakeholders at the heart of the R&I process, participants had the view that RRI enables a better assessment of societal expectations in science. Participants noted that public engagement, inclusion and dialogue are key process requirements to feed stakeholder needs, interests, and concerns into the R&I process. RRI also offers the opportunity for early engagement in the R&I process, which is key to anticipating unexpected impacts of R&I in society, to determining acceptable levels of risk in society and to collectively assess the risks and benefits of particular technology development paths.

Workshops highlighted the potential for RRI to improve the image of science in society: by increasing the opportunities for society to engage with science through a variety of formal and informal streams (through science centres and new school curricula for example) and generating more responsive R&I systems, RRI opens up the possibility of improving the image of science in society.

Generating early dialogue between science and society can enable better policy preparation, which, participants argued, in the long run, provides the opportunity for developing more acceptable policy decisions. Participants said that where stakeholders feel empowered throughout the decision-making process, either directly through participation, or indirectly
through early engagement and responsive R&I systems, citizens would trust policy decisions more. Context-sensitivity and attention to local and global impacts of R&I were equally highlighted as an opportunity to increase citizens’ confidence and avoid controversy.

Quotes from workshops:

“On the long term a process like this one can avoid significant problems that might arise (see GMOs)”

**Industry, Italy**

“Will improve the image of research; raises the profile of efforts to popularise science”

**Education Community, Researchers, Belgium (Wallonia)**

“Theyir constituents will like it (i.e. citizens) = more trust”

**Policymakers, Ireland**

“Both the local and global impact are taken into account”

**CSO, Luxembourg**

“Shared responsibility according to level of participation”

**All stakeholder groups, Germany**

c. Incorporating long-term thinking into both science and society

Participants agreed that RRI generates useful tools to help society become better at thinking about the long-term. For example, tools that collate good examples of RRI practices across Europe and facilitate cross-country learning were mentioned in multiple workshops, and some participants noted that RRI helps countries develop the strategies necessary to integrate long-term thinking in technology assessment.

Quotes from workshops:
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“RRI offers to experiment with the tools, with methods and groups. It supports learning processes”

Researchers; Education, Germany

“Collecting and sharing memories of RRI practices”

Education, Italy

Opportunity 2: Democratic benefits

Workshops identified a range of democratic benefits stemming from RRI processes and outcomes. These were seen to be driven by better funded CSOs (and other under-represented groups), more informed and engaged citizens, engaging with new groups in society, and the development of clearer processes and standards for involving citizens across the R&I system.

a. Better support for traditionally under-represented groups

Participants also argued that RRI process requirements like diversity and inclusion could give typically under-represented groups (such as small CSOs) access to more resources guaranteed at the European-level. These resources would go beyond financial resources, and include institutional and training support.
Related to this potential for RRI to ensure the participation of typically under-represented groups in R&I processes was the possibility, under RRI, to identify and engage with new groups. Specifically, interest in integrating gender-sensitive perspectives, or involving the views of sub-sections of the population – employees for example – was generally acknowledged as a key opportunity from RRI.

Quotes from workshops:

“Available resources: material resources, research/project management, self-sufficiency, call for papers”

CSO; IND; RES, Hungary

“Identify and engage new groups”

Education, Sweden

b. Creating more informed and engaged citizens

Workshop participants also found that RRI creates the opportunity for more informed and engaged citizens across the continent. In emphasising multidisciplinary in school curricula and promoting an R&I system more in tune with societal needs and interests, RRI ensures that citizens are aware and able to partake in R&I processes. In developing an R&I system grounded in citizens’ daily needs and experiences, RRI provides the opportunity to involve citizens in all stages of the research process.

RRI provides the opportunity to consciously choose the way we want to live: participants found that both RRI processes and outcomes helped meet society’s desire for greater “upstream engagement” with technology development that would empower people to define their future, as well as to be more critical of what innovators were planning to bring online. Many workshops highlighted RRI’s role in fostering a more open, less hierarchical, society.

Quotes from workshops:
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“Link with daily life, knowledgeable citizens”

The Netherlands

“Desire in society for a change towards better conditions (desire for better innovations)”

CSO, Bulgaria

“Opportunity to trigger reflection and action about the end goals of specific research especially when there could be dual use of technology engage early in discussion about the benefits and risks”

CSO, Switzerland

“Openness: a tolerant, egalitarian innovative climate, not so hierarchical.”

Policymakers, Sweden

c. Clearer processes and standards for citizen involvement/institutional legitimacy

The potential for RRI to develop clearer processes and standards for involving citizens was the most discussed aspect under this opportunity cluster. In particular, taking advantage of new technologies and online tools to facilitate inclusion and participation were acknowledged.

Further to that, participants also argued that involving citizens in decisions and discussions around science could also help empower them for ‘real’ democracy and draw them into political life and decision-making – a ‘soft entry’ into wider political issues and activity.

Finally, participants also argued that RRI increases the institutional legitimacy of political institutions.

Quotes from workshops:

“Criteria for reasonable and meaningful participation of civil society”

CSO; Researchers, Germany
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“Learn to use interactive ways of social media to involve people”

CSO, Baltic Hub

Opportunity 3: Improving innovation

- Increased Competitiveness/Creativity

Another key cluster to come out from the workshop reports emphasises the major potential competitiveness opportunities from RRI. There was a large degree of country-specific perspectives on the market potential of RRI, which are developed further in section 4.2.3. In general, participants paid particular attention to the potential for RRI to generate new products, reach new markets and grow existing ones.

For example, participants noted that RRI opens up a range of new potential business ideas from the direct engagement with end-users, creating both new business opportunities and securing access to new consumers.

From a consumer perspective, products are expected to become more adapted to particular needs, and changing societal demands and interests would be better met. Participants across the workshops recognised the central role for government to generate incentives in the long run in ensuring that the full economic and creative opportunities stemming from
RRI are met. RRI marks a powerful market signal for workshop participants who emphasised the value of a strong political commitment in promoting long-term business strategies.

Strategies to benefit from these competitive advantages were outlined, including how to benefit from first-mover advantage (both for an individual business and an economy as a whole), how best to support and grow market demand for RRI products (through public procurement for example), as well as possible efficiency and flexibility gains from business process innovations.

Some participants also noted the possibility of more transformative change in the business and innovation ecosystem via RRI, in particular through discussions of the possibilities to redefine how profits are measured, and the potential for return on investment to be extended beyond monetary gains.

Quotes from workshops:

“Large field of potential applications from R&D”
Researchers; Industry, Romania

“Increase in the organisational efficiency, there will be more studies on the needs of the market”,
Industry, Spain (Madrid)

“Innovation in business models and new market niches (positioning)”
Industry, Spain (Madrid)

“Competitive activity, getting ahead (it’s a good thing, gives competitive advantage)”
Industry, Sweden

“Untapped business potential (transfer of existing knowledge to application)”
Policymakers; Researchers, Greece (Thessaloniki)
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“May unlock new sources of income if we evaluate the social return on investment”

CSO, Belgium (Wallonia)

b. Better innovations
Stimulating creativity in innovation was highlighted as a particularly important opportunity stemming from RRI, where participants noted that the flexibility and inclusiveness facilitated by RRI process requirements enable the development of new products and processes. By focusing on attracting new minds and new stakeholders into the R&I process as well as becoming more responsive to changing societal needs, RRI unleashes currently untapped potential in society.

RRI rewards long-term thinking in the R&I process by enabling society to reflect, rethink and reshape the R&I system over time. This was viewed as particularly important in light of contemporary sustainability challenges across Europe: stakeholders regularly commented on the opportunity, from RRI, to focus more attention on product sustainability, foster environmental awareness in society and particularly amongst investors, as well as develop new ways of valuing R&I’s social impacts.

Workshop participants expressed enthusiasm for the opportunity of designing a more “problem-oriented” R&I system, as made explicit by RRI outcome commitments. RRI fosters more relevant innovations by placing end-users at the heart of the R&I process. Specifically, collaboration with under-represented groups in the R&I system was seen as generating win-win societal and business opportunities.

Participants regularly evoked the potential for RRI to foster gender-specific research and innovation, a user need that was often prioritised by workshops participants. Beyond conducting gender-sensitive research and posing gender-focused questions, participants noted that RRI also provides the opportunity to develop gender-sensitive methodologies to evaluate R&I outcomes.

Quotes from workshops:
“Flexibility of RRI process (ability to change, adapt, creativity)”

Policymakers, Poland

“RRI brings positive combination of economical, ecological, and social factors.”

Industry, The Czech Republic

“Increasing importance of sustainability among investors”

Industry, Portugal

“Increased rate of applications of research results – caused by the fact that research is more and more targeted to the needs of concrete users.”

Researchers, Poland

“Personalized research; research specialized for women and men; data collection by gender in R&D”

CSO, Poland

Opportunity 4: Improving the culture of science and scientific careers

- New learning and training opportunities
- Making review and evaluation more robust
- Expanding the role of scientists in society
- Help scientists feel they are making a difference
- Looking at the bigger picture
- Identifying new research questions
- Engagement with people at the heart of research
- More useful innovations
- CV opportunities and better recognition
- Training on public engagement and communication
- Interdisciplinary curricula and research
- Increase number and range of science vocations
- More public engagement
- Broader definition of role
- Direct engagement with end-users
- Problem-oriented science
- Research quality in open access systems
- Publish all research results

RRI Tools  |  Fostering Responsible Research and Innovation
a. Expanding role of scientists in society

Researchers in particular viewed RRI as an opportunity to expand the way we understand the role of researchers in society. This means not only enabling scientists to engage more directly with RRI processes and outcomes (such as with public engagement activities), but also recognising that scientists work as part of a wider system of institutions, rules, and incentives which can all be transformed through RRI. RRI may also lead to an increase in the number and range of science vocations, participants pointed out.

Quotes from workshops:

“Broader way of defining ‘researchers’ and their role in society – we can’t separate the research from its impacts”

Researchers, UK

b. Helping scientists feel they are making a difference

A number of participants found that scientists value the feeling of making a difference through their work, and by providing an opportunity to directly engage with research users, as well as generate problem-oriented research, RRI creates this opportunity for more scientists. Researchers in particular noted that this was important for young and future scientists, and provided an opportunity to retain trained scientists in the R&I system.

Quotes from workshops:

“Young scientists are really seeking for meaningful research”

Researchers, France

“Researchers should have the opportunities to feel their work is making a difference – could help retain researchers and keep talent in the pool”

Researchers, UK
c. Making review and evaluation more robust

Workshop participants were particularly interested in the new research impact and evaluation criteria under RRI. More specifically, opportunities around transforming the peer-review process within an open-access system and developing new citation practices were raised. A related practice that was discussed in the workshops was developing a tool that enables more disclosure of research activities to overcome the current bias in publishing positive research results.

Quotes from workshops:

“Peer review for RRI”
Researchers, UK

“Better opportunities for a new and improved form of research evaluation”
Policymakers, Denmark

d. New learning and training opportunities

Workshop participants identified new training opportunities at different stages of the scientific career as central to RRI, including developing more interdisciplinary curricula at universities or training researchers on public engagement and communication tools. New structural opportunities such as supporting cross-sector research (particularly researcher-CSO collaborations) and wider institutional recognition for RRI-related activities (changing the way scientific career advancement is assessed for example) were also discussed. By generating new incentives for scientists to engage in RRI process activities – such as developing an RRI seal or integrating public engagement into the way research is funded – RRI makes it easier to recognise and reward RRI practices within scientific careers.

Quotes from workshops:

“Creating an RRI seal/stamp can generate more commitment to RRI in the scientific community.”
CSO, Portugal
 Opportunities, obstacles and needs analysis

“Find the way to implement RRI principles (apply for funding)”

Education Community, Baltic Hub

e. Identifying new questions and helping scientists look at the big picture

Beyond the democratic benefits of engaging in a dialogue with patients, employees, and other stakeholder groups, participants found that RRI could enable new research questions and target areas currently not even being addressed. In particular, many felt that engaging with the public would enable scientists to put people at the heart of research, to consider more big picture questions and to trigger reflection and action about the end goals of specific research. Especially when there could be dual use of technology, engaging early would facilitate discussions about benefits and risks.

Quotes from workshops:

“Detection of some questions or problems that have not been taken into consideration before.”

Researchers, Spain

“To raise questions that were never addressed”

CSO, France

Opportunity 5: Learning
a. Connecting research and practice
Learning by connecting research and practice was identified as a key opportunity from RRI. By developing social competencies for science, R&I systems may be able to benefit more from existing collaborations (between and amongst stakeholder groups), save resources by working together, and learn from the diversity of perspectives brought together under RRI.

Quotes from workshops:

“Synergies > save resources”

Industry; Researchers, Austria

b. Networking to improve learning across Europe
Workshops emphasised the opportunity for greater European collaboration from RRI. Coordination and network building were seen as important for learning under RRI, and some participants identified particular structural opportunities to enable networking and partnerships, including the importance of role models, collaborations across funding institutions, and developing a platform that brings policymakers together. Further, some researchers noted the importance of taking advantage of scientific networks to foster cross-country learning.

Quotes from workshops:

“Enhance collaboration with multipliers”

Education, Policymakers, Austria

“Take advantage of scientific networks > multiplicity of approaches and perspectives”

Researchers, Portugal

c. Improving formal science education
Workshop participants expressed a range of opportunities around improved science education, encompassing changes in formal institutions (school curricula, trained teachers) and a greater role for informal learning institutions (science centres for example).

Changing the way science is taught in school was seen as an important opportunity, particularly in terms of better integrating the way science is taught with other subjects
Opportunities, obstacles and needs analysis

(economics, environmental studies). The Education Community stressed the benefits of targeting young citizens early in their education career, finding for example that addressing the issues around gender and inclusivity in scientific careers would involve supporting girls’ interest in science subjects from a young age. The importance of training teachers was equally emphasised as an opportunity around RRI.

Quotes from workshops:

“Change the way innovation is taught in schools”
Education, Greece (Athens)

“Formal and non-formal groups of colleagues to build the common understanding in modern teaching”
Education, Baltic Hub

Researchers across workshops emphasised the opportunity from RRI to inspire young researchers and students by changing university curricula, making philosophy subjects an integral part of scientific training, and foster research collaborations with other stakeholders (particularly where those collaborations are still under-developed, with CSOs for example).

Finally, workshops identified a range of opportunities stemming from better integrating informal learning institutions in R&I processes, including these institutions’ ability to react and present new ideas around science and technology more quickly than formal institutions; their more accessible, relaxed learning atmospheres might provide a complementary learning strategy to inspire young researchers; informal learning institutions may be better suited to combine insights from various fields around technology in society (science, engineering, art, sociology).

Quotes from workshops:

“To inspire young university students and to involve them from the beginning”
Researchers, Spain (Madrid)

“Trend of connection of formal and informal education system. Informal education can faster adapt to changes - lead to engaged public. Because informal learning is
based on free choice learning, the message passed through it is more reachable to the public. It is brand new concepts and Czech schools are learning to work with it. This connection must be still developed RRI tools can help with the development system”

Education, The Czech Republic

Opportunity 6: New opportunities from new networks

The level of networking and collaboration with stakeholders from outside organisations’s usual networks that is necessary if you are to engage with RRI fully was seen as a valuable benefit. For instance, it could encourage people to take better advantage of current collaborations, or offer new partners and collaborators. Industry stakeholders particularly mentioned the opportunity to work with public sector organisations. Furthermore, the mutual understanding developed in such interactions could add additional benefit – understanding markets or customers better, for example. For CSOs, networking could increase the impact of their lobbying work and help build cross-European alliances.

Quotes from workshops:

“Partnerships are formed and multidisciplinary is encouraged, both the scientific world and among the parties involved (public, industry, scientist, and public authorities)”

Industry, Luxembourg
Opportunities, obstacles and needs analysis

Opportunity 7: Access to new sources of funding

Access to more sources of funding under RRI was proposed as an opportunity across workshops, although there was some variation regarding how “more funding” may constitute an opportunity for different participants. Some stakeholders viewed the opportunity as a question of redistribution, where RRI would be better distributed (according to new criteria) across stakeholders and countries. Other comments centred on the possibility for funding to drive the RRI process, where funding is allocated conditionally according to a set of RRI evaluation criteria. For some regions (Romania, Cyprus, for example), the opportunity to gain greater access to European-level resources was identified as an opportunity.

Quotes from workshops:

“**Incorporating RRI in their work may benefit them to receive more funds, have the support of the industry, new allies, etc.**”

Researchers, Spain (Barcelona)

“The opportunity resides in better system of money distribution and project evaluation”

Researchers, Czech Republic

“**New funding opportunities (Horizon 2020 etc.)**”

Researchers, Cyprus
Opportunities, obstacles and needs analysis

“Easier access to European funding > international cooperation”

Education; CSO, Romania

4.1.2 Stakeholder specific opportunities

<table>
<thead>
<tr>
<th>Ranking</th>
<th>CSO</th>
<th>EDU</th>
<th>IND</th>
<th>POL</th>
<th>RES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Better support for CSOs in R&amp;I</td>
<td>Improving stakeholder collaboration</td>
<td>Expanding markets, new consumers, better products</td>
<td>Brings science and society closer by avoiding controversy</td>
<td>Rewarding individual scientists who engage with RRI</td>
</tr>
<tr>
<td>2</td>
<td>More collaboration with researchers and better science</td>
<td>Interdisciplinary research</td>
<td>Improving stakeholder collaboration</td>
<td>Improving stakeholder collaboration</td>
<td>More collaborations, new research questions, better science</td>
</tr>
<tr>
<td>3</td>
<td>Improving stakeholder collaboration</td>
<td>Brings science and society closer by improving the image of science in society</td>
<td>Personalised research/problem oriented science</td>
<td>Competitiveness and creativity</td>
<td>Improving stakeholder collaboration</td>
</tr>
</tbody>
</table>

Figure 5: The 3 most important clusters for each stakeholder group

All stakeholder groups ranked the potential for developing better networks and cross-stakeholder collaboration as a key opportunity stemming from RRI, and noted a high level of optimism with regards to the RRI Tools as enabling better collaboration.

Both CSO and Researcher representatives saw value in RRI facilitating collaborations amongst them, emphasising how these may generate both better innovations and better science. Researchers in particular noted that collaborating with end-users may lead to the discovery of new research areas and questions, and subsequently improve the impact of science, whereas CSOs noted that collaboration may help scientists become more aware of the bigger picture.
Industry and Policymakers specified that RRI might foster greater competitiveness and creativity within the R&I ecosystem. Industry representatives view RRI as an opportunity to create new commercial opportunities by improving business understanding of consumer demand, putting end-users at the heart of the innovation process, and stimulating consumer demand for RRI products and processes. Policymakers emphasised the potential for RRI to improve policy decisions around R&I, as well as highlighted the value of dialogue and communication in increasing trust in society.

Researchers focused on the important potential of RRI to transform the way science is done and viewed RRI as an opportunity to rethink the product(s) of science. They also emphasised the key role of RRI for better recognising and rewarding individual scientists who engage with RRI process requirements and outcomes, but were keen to emphasise that RRI also provides the opportunity to reshape the incentive structures that influence the culture of science in Europe. In relation to this, the Education Community noted that RRI opens up the possibility of integrating a greater number of perspectives into science curricula, remarking that this interdisciplinary would support cross-stakeholder collaboration in the future and improve the image of science in society.

Generally stakeholders were optimistic about the transformative opportunities of RRI, which may in part be explained by the nature of the audience, i.e. those participants who took part in the workshops had an initial interest in the potential of RRI. At the same time these participants may be viewed as ‘first movers’ or leaders within their particular stakeholder groups, and may eventually act as role models for other similar stakeholder across Europe.

Quotes from workshops:

“Tools can be interesting for citizen and solution orientated research (e.g. aging society, rural exodus)”

CSO; Researchers; Policymakers; Industry Germany

“Detection of some questions or problems that have not been taken into consideration before.”

Researchers, Spain (Barcelona)
Opportunities, obstacles and needs analysis

“Multi-disciplinary approach for socially valuable research.”
Researchers, Baltic Hub

“Helps avoid risks and unexpected impacts”
Policymakers; CSO; Researchers; Industry; Germany

“Facilitates communication and the development of a shared language”
Education Community; Policymakers; Italy

CSOs
CSOs viewed new funding opportunities and tools from RRI as an opportunity to strengthen their position within the R&I system, and particularly their influence on agenda setting, as well as opening up the process to more constructive science-society dialogues via more user involvement in research.

Quotes from workshops:

“Strong civil society with good resources”
CSO, Sweden

“Involves citizens in research processes (as it already exists in health)”
CSO, France

Researchers
Some researchers were keen to discuss the role of universities in society, and whether researchers have a responsibility towards ensuring that their research contributes to society, and whether scientists ‘should’ be championing RRI.

Quotes from workshops:
“Contribution to society, problem solving, transfer of knowledge on future generation, many real life problem could be solved”

South Eastern Europe Hub

“Scientists could be leading RRI because of their knowledge on research and its context”

Spain (Madrid)

“Broader way of defining 'researchers' and their role in society - we can’t separate the research from its impact”

UK

“Keep your research activities ethical, support those who can’t finance to expensive studies.”

Baltic Hub

“The best researchers are also the best promoters (Cf Pablo Jensen’s paper). They are a pool of actors that can be “used” in the dissemination of RRI) (This precise topic gave birth to a long discussion about researchers and their ability/legitimacy in science communication)”

France

“New generations, new players, other incentives and perspectives (we get access to new researchers that we can influence during their scientific education etc. who aren’t stuck in their ways)”

Sweden
4.1.3 Country specific opportunities

Greece

Echoing the obstacles section, the Greek Hub identified country-specific opportunities from RRI, particularly re-contextualising these opportunities in light of current economic hardship. The crisis was seen as providing an impetus for improved, more responsible R&I systems, whilst developing RRI was seen as an opportunity to limit the drain of talent out of the country, as well as change the way resources are currently distributed within this system. This sentiment was also echoed, to a lesser extent, in Spain.

Quotes from workshops:

“Crisis - new opportunities to use resources (more efficiently), innovate and act”

Policymakers, Greece (Thessaloniki)

“It is still possible to avoid the brain drain of our society”

Industry Greece (Thessaloniki)

“Personal initiative, flexibility, bringing new talents more to the front so that they can stay in the country”

Civil Society; Education (Athens)

“The context: Crisis made more visible the need of incrementing efficiency and social return”

Civil Society, Spain (Madrid)

Sweden

The view that cross-sector collaboration via RRI could generate a national comparative advantage was particularly strong across the Swedish workshop. This optimism was shared across stakeholders.

Quotes from workshops:
Opportunities, obstacles and needs analysis

“Export industry (knows the market)”

Industry

“Swedish research conditions are attractive globally (the academic exemption)”

Policymakers

“Identify new unknown areas of strength”

Policymakers

“Opportunity for the whole value chain”

All stakeholders

“Knowledge (exists on different things in different organisations)”

Civil Society
4.2 Obstacles

4.2.1 Main clusters

Nine clusters relating to the possible obstacles to implementing RRI were identified by the workshops: knowledge, skills, attitudes, relationships, culture, economics, resources and the public.

The biggest clusters of issues were around attitudes and culture.

Figure 2: Overview issues identified as possible obstacles to implementing RRI – shown by relative size/importance.
Obstacle 1: Attitudes

Attitudes was an important cluster, encompassing issues relating to lack of buy-in, resistance to change, tendency to short term thinking and risk aversion.
A lack of buy in, an attitude that related to some of the issues around knowledge (discussed later) was seen as important. Without making the benefits of RRI clear, or creating a requirement for RRI, other things would be seen as more important, participants argued. Relating to discussions around resources, workshops argued that formal recognition, incentives or clear career benefits were important in gaining buy in. There was however a tension between the desire to require/incentivise RRI and the risk of making RRI a box-ticking exercise – an outcome that was seen as a potential undesirable side effect by many. Similarly participants said that there would be resistance to RRI being imposed.

Resistance to change was also identified as an attitude that is likely to be an obstacle to implementing RRI. Large systems like science and education are difficult to change; some groups – especially those with power and high up in the hierarchy - are happy with the status quo and therefore will not be interested in changing. Further to that, many expressed a lack of confidence in the possibility of changing happening. Unwritten rules and norms were also mentioned as possible obstacles – relating to many of the issues discussed under ‘culture’. Relating to that, risk aversion was also seen as an important issue with RRI being seen as a potential risk to the direction of science and to the possibility of creating a public controversy.
Finally, under attitudes, short-term thinking was seen as a significant obstacle. Political cycles do not match research timescales, government funding is looked at in the short term and there is a tendency to focus on hot topics and project opportunities. In light of that, who has the authority to act in the long-term, participants asked.

Quotes from workshops:

“What is my financial interest into putting energy into it?”

Industry, France

“Fear of researchers to be questioned. They may be reluctant to RRI as eventually it may suppose a decrease in investment in research that is not socially supported (e.g. Mathematics).”

Researchers, Spain

“A lack of understanding of RRI among policy makers may lead to RRI not making it into important policy documents.”

Policy Makers, Sweden
Relating to many of the issues around attitudes, the culture of science, the culture of politics, cultural difference and wider culture were seen as presenting important obstacles too.

The culture of science was the largest aspect of this issue discussed. Firstly, the unpredictability of science and the right to academic freedom was raised. Given the unpredictability of science, how can we begin to control it? If we don’t know where science is going, at what point can we judge if it is going to bring responsible or not responsible outcomes? And who can be expected to be responsible for such a networked activity and diverse outcomes? Added to that, participants argued that scientists work on just a small part of science. Who has the overall vision or big/picture and how can it be directed or influenced?
Other more day-to-day aspects of the culture of science were also raised as obstacles. The pressure on scientists to publish was cited as an important issue – both because it excludes any other activity and because it encourages a view that cuts science up into disconnected projects rather than seeing the big picture; the competitive nature of science makes researchers reluctant to be open and share their data prior to publication and leaves open the question of whether RRI will make particular researchers more or less competitive in this context; the way in which science is evaluated was also questioned with some arguing that it was no longer fit for purpose if RRI is the be an important consideration. At the moment they argued, RRI is not integrated into researchers’ or institutions’ evaluations and instead research evaluation is based upon productivity rather than social relevance. Worse than overlooking RRI, the current evaluation procedure may actually sometimes undermine RRI objectives. Strong boundaries between disciplines, along with the fact that interdisciplinary working is not rewarded in research evaluation was also raised as a possible obstacle to RRI. Others pointed out that it is difficult to measure how well you are doing at RRI.

The culture of politics and policymaking was also mentioned when discussing a number of obstacles. There was a view that scientific expertise was not always taken into account during decision making and, similarly, that there were few opportunities for citizens to participate in the process; the potential for RRI to slow down the decision making process was also raised. The lack of levers/limited influence that policy can have was seen as a limitation to policy’s involvement in RRI, as was the distributed nature of power and the relative inflexibility of the policymaking process. Participants also expressed a view that politicians were more interested in ‘inner dramas’ and party politics.

More widely, the Europe-wide mood to reduce bureaucracy was seen as a potential obstacle, creating resistance to RRI, especially if it is seen as a box ticking exercise, or imposed. The lack of innovation culture and lack of collaborative culture in some countries and the perceived low status of science within society were also raised.

Quotes from workshops:
“More bureaucracy = more tick boxing forms.”

Researchers, Ireland

“Would adopting RRI slow down the evidence finding process, and thus slow down policymaking?”

Policy makers, UK

“Evaluation mechanisms in scientific careers do not facilitate RRI. For instances, scientists are pushed to publish as fast as possible, without giving priority to other aspects.”

Researchers, Spain (Madrid)

“Research it is not predictable, how we can be responsible on something we cannot predict?”

Researchers, Italy

“RRI is not well integrated in the institutions. It will easily be left in a corner.”

Policy makers, Denmark
A lack of a clear definition of and rationale for RRI emerged as a key issue, which related to the points above about lack of buy-in. Participants described how without a clear definition that brought the issue to life and highlighted the benefits for each stakeholder group, different people understood the concept differently. While this has the advantage of building agreement and support easily (everyone projects their own aspirations onto the terms, so who can disagree?) this is a problem if we are aiming to implement a consistent concept. Stakeholders also pointed out how difficult a concept it is to communicate at the moment – largely because of this lack of consensus and clarity of definition. Consequently, important stakeholders were not familiar with the concept and so mention of RRI, and its approach, was not making it into key documents and frameworks.

Connected to this, RRI was seen as a difficult concept to communicate and a tendency to use ‘RRI language’ was identified, which did not help communication between stakeholders. Conversely, different stakeholder groups argued that there was a lack of understanding between the groups of others’ motivations – business stakeholders in particular expressed a view that others didn’t understand or accept their motivations. The media was seen by some as not being interested in ‘serious’ science and lacked any ability to challenge, so communicating more widely was difficult.
Opportunities, obstacles and needs analysis

A lack of understanding of how and when to implement RRI and how to reach particular groups such as the public was also seen as important and stakeholders highlighted the absence of norms, regulations and examples of good practice.

Quotes from workshops:

*Unclear definition of RRI in its current form, who would disagree with RRI*

*('parenthood and apple pie')*

Policy makers, UK

*“Ideas gathered under RRI are unclear and everybody understands them in a different way”*

Researchers and CSO, Poland

*“RRI concept should be defined in a way to be understood by all stakeholders”*

All stakeholder groups, Slovenia

**Obstacle 4: Relationships**

Relationships- both between stakeholder groups and between science and wider society, were also raised as important issues. To begin, the apparent misalignment of objectives between public and private/industry and society underpinned many of the discussions about obstacles – how do we make science more responsible when industry’s imperative is to make money? Added to that, participants recognised the mis-match of power between different groups which made it difficult for some voices or perspective to be heard – something that RRI processes need to take into account.

Building the right relationships within and between stakeholder groups was also raised as an obstacle to RRI. The lack of networking opportunities and coordination was mentioned as one specific problem. On one hand industrial representatives complained of a lack of
understanding of their goals and how complicated the research field appears, on the other, stakeholders mirrored this by commenting that industry was too introspective and that it was difficult to identify not only the right individuals but also the right path within a business to make connections – should it be through research management or CSR, for example. Civil Society Organisations were identified as being ‘problematic legitimate partners’ – without any form of organisation, how do you find the right one to work with? Who do they speak on behalf of? What formal status and accountability structures do they have?

Quotes from workshops:

“Industry is met by suspicion from other stakeholders - different languages and realities. A lack of understanding for industry's driving forces. How to create a constructive dialogue on, for example, chemicals of the future? Difficult for industry to find suitable partners within acceptable time frames”

Industry, Sweden
Opportunities, obstacles and needs analysis

“Lack of communication & coordination between Education, industry and policy makers, one group not aware of what the others are doing”

Education, CSO and Industry, Bulgaria

Obstacle 5: Resources

Resources, in terms of time, money, people and infrastructure, were seen as important. Overall, the lack of formal funding for RRI was seen as a problem to implementing RRI. Without additional money, participants argued that RRI will be seen at best as ‘extra’ but more realistically, as an ‘expensive luxury’. RRI is not being seen as a ‘core’ function by the stakeholders. Small organisations such as CSOs and small businesses were seen as particularly vulnerable to the cost of RRI as they are less able to absorb non-profit or core activities.

Further to that, competition for funding and a lack of regular funding means that researchers need to dedicate more and more of their time to doing the research that will attract funding, and to producing the grant applications to support their research. Even time for networking was described as ‘limited’. Developing new RRI resources and participating in RRI activities was seen as time consuming activities.

In terms of infrastructure, the lack of a national body to coordinate RRI and a legal framework to ensure its consistent implementation were mentioned as institutional resources, which were missing.
Opportunities, obstacles and needs analysis

Quotes from workshops:

“Too small number of employees to deal with non-profit activities”

Industry, Baltic Hub

“Lack of time when it comes to involving researchers, esp as they need to publish to secure financing”

Researchers, Belgium (Wallonia)

“Less basic funds for universities needs more proposals and causes less time for RRI/participation”

Research and Education, Germany

**Obstacle 6: Skills**

Overlapping with many of the issues relating to knowledge and attitudes, a shortage or absence of skills was seen as an obstacle to implementing RRI. The lack of expertise and specific training to support researchers in implementing RRI was seen as one issue, but so too were wider skills related issues: the lack of softer skills such as communication, amongst researchers and the difficulty of teaching new skills to those with established careers. The skills of schoolteachers were also highlighted as particular problems as many lack any specific science training and ethics are not included in the school or higher education curricula.
Opportunities, obstacles and needs analysis

Quotes from workshops:

“Expertise on RRI processes”, **Netherlands**

“Capacity problems: there are not a lot of people who are able to drive the right processes (RRI) in the right way in neither Denmark or the EU”

**Policy Makers, Denmark**

“Scientists are not trained in communication, which undermines the transfer of information to the public”

**Education, Luxembourg**

**Obstacle 7: Who**

Questions around ‘who’ were also identified by the workshop participants and organisers as important – who decides what we want as a society? Who decides what is RRI and how are the qualified to do that? Who should be responsible - should it be institutions or individuals?

Quotes from workshops:

“Who decides what is RRI? Do they have enough information and training?”

**Researchers, UK**

“No one wants to take responsibility”

**Industry, Greece (Athens)**
Engaging with the public was also seen as a significant obstacle to implementing RRI for two reasons. Firstly the public themselves were problematized – workshop participants described the public as not being interested in science, not knowing enough about it, being too passive and not wanting to get involved; participants also expressed concern that the discussion won’t be useful.

Secondly, the process of Public Engagement was seen as a problem: it is difficult to get a representative public; methodologies to manage participation aren’t available; the target groups are difficult to reach; RRI topics aren’t present in educational curricula; citizens place in the decision making process is not always taken into account.

Quotes from workshops:

“Unrepresentative responsiveness by public”

Policy Makers, Ireland

“Scientific illiteracy and minimal engagement of citizens in scientific projects”

CSO, Portugal
Opportunities, obstacles and needs analysis

Obstacle 9: Economics

While this was a relatively small group of comments, the current economic situation within Europe was raised as an important issue in several of the workshops. Firstly, the economic crisis has underlined the role of science in creating wealth and economic growth and therefore anything that might inhibit that function is unlikely to gather much support. Science and business are being seen as having carte blanche provided they create jobs and growth. The economic crisis also means that less public funding is available, compounding all of the issues raised above about time, money and competition.

Alongside that, the pressure on European economies to compete with emerging economies like China and India was seen as putting more pressure to resist RRI – anything that could be seen to slow down innovation will be poorly received as it will run the risk of making us less competitive.

Businesses focus on profit, as well as being a problem for aligning objectives and addressing societal needs, was seen as a potential obstacle to the openness agenda in particular. Publishers were seen as resistant to open access sources because of the challenges to their business model; commercial secrecy, IP rights and patents raise important issues for moves towards transparency, open science and sharing knowledge. At the same time it was also noted that too much openness from industry could be irresponsible as it could limit competitiveness that could lead to a loss of jobs.
Opportunities, obstacles and needs analysis

Quotes from workshops:

“Difficulty of valorising the benefits of RRI, it will initially increase the production costs. Profitability of implementing RRI should be assessed”

Industry, Spain (Madrid)

“Businesses always aim at profit, if we focus too much on RRI processes it might become too costly”

Industry, Greece (Athens)

4.2.2 Stakeholders specific obstacles

Even though the obstacle clusters outlined above apply across the five stakeholder groups, particular obstacles carry different importance depending on the stakeholder group. Figure 2 shows the most frequently mentioned obstacles across workshops by stakeholder group.

<table>
<thead>
<tr>
<th>Ranking</th>
<th>CSO</th>
<th>EDU</th>
<th>IND</th>
<th>POL</th>
<th>RES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collaboration between stakeholders</td>
<td>Collaboration between stakeholders</td>
<td>Industry-society connections</td>
<td>Political culture</td>
<td>Scientific culture</td>
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<tr>
<td>2</td>
<td>Communication</td>
<td>Time</td>
<td>Collaboration between stakeholders</td>
<td>Public engagement</td>
<td>Bureaucracy</td>
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<tr>
<td>3</td>
<td>Lack of understanding of RRI</td>
<td>Challenges of change</td>
<td>Buy-in</td>
<td>Short term vision</td>
<td>Collaboration between stakeholders</td>
</tr>
</tbody>
</table>

Figure 3: The 3 most important obstacles per stakeholder group

Aside from overarching obstacles, certain stakeholders have also identified obstacles that are of specific relevance to them.

Civil Society Organisations

Several obstacles to collaboration with CSOs were pointed out during the workshops. Representatives from Civil Society Organisations noted that their resources are limited, and they don’t necessarily conduct research of their own. They therefore felt the onus had to be on academia to initiate collaboration with CSOs. However, as mentioned in Obstacle 4, CSOs have been identified as being perceived to be problematic legitimate and credible partners, which poses an obstacle to collaboration.
CSOs cover a wide range of approaches, and types of organisations. So even though they are important for RRI, it is not straightforward to establish collaborations with all CSOs, particularly with more alternative groups. Finally, the risk of tokenistic engagement was specifically mentioned in relation to collaborating with CSOs.

Quotes from workshops:

“Difficult for RRI to reach extreme environments (more autonomic groups, such as bio hackers) and alternative organisations”

CSO, Denmark

Education

Even though it was felt that education could provide an opportunity for RRI, stakeholders noted that unevenness in the development, recognition and visibility of informal education in national research and education landscapes could be an obstacle to including informal education in RRI.

Quotes from workshops:

“How to measure the facets of, for example, visits to science centres? Difficult to promote science centres as a possible arena for RRI.”

Education, Sweden

4.2.3 Country specific obstacles

Greece

The Greek Hub organised 3 workshops, in Athens, Thessaloniki and Cyprus. All three workshops mentioned the lack of trust and collaborative culture in the country as an obstacle to RRI.

Quotes from workshops:

“There is a culture of turning only to yourself in Greece and trusting no one”,

Researchers, Athens
“Claustrophobic culture”
Policy makers, Cyprus

“Lack of collaboration culture in the country”
Education, Industry and Research, Thessaloniki

Czech Republic
In the Czech Republic, researchers and policy makers discussed the relationship between the money the Republic contributes to the EU and the research funds that they receive from Europe. Stakeholders argued this left the Czech Republic with a deficit and worried that the RRI Tools project would widen the gap between Western and Eastern European countries. They also expressed a concern about the best researchers emigrating. This obstacle was also mentioned in the workshops organised by the Greek and South Eastern Europe Hub.

The Bulgarian and Baltic Hubs both mentioned cases of corruption as an obstacle.

Quotes from workshops:

“Corruption in some cases”
Education, Baltic Hub

“Bureaucracy leading to corruption”
Industry, Research, Civil Society, Bulgaria
4.3 Needs and Actions

4.3.1 Main clusters
Nine clusters relating to the possible actions for implementing RRI were identified by the workshops: build relationships, change research, education, how to RRI, institutionalise RRI, buy-in, evaluating, economics and transparency and open access.

The biggest clusters of issues were around relationships and how to RRI. It can be said for all clusters that stakeholders did not specify who should be responsible for completing the actions; the RRI Tools Project, the stakeholder who identified the action or one of the other stakeholders groups.

Figure 10 Overview issues identified as possible needs and actions for implementing RRI – shown by relative size/importance.
Opportunities, obstacles and needs analysis

Action 1: Relationships

Systematically organise public consultation throughout the research and innovation process

Public engagement

People power: opportunities for industry to engage with the public

Connecting stakeholders

Stimulate dialogue between stakeholders

Legitimization of different groups

Meeting places are needed in order to foster thinking from a common RRI point of view rather than isolated stakeholder point of view

Pre-competitive collaboration on R&I

Foster public-private partnerships

Connecting with Industry

RRI Tools | Fostering Responsible Research and Innovation
Building relationships between the various stakeholders as well as between the stakeholders and the public, were identified as a key need for RRI. Workshop attendees emphasized the need for coordination and collaboration throughout the research and innovation process. From agenda setting and research commissioning to project evaluation. Ranges of actions, aimed at achieving this, were identified.

a. Connecting stakeholders
Actions related to enhancing and facilitating collaboration, and the exchange of expertise and experience, on RRI between the various stakeholders were mentioned frequently by all stakeholders. CSOs specifically mentioned the need to widen the range of stakeholders involved in research and innovation as well as the need to remove stereotypes that may inhibit collaboration.

Suggested actions to achieve improved relationships between stakeholder groups included the establishment of new networks, meeting spaces, exchange of internships between groups and the establishment of a global day to promote and foster collaboration.

Specific actions were identified in relation to industry partnerships such as pre-competitive collaboration and creating the right environment for Public Private Partnerships.

Quotes from workshops:

“Policy makers can provide funding for structured meeting places- new or old -such as courses, events, pilot projects”

Policy makers, Sweden

“Promote the creation of scientific committees that collaborate with policy makers to work on the policy creation and its implementation”

Policy makers, Spain (Barcelona)

“Different interest might be generating suspicion and thus it would be better to facilitate the development of forms of communication that are jointed and allied
between private and public realms. This approach has been closely related to the opportunity of developing common needs, aims and objectives” Industry, Italy

b. Public engagement
Actions related to moving beyond informing the public to engaging the public were mentioned by all stakeholders, albeit from different viewpoints. Policy makers in Luxembourg, for example, mentioned a systematically organised consultation forum before the launch of research programmes as an action to include the public’s perspective in identifying research needs and making decisions on research funding allocation. Industry on the other hand pointed out the potential of (improved) Private-Public Partnerships as well as closer communication and co-creation with the public through social media.

All stakeholders agreed that public participation should be formalized, structured and integrated. Participants also mentioned the need for guidance on how to do public engagement and examples of tools that work – discussed later.

Quotes from workshops:

“Need to adapt the strategy for the development of science and research to the answers and needs of society which requires the development and enforcement of a true dialogic approach that abandons the paternalistic approach towards a more open approach that recognizes when and where there are complicated or uneasy situations”
CSO, Italy

“Citizen summits as examples (lighthouses) of RRI, e.g. during the national Danish event ‘Days of research’”
Policymakers, Denmark

“CSOs should promote public participation during the evaluation of a project, and this should include a training programme. It was also said that the participation should be
real, not only based on providing information, and that CSOs should make sure that after the involvement there is some sort of response to keep participants motivated”

CSO, Spain (Barcelona)

**Action 2: How to do RRI**

The need for guidance for stakeholders on how to do RRI was identified by all groups. To begin, they wanted a clear and common understanding of what is meant by RRI and how to communicate it. Industry specifically mentioned the need to make RRI clear and concrete in their terms – in particular about the commercial gains to be made from this approach.

Beyond that, all stakeholder groups identified a need for clear guidance on translating the concept of RRI into processes and implementation plans. It was pointed out that these methods and tools should not have a one-size-fits-all approach but be adaptable to the different needs and cultures between stakeholders and countries. It was also mentioned that they should be multi-lingual.

An action to achieve RRI that was often referred to was training. Training for researchers on how to communicate (better) about their research, training for research evaluators and reviewers on the general conditions for RRI or the inclusion of training on RRI in the continual professional development of teachers.

Quotes from workshops:

“Develop clear criteria and roadmap for accessing RRI”
Opportunities, obstacles and needs analysis

Industry, Switzerland

“Do not treat RRI as an “indivisible whole” – be flexible in terms of implementing RRI into the practice (insisting on integrity of this notion may lead to its rejection)”

Policy makers, Poland

“Guidance: RRI director, that helps to put the guidelines into practice in first stage, delineation of the project, check feasibility business model, balance of trade offs social and financial assets”

Industry, Belgium (Flanders)

“Illustrate the definition providing lots of examples to get industry attention, especially with win-win practices”

Industry, Spain (Barcelona)

“Share free and existing RRI tools; tools relevant to industry (scalable to size, market share, complexity of business)”

Industry, UK

Action 3: Change how we do research and innovation
Opportunities, obstacles and needs analysis

a. Research culture

Needs and actions in relation to changing various aspects of the research and innovation process were among the most frequently mentioned by the workshops. A significant number of comments were made about changing the existing research culture. For example regarding changing the culture in the lab to an environment where researchers discuss the potential consequences and impacts of their research with each other and rethinking the culture and ethos of rewards, continuing development, promotion in the scientific community.

Quotes from workshops:

“Doing RRI can be quite hard if you are only being valued for your publications. This has to do with the academic structure of evaluating success and the academic job market: after 5 to 7 years of postdoc or a tenure track you have to focus on your publications and you do not have time for RRI as a hobby. So there is a need for a new structure of contracts”

Researchers, Netherlands

b. Research funding

Actions were also identified in research funding. Participants discussed the possibility of setting RRI as a requirement for research funding – although it was important that this was done in a meaningful way that encouraged RRI, rather than simply a box-ticking exercise.

Further to that, participants also said that research funding should reflect society’s needs and consider socially desirable outcomes. They also suggested that research data could be used to understand and, importantly, to challenge whether or not the pattern of research funding meets these outcomes.

Quotes from workshops:
Opportunities, obstacles and needs analysis

“Funding should not be granted based on promises, but also on “proven RRI” (i.e. not just take into account what researchers say they WILL do, but also what they HAVE done in the past”

Policy makers, Netherlands

“Include analysis of risk and undesirable effects when applying for research funding”

CSO, Portugal

“Someone should take control of analysing research spend overall - taking a big picture view of whether the money is going to the right places”

Policy makers, UK

Actions 4: Education

Actions that were mentioned in relation to education included improving STEM education, including RRI in teaching curricula at all levels, courses on ethics and science communication for all university students and developing RRI courses and qualifications for teachers and research managers.

In relation to how curricula could include RRI a significant number of comments were made about partnerships between stakeholders. For example by fostering the collaboration between the education sector and businesses resulting in the active inclusion of businesses in the curricula, including work placements. Visits to research labs, collaboration between students and researchers and the inclusion of ‘real life’ examples in education.
Aside from changing curricula in formal education mention was made of the potential to encourage RRI through informal education aimed at the general public as well as students. Education representatives at the workshop in France suggested this could be encouraged by setting the involvement of informal education partners as a requirement in calls for European research projects.

The importance of engaging young researchers with RRI, encouraging them to peruse a career in research and provide them with opportunities was highlighted by several workshops. Furthermore several workshops mentioned the importance of promoting research and RRI from a young age.

Quotes from workshops:

“RRI should be embedded in higher education and teaching. This needs adapted curricula and teaching methodologies for societal responsibility”

Education, Germany

“Early awareness raising: tools which are also useful in school, ethics education, argue and discuss, create open spaces in class, university mandatory ethics and science communication”

Education, Austria

“Register/portal on European level for establishing relations between science, education and business; those which are operating are not actually working do not support partnerships, only data bases for registration”

Education, Bulgaria

“New master programme for manager of R&I - specialists who will govern the whole process of RRI and know on which stage who is to be involved”

Education, Romania
Opportunities, obstacles and needs analysis

**Action 5: Generating Buy-in**

Needs and actions relating to stakeholders’ commitment to RRI fell into three categories:

Firstly, RRI needs to be meaningful and must avoid creating more bureaucracy. This was especially important for industry. Secondly, Documenting case studies, sharing best practices and support and collaboration with early adopters (RRI champions) were mentioned as a way to further RRI. In this respect, industry mentioned the importance of illustrating how RRI creates value.

Professional development opportunities were also mentioned as a possible incentive to RRI. Referring back to Action 2, ‘Changing the research culture’, specific changes were proposed regarding scientific careers: reducing pressure to publish, validating RRI in the CV of scientists, acknowledging it as a merit in the scientific career and including it in recruitment and appraisal process as well as giving researchers more time to communicate their research were mentioned as actions.

Finally, a large number of comments were made about the importance of incentivising stakeholders to adopt RRI, for example by making it a requirement to get published in a journal, or by awarding a RRI price to an organisation that successfully adopts RRI.
Opportunities, obstacles and needs analysis

Quotes from workshops:

“In future, all project proposals need to require that the project proposal is following RRI principles and have gender dimensions included”

Education, South Eastern Europe Hub

“Creating a „map of benefits“ which would clearly present potential benefits that different stakeholders engaged in the RRI process could actually gain; it would be particularly important from the business/industry actors’ point of view because their decisions to join or not to join any initiative is usually based on calculation of costs and benefits; since in case of RRI benefits are not that clearly visible the map could help in attracting business/industry partners”

CSO, Poland

**Action 6: Institutionalise RRI**

Several stakeholders suggested actions to embed RRI in organisational structures by integrating it into existing strategies, charters and policies (see quotations below). New networks, (governing) structures or organisational RRI coordinators were also suggestions for ways to encourage and develop RRI practices.

Quotes from workshops:

“In include RRI principles into interior organizational culture of policymaking institutions”

Policy makers, Baltic Hub
Opportunities, obstacles and needs analysis

“Include RRI charter in governance charter: part of mission and vision, RRI processes, overview of stakeholders, include in financing strategy”
CSO, Belgium (Flanders)

“The creation of a RRI observatory, where all stakeholders take part, which aims to create an enabling environment for RRI.”
Researchers, Spain (Madrid)

“Commission a RRI responsible and involve him/her from beginning until the end of the research process”
Researchers, Belgium (Flanders)

**Action 7: Evaluate/accredit RRI**

Stakeholders made various suggestions around developing systems to evaluate RRI and indicate the extent to which it has been achieved. Such systems were identified as a mean to showcase quality and enable improvement.

Quotes from workshops:

“The creation of some kind of certificate, accreditation or stamp given by an international institution was seen as a crucial tool to communicate the added value of an RRI product or company, as well as, to help to the identification of those products which have been developed in a RRI manner. If a product has been developed with RRI it will fulfil users’ needs.”
Industry, Spain (Madrid)
Action 8: Economics

As discussed in Action 3, participants suggested that RRI should be taken into account when evaluating research funding.

Furthermore, stakeholders noted that funding opportunities should be available to support RRI, for example by creating calls specially aimed at RRI projects or supporting SME’s with limited resources to participate. Representatives from business and industry noted that RRI could open new markets and products but this would need to generate a return on investment.

Quotes from workshops:

“There is a lack of referents to see the profit of implementing RRI. For them, what RRI can mainly provide to industry is Innovation, as the final user is taken into account during the whole process. Hence, consumers will feel empathy for those RRI products that they would have contributed to design and develop from the begging. It was also stated that what should be RRI is not only the product but also the company that fabricates it and the production process.”

Industry, Spain (Madrid)
Workshop attendees argued that decisions (and the processes to come to these decisions) on funding allocation should be transparent and publicly reported. It was noted that in certain cases, for example because of competition in industry, or when dealing with sensitive research data, information sharing should be regulated. Establishing national or institutional platforms for open access or open access journals were also mentioned as actions.

Quotes from workshops:

“Transparency in the decisions for financing, their allocation and publicly accessible reporting of where the money is spent”

CSO, Bulgaria

### 4.3.2 Stakeholder specific needs

<table>
<thead>
<tr>
<th>Ranking</th>
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<th>EDU</th>
<th>IND</th>
<th>POL</th>
<th>RES</th>
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<td>Collaboration of stakeholders</td>
<td>Collaboration of stakeholders</td>
<td>Research culture</td>
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<td>Train teachers</td>
<td>Finance</td>
<td>Funding</td>
<td>Training/education</td>
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<td>3</td>
<td>Structures</td>
<td>Build communities of practice</td>
<td>Cutting red tape</td>
<td>Develop training</td>
<td>Research funding and commissioning</td>
</tr>
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</table>

*Figure 11: The 3 most important clusters for each stakeholder group*
Opportunities, obstacles and needs analysis

Even though the needs and actions identified by the individual stakeholder groups largely overlap and show common themes, stakeholders have subtly different priorities, mirroring their objectives and position in society:

- For CSOs, the most pressing actions were around the involvement of the public in the research and innovation process.
- The education sector identified actions to change the curriculum so that professionals, across institutions and age groups, can educate students on RRI.
- For Industry to commit to RRI it will need to understand how RRI impacts on their return on investment.
- Policy makers identified actions to review the process of funding allocation.
- For researchers to be able to foster RRI they require a cultural environment that will enable them to do so.

4.3.3 Country specific needs

Attracting and retaining research experts

Researchers from the South Eastern Hub mentioned incentives for scientists returning from abroad as an action to counteract the brain drain from their region. Researchers from the Czech workshop discussed a range of actions to address the issue of attracting top researchers to Czech research and innovation centres. One of the actions they mentioned was increasing the salary of researchers in the Czech Republic. According to the workshop attendees: “This could even bring back Czech scientist who went to work abroad after school, there become a tops in their field, but not want to return, because of the money.”

Regional collaboration

Several RRI hubs, for example the Baltic Hub and the South Eastern Hub, cover a region, rather than an individual country. The importance of collaboration between regions with similar circumstances was emphasized by several workshops.

Quotes from workshops:
“Some of the obstacles and opportunities identified by both Romanians and Bulgarians are common and valid for both countries which impression implies a regional image of the current RRI status rather than divided by nations image. “**Romania**

“To establish collaborations between different European regions with similar circumstances”

**Policy makers, Spain (Madrid)**

“At national and European there could be interregional meetings and exchanges”

**CSO, France**
5 Conclusions

Holding 27 workshops to introduce and discuss the concepts of Responsible Research and Innovation in a systematic and structured fashion has been a major undertaking, never previously attempted. The project has thus completed a significant exercise in understanding and developing – putting flesh on the bones of - RRI. This has also given RRI Tools a major reach into the 30 countries across Europe covered by the hubs.

Overall, the stakeholder workshops have built a clear picture of where current thinking on RRI amongst the key stakeholders across Europe and the steps that can be taken to help progress the agenda. Most of the (potential or actual) obstacles to RRI identified in the literature were also reflected to a greater or lesser degree in at least some of the workshops. The process of holding these workshops, however, and the systematic way of reporting them has enabled RRI Tools to pick up on a number of key differences and omissions in comparison with what is generally concluded in the existing academic literature.

Perhaps the most noticeable difference with the literature was that there was considerable enthusiasm and optimism about RRI. Participants in the workshop appeared to be keen for RRI to be a serious and transformative activity, rather than a modest-tick box exercise. Indeed they argued that were the latter attitude to be adopted it would be damaging to all concerned.

The workshops also identified many opportunities that adopting RRI could bring. The opportunities varied from stakeholder to stakeholder – for example, industry representatives suggested that there could be new markets and business models for them in this approach; researchers argued that RRI could make their careers more fulfilling by making the goals of their research clearer in their minds; CSOs could see new roles and funding opportunities for themselves.

Participants also expressed a view that RRI was an opportunity to bring about the wider cultural and societal progressive changes that many have been wanting for some time –
taking a long view of the type of world we want to live in and making science more relevant to that, for example.

It was also clear from the workshop that there is also a lot of common ground between stakeholders and a lot of agreement about the barriers and solutions to making RRI a reality. A clear definition of RRI, training and networking opportunities and ‘how to’ guides were actions that came up again and again across stakeholders and will be important for the toolkit project to take forward. Alongside that though, stakeholders were also very clear that whatever support was offered to them, it needed to speak to their particular circumstances. While they felt that a clear definition of RRI was needed in order for everyone to be talking about the same thing, they also argued that any definitions and rationales for RRI needed to bring the concept to life for each stakeholder. ‘Tailored’ was an adjective commonly used.

Further to that however, it was also clear that knowledge of RRI was relatively low across all stakeholder groups. While some talked confidently about the public engagement or open-access agendas, there was little understanding of the other agendas making up the concept of RRI. As a result, discussions tended to focus on public engagement and open-access.

Most of the discussions also took place in abstract terms and while there were lots of ideas about what needs to be done, it was difficult to assign these responsibilities to specific actors. Related to this, discussions about how to create buy-in were also important, suggesting that participants still weren’t clear enough about the concept to go away and make the case with their colleagues. There were also requests for more resources or people dedicated to implementing and monitoring RRI – requests we would argue was at least partly the result of the point of RRI not being fully understood, and its place in the core business of science and innovation being unclear.

The aspirations of the stakeholders in RRI also appeared to be high. One of the clusters of ‘obstacles’ that we identified were about cultures – the competitive nature of science, the profit motives of industry and the short-term view of policymaking. Clearly these matters
are key to achieving research and innovation that better fulfils the needs of society, but they are huge and challenging changes to make. The expectations of what would come from improved public engagement and openness were similarly huge and included changing the way people engage with democracy, avoiding future controversies and creating a more reflexive society. These views appear to be based upon normative values, rather than experience of the effects of public engagement and open science and such might need to be managed during the course of the project.
6 References


Opportunities, obstacles and needs analysis


Opportunities, obstacles and needs analysis


Opportunities, obstacles and needs analysis

(38) Dana Centre (2004). *Naked Science: Evaluation of 18 months of contemporary science dialogue events*. London: Science Museum and Wellcome Trust. Available online: 

7 Appendix 1: Full list of workshops held

Nineteen country and regional Hubs hosted 27 workshops across over thirty European countries. Some hubs coordinated multiple workshops, such as the Italy & Switzerland and Austria & Slovenia Hubs. Other Hubs spanned several countries across a region, like the South Eastern Europe or Baltic Hub. Finally, some Hubs hosted more than one workshop, as was the case for Belgium, Greece and Spain.

<table>
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<td>Greece and Cyprus</td>
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Figure 12: Full list of workshops held with total participants
8 Appendix 2: Breakdown of workshop participants

There were slightly more men than women taking part in workshops across Europe, with 212 men and 199 women marked as attending.

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Figure 13: Breakdown of workshop participants according to gender
Opportunities, obstacles and needs analysis

On average, all stakeholder groups were equally represented, although more researchers and policymakers were present across workshops. With 71 representatives across Europe, industry was the smallest group.

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</table>

Figure 14: Breakdown of workshop participants according to stakeholder group
The Consortium

RRI Tools is being carried out by a Consortium of 26 partners from 19 European countries that include representatives from a wide range of stakeholders (research, civil society, policy making, education and business). It consists of four foundations, ten science centres, four universities and research centres, a science shop, a chamber of commerce and a technological partner, plus six related European networks. Together, these partners have relevant experience in all different aspects of Responsible Research and Innovation.

<table>
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<tr>
<th>NAME</th>
<th>ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>“La Caixa” Foundation</td>
<td>Coordinator, WP3 and WP7 Leader</td>
</tr>
<tr>
<td>ECSITE</td>
<td>WP2 Leader</td>
</tr>
<tr>
<td>EUROSCIENCE</td>
<td>WP6 Leader</td>
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<tr>
<td>European Foundation Centre</td>
<td>Network</td>
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<td>Fondazione Cariplo</td>
<td>Italy and Switzerland Hub Coordinator</td>
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<tr>
<td>Everis Spain</td>
<td>Technological Partner</td>
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<td>Ellinogermaniki Agogi</td>
<td>Greece and Cyprus Hub Coordinator</td>
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<td>Techmania Science Center</td>
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<td>The Ruse Chamber of Commerce and Industry Association</td>
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<td>IrisCaixa</td>
<td>Deputy Coordinator, Spain Hub Coordinator</td>
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<tr>
<td>University College London (UCL)</td>
<td>WP4 Leader, UK Hub Coordinator</td>
</tr>
<tr>
<td>Ciencia Viva-Agencia Nacional Para Cultura Cientifica e Tecnologica</td>
<td>Hubs Coordinator, Portugal Hub Coordinator</td>
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<td>Vetenskap &amp; Allmänhet</td>
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<tr>
<td>ATHENA Institute, Free University of Amsterdam</td>
<td>WP1 Leader, Netherlands Hub Coordinator</td>
</tr>
<tr>
<td>Zentrum fuer Soziale Innovation (ZSI)</td>
<td>WP5 Leader, Austria and Slovenia Hub Coordinator</td>
</tr>
<tr>
<td>European Business and Innovation Centre Network</td>
<td>Network</td>
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<td>Bonn Science Shop</td>
<td>Germany Hub Coordinator, Network</td>
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<td>Foundation for Polish Science</td>
<td>Poland Hub Coordinator</td>
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<td>AHAA Science Centre</td>
<td>Estonia, Latvia, Lithuania Hub Coordinator</td>
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<tr>
<td>Science Animation Midi-Pyrénées</td>
<td>France Hub Coordinator</td>
</tr>
<tr>
<td>Science Gallery Dublin</td>
<td>Ireland Hub Coordinator</td>
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</tbody>
</table>

Figure 15: List of RRI Tools Consortium Members
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1. Executive Summary – Feedback Questionnaire

In this section the results of the feedback questionnaire are presented. Almost 70% of the workshops participants filled in the questionnaire. As the results show the workshops were mainly experienced very positively. The methodology worked out absolutely well, even though time was very tight. Most participants used the open questions to express their satisfaction and pointed out the importance of RRI in their professional lives. The numbers show that most participants, no matter which stakeholder group, appreciated to participate in the workshop and are willing to use the information gained in the workshop in their future and actual work. The diversity of stakeholder groups was also emphasised as very positive. Still, in very few cases the stakeholder composition was not experienced that positive. Mainly the different understanding of RRI, and the different “language” used by the stakeholder groups were stated as reasons.

The following sections show detailed results per question taking into account the total of the participants of all workshops.

2. General Information

277 questionnaires have been filled in. This corresponds to 67% of the total workshop participants (411). The following 25 countries contributed: Belgium, Greece, Switzerland, Cyprus, Portugal, Denmark, Luxembourg, Austria, Czech Republic, Croatia, Serbia, Albania, Montenegro, Bosnia and Herzegovina, Sweden, Germany, UK, Netherlands, France, Italy, Ireland, Bulgaria, Romania, and Spain. The questionnaires were filled in between 2nd of October and 11th of November. In the following section (2) the statistics regarding the total of submitted questionnaires are presented. Chapter (3) shows the answers to the questions and the diagrams separated by cities were the workshops have been conducted.

3. Total answers

3.1 In which session did you participate?

The workshop offered two sessions, namely the “RRI definition & practices session” and the “stakeholder consultation session”. 81.95% (227) of the participants attended both sessions, 10.83% (30) attended only session one and 3.25% (9) attended only session two. 3.97% (11) of the participants did not give an answer to this question.
3.2 To which stakeholder group do you feel affiliated?
Out of five stakeholder groups, namely Civil Society, Education, Industry, Policymakers, and Researchers, the group of researchers has been the most represented with 23.47% of all participants. The other four groups are almost equally represented with a range between 16% and 18%. 8.30%, which counts 23 participants in absolute numbers, used the option “other”. They stated to feel affiliated to more than one stakeholder group.

3.3 To what extent was attending this workshop worth your time?
160 participants (57.76%) perceived the workshop as “very worth” their time. 59 participants (21.30%) indicated that the workshop was “extremely” worth their time. However, 37 (13.36%) answered that the workshop was moderately, 7 (2.53%) slightly, and 1 (representative for industry and business) (0.36%) answered that the workshop was “not at all” worth his/her time. 13 (4.69%) did not give an answer.
3.4 How would you rate each of the following?

3.4.1 Exercises

151 of the participants (54.51%) rated the exercises as “Good”, 66 (23.83%) as “Very Good”, 48 (17.33%) as “Fair” and 2 (0.72%) (both representatives for education) rated them as “Poor”. 10 (3.61%) participants did not answer this question.
3.4.2 Discussion/Interaction

The discussion and interaction at the workshop was rated throughout positive. 149 participants (53.79%) rated the discussion and interaction as “Very good”, 108 (38.99%) as “Good”, only 15 participants (5.42%) rated them as “Fair” and none as “Poor”. 5 participants (1.81%) did not answer this question.

![How would you rate each of the following? [Discussion/Interaction]](image)

3.4.3 Moderation

Also the moderation was rated mainly positive. 149 participants (53.79%) rated the moderation as “Very good”, 112 participants (40.43%) as “Good”, but 11 (3.97%) rated the moderation as “Fair” and one participant as “Poor”. 4 (1.44%) persons did not answer this question. Considering results of the single workshops, Athens and Dublin (around 90% each) and Austria (100%) got the best ratings for the moderation.
3.4.4 Location

The workshop locations were also rated mainly positive. 162 participants (58.48%) rated the location as “Very good” and 95 (34.30%) as “Good”. However, 14 (5.05%) rated it as “Fair” and one person as “Poor”. 5 participants (1.81%) did not answer this question.

![Location ratings graph]

3.4.5 Time

The time schedule was rated mostly moderately. Most of the participants (46.57%) chose the answer possibility “Good”. Still, 95 persons (34.30%) rated it as “Very good”. 38
participants (13.72%) rated the time schedule as “Fair” and 8 (2.89%) as “Poor”. 7 participants (2.53%) did not answer this question.

### 3.4.6 Group composition

The group composition was rated very positively. 122 participants (44.04%) rated it as “Very good” and 111 (40.07%) as “Good”. 35 persons (12.64%) rated the group composition as “Fair” and one as “Poor”. 8 (2.89%) participants did not answer this question.
3.5  Which of the following topics – presented and discussed in the morning session – were useful for you?

3.5.1 RRI tools project

The topic “RRI Tools Project” was mainly rated as very useful (108 participants – 38.99%). 59 participants (21.30%) experienced that topic as extremely useful, 70 (25.27%) as quite useful, and 8 (2.89%) as not very useful. 5 participants (1.81%) did not understand and 27 participants (9.75%) did not answer this question.

Regarding differences in stakeholder groups, 28.6% of the policy makers rated this topic as “extremely useful”, whereby representatives of education (16%) and business and industry (18.2%) showed the lowest numbers in rating this topic as extremely useful. If we add the answer option “very useful” we see, that more policy makers and researchers rated this topic as positive (around 65% each), than the other stakeholder groups (around 50% each).

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<tr>
<th></th>
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</tr>
<tr>
<td>Very useful</td>
<td>108</td>
<td>38.99%</td>
</tr>
<tr>
<td>Extremely useful</td>
<td>59</td>
<td>21.30%</td>
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<tr>
<td>Did not understand</td>
<td>5</td>
<td>1.81%</td>
</tr>
<tr>
<td>No answer</td>
<td>27</td>
<td>9.75%</td>
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</table>

3.5.2 RRI concept

Also the topic “RRI concept” was rated mostly as “Very useful” (111 participants – 40.07%). 71 participants (25.63%) rated this topic as “Extremely useful”, 52 (18.77%) as quite useful and 10 (3.61%) as not very useful. 8 participants (2.89%) did not understand and 25 (9.03%) did not answer this question.
3.5.3 Policy agendas

For 108 participants (38.99%) the topic “policy agenda” was very useful. For 49 (17.69%) it was extremely useful, for 51 (18.41%) it was quite useful and for 18 (6.50%) it was not very useful. 13 participants (4.69%) did not understand and 38 (13.72%) did not answer this question.

Regarding differences in the stakeholder groups participating in the workshop, policy makers (20.5%) and representatives of industry and business (28.6%) rated this topic most often as “extremely useful”. If we consider the two answer options “very useful” and “extremely” useful, more than 60% of policy makers, researchers and representatives of industry and business rated this topic as positive, whereby around 50% of the groups CSO and education chose to rate “very useful” or “extremely useful”.

### Table 3.5.3: Policy agendas

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<tr>
<td>Extremely useful</td>
<td>71</td>
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<tr>
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<td>2.89%</td>
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<tr>
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<td>25</td>
<td>9.03%</td>
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3.5.4 Process requirements

For 120 participants (43.32%) the topic “process requirements” was very useful. 54 participants (19.49%) rated this topic as extremely useful to them, 52 (18.77%) as quite useful and 9 (3.25%) as not very useful. 8 participants (2.89%) did not understand and 34 (12.27%) did not answer this question.

3.5.5 Hubs and communities of practice

For 92 participants (33.21%) the topic “Hubs and communities of practice” was very useful, for 54 (19.49%) it was extremely useful, for 58 (20.94%) quite useful, and for 9 (3.25%) not
very useful. 11 participants (3.97%) did not understand and 53 (19.13%) did not answer this question.

Compared to the other stakeholder groups, representatives of industry and business (25.0%) and CSOs (27.3%) rated this topic more often as “extremely useful”.

**Which of the following topics - presented in the morning session - were useful for you? [Hubs and communities of practice]**

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<thead>
<tr>
<th>Count</th>
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<tbody>
<tr>
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<td>3.25%</td>
</tr>
<tr>
<td>Quite useful: 58</td>
<td>20.94%</td>
</tr>
<tr>
<td>Very useful: 92</td>
<td>19.49%</td>
</tr>
<tr>
<td>Extremely useful: 54</td>
<td>19.13%</td>
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<tr>
<td>Did not understand: 11</td>
<td>3.97%</td>
</tr>
<tr>
<td>No answer: 53</td>
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</table>

**3.6 What was especially positive about this event?**

229 participants (82.67%) answered to this question, while 48 (17.33%) did not.

The participants mostly emphasised the broad range of stakeholders. They experienced especially positive the exchange with representatives of other stakeholder groups and the discussions and processes among them. Moreover, the topic of RRI, its importance and the instructive character of the workshops where highlighted. It was very useful for the participants to exchange best practice examples and have the possibility to deepen their understanding of RRI. As a result of the discussions and exchange among different stakeholder groups, the participants mentioned the outcomes of the events as very positive. Besides that, the organisation of the workshops, their design and the moderations were experienced as very positive. Two participants also mentioned the time schedule of the workshop as positive.

**3.6.1 Why?**

The question “Why” was answered by 156 participants (56.32%), while 121 (43.68%) did not answer this question.
Opportunities, obstacles and needs analysis

Again the exchange of different ideas, the various perspectives and the discussion of problems from different points of view were mentioned. The presentation of all points of view covers all needs of participants in the process of RRI. The workshops helped for better understanding of the concept of RRI and raised awareness on its usefulness.

3.7 What did you like least about this event?

147 participants (53.07%) answered that question, while 130 (46.93%) did not. Among the 147 participants answering to this question, the dense time schedule was stated to be liked least about the event. People emphasised that the subject was too complex to be discussed in such short time. Deeper discussions, the elaboration of elementary questions about the conceptual model, concrete outcomes and the general possibility to share thoughts were suffering from this lack of time. People suggested splitting the workshop into two days.

The following aspects of the workshop design/concept were also mentioned as being liked least about the event: Static presentations, too little dynamics, too long theoretical parts, experiences ranging from too short to too long introduction till too much theory, too structured and the timing and methodology in general have been stated. Moreover single participants wished to have more moderators, more concrete discussions, and more openness to results in the discussion around RRI and clear focus and goals. Some people criticised too small rooms for the workshop.

Some participants also explained that the topic of RRI was too un-concrete, or vague. More contextual and previous information would have been helpful. Some participants underlined not being attracted by the concept of RRI at all, for others RRI is a too wide concept. A few times participants stated that there has been a lot repetition in the workshop. The variety of the stakeholders and the constellation of the groups have mainly been experienced as very positive. However, some participants did like these constellations least about the event for different reasons: Some workshops did not manage to be balanced. Participants stated that they missed representatives of policy makers, others missed researchers or NGOs. Also unbalanced groups have been mentioned. The diversity of participants in terms of their professional experience was also mentioned to be liked least about the event. Even though the fact of sharing ones opinion with different sectors is mostly experienced as interesting, it was hard to use the same language.
It also needs to be mentioned, that a lot participants used this question to tell that there was nothing they liked least about the event, and some emphasised that they enjoyed the event and everything was good.

**3.7.1 Why**

Only 72 participants (25.99%) answered this question, while 205 (74.01%) did not.

In this section the answers are mainly repeating the above outlined experiences. Again the participants emphasise too tight time schedule. There have been too many tasks in short time so that there was too little time for reflection and also too few breaks. It would have been better to dedicate more time for less exercises instead of running through all.

Regarding the group(s), it was stated that it would have been better to have more people involved. One person mentioned that a key actor was missing. Another one criticised the divers knowledge about RRI and the difficulty of finding a common understanding among the divers group of stakeholders.

Regarding the topic of RRI, single participants felt disconnected, for others it was not clear what the group is concretely talking about. One person stated that the wideness of RRI became clearer later on during the workshop.

Considering discussion and dialogue at the event, it was stated that exercises were too general, which led to general discussions before the participants came into concrete actions and that discussions were too theoretical.

Moreover, more space, bigger rooms, circles for discussions and a central event location were suggested to improve the workshop.
3.8 I understood the principles of RRI – Before and After the Event

3.8.1 Before the Event
Most of the participants understood the principles of RRI “somewhat well” (116 – 41.88%) and not very well (64 – 23.10%). 63 participants (22.74%) understood the principles moderately well and 25 (9.03%) very well. 9 participants (3.25%) did not answer this question.

<table>
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<th></th>
<th>Count</th>
<th>Percentage</th>
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<tbody>
<tr>
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<td>25</td>
<td>9.03%</td>
</tr>
<tr>
<td>No answer</td>
<td>9</td>
<td>3.25%</td>
</tr>
</tbody>
</table>

3.8.2 After the Event
After the event the numbers changed, and most participants, namely 144 (51.99%) understood the principles of RRI moderately well, and 104 participants (37.55%) very well. Only 16 (5.78%) stated to understand the principles somewhat well and 2 (0.72%) not very well. 11 participants (3.97%) did not answer this question.
Opportunities, obstacles and needs analysis

3.9 I know how to implement RRI aspects in my daily working environment

3.9.1 Before the Event

Most of the participants answered to know how to implement RRI aspects in their daily working environment somewhat well (105 participants – 37.91%) and not very well (69 participants – 24.91%). 65 (23.47%) answered moderately well and 18 (6.50%) very well. 20 participants (7.22%) did not answer this question.
3.9.2 After the Event

133 participants (48.01%) answered to know after the event moderately well how to implement RRI aspects in their daily working environment, 55 (19.86%) stated to know very well, 57 (20.58%) somewhat well and only 7 (2.53%) not very well. 25 (9.03%) did not answer this question.

![I know how to implement RRI aspects in my daily working environment](chart)

3.10 I am aware of the needs, possible solutions and necessary tools of my stakeholder group for implementing RRI.

3.10.1 Before the Event

Before the event 104 participants (37.55%) answered to be somewhat well aware of the needs, possible solutions and necessary tools of their stakeholder group for implementing RRI. 73 (26.35%) stated that they have not been very well aware, 72 (25.99%) moderately well and only 13 (4.69%) stated that they have been aware very well of the needs, possible solutions and necessary tools of their stakeholder group for implementing RRI. 15 participants did not answer this question.
Opportunities, obstacles and needs analysis

3.10.2 After the Event

152 participants (54.87%) stated that, after the event, they were moderately well aware of the needs, possible and necessary tools of their stakeholder group for implementing RRI. 55 (19.86%) stated to be even very well aware, 47 (16.97%) to be somewhat well aware, and 5 (1.81%) stated to be not very well aware. 18 participants (6.50%) did not answer this question.

I am aware of the needs, possible solutions and necessary tools of my stakeholder group for implementing RRI

[Before the Event]

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<thead>
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<th>Count</th>
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<tbody>
<tr>
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<tr>
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<td>26.35%</td>
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<td>104</td>
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<td>13</td>
<td>4.69%</td>
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<td>15</td>
<td>5.42%</td>
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not very well | somewhat well | moderately well | very well | No answer

I am aware of the needs, possible solutions and necessary tools of my stakeholder group for implementing RRI

[After the Event]

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not very well | somewhat well | moderately well | very well | No answer
3.11 Do you plan to use the information from this workshop? If yes, how?

223 participants (80.51%) stated that they plan to use the information from this workshop and 22 (7.94%) state that they do not. 200 of the participants (72.20%) commented their answer. 32 participants (11.55%) did not answer this question.

Compared to the other stakeholder groups more representatives of CSO (13.6%) and Education (14.0%) indicated to be not planning to use the information form this workshop. However, the numbers show that most representatives of all stakeholder groups plan to use the information from the workshop.

In general the participants answering this question stated to use the information gained in this workshop in their work. It inspired them to find good practice examples which can be used in their work and to develop future processes and procedures taking RRI into account as well as to improve actual project processes and activities. Many workshop participants aim to spread the information in their organisations and among their colleagues and start discussions about RRI. Thus, workshop participants stated to be willing to be more active when it comes to RRI matters and to implement the good practices in their everyday work.

The ideas from the action list, as an example, will be used and more importance to RRI will be attracted. The information from the workshop will also be used to have a wider perspective on R&D and other activities.

Further, the information will be used in research and education and RRI is described as an interesting topic for publications. Participants will use it for proposals in their scientific communities and while conceptualising research projects.

Others were inspired to collaborate more with different stakeholders and to get more sensitised how other stakeholder groups think and work. Actions, solutions and collaborations will be implemented with the other workshop participants. The event was an opportunity to meet representatives from different stakeholder groups and create new networks.

Some participants stated to use the information to stimulate policies in the area of RRI. Also quite often participants mentioned to want to spread the concept of RRI, to focus on communicating and disseminating it.
11 participants stated that they do not know yet, how to use the information gained in the workshop.

3.12 General comments and suggestions for improving this workshop

127 (45.85%) participants answered this question, while 150 (54.15%) did not.

Workshop participants answering this question mainly used the possibility to add ideas regarding the workshop design. For example they wished more links between the different sessions, or more emphasis on what to do in concrete tools. Other suggestions have been to make smaller groups from the beginning on, to make the goals of RRI clearer at the beginning of the workshop, give more detailed information before the workshop and make clearer what the participants’ roles look like, longer breaks, or stronger focus on open discussions. The time schedule could also be improved. Most of the participants criticised this issue about the workshop design.

Regarding the stakeholder groups single participants suggested the following: to involve more policy makers, to create a more critical discussion by inviting people that are not representing any institution, to give a clearer definition of the stakeholder groups, and to treat the stakeholder groups holistically not separated. More over one person suggested including mass media.

Regarding the location, room and atmosphere, participants suggested getting a room big enough, to find locations which are easy to reach, to provide WIFI at the workshop, and to mind the diversity at the workshop to create a better atmosphere.

Moreover, to improve the workshop the participants wish clearer definitions of criteria/standards of RRI, more clarification about concrete aims to focus the discussion better, to give a clearer definition of RRI in general, and talk more about the actual tools.

Many participants emphasised to continue with these kinds of workshops, to keep the participants up to date with the latest changes on the RRI definition, to monitor national initiatives on RRI, and to also organise meetings and workshops with groups working in the same field. One person suggested organising this kind of workshop frequently in order to raise awareness about RRI, another one suggested to create an electronic platform that allows to share model projects that were discussed and to discuss future collaborations.

However, most of the participants used this question to express their satisfaction with the stakeholders participating at the workshop as well as with the workshop design and would
not change the workshop design. Moreover they emphasised the importance of the topic of RRI and will consider it enhanced in their future work.

### 3.13 Conclusion

Most of the workshop participants filling in this feedback questionnaire participated in both sessions. The representatives per stakeholder group were balanced. However, researchers were highest in number (65) and representatives of industry and business and civil society organisations were lowest in number (both with 44 participants). It also has to be mentioned that almost 9% of the participants stated to feel affiliated to more than one stakeholder group.

Summing up, the workshop was rated very positively. Most of the participants (around 80%) rated the workshop in general as well as single aspects - such as “exercises”, “discussions”, “ moderation”, “ location”, “ time”, or “ group composition” - as “good” and “very good”. Also the workshop topics were rated very positively.

Concluding it can be said, that the workshop method worked out absolutely well, even though time was very tight. Also the stakeholder composition was mainly appreciated and rated as very good. Nevertheless, the composition and the workshop framework conditions did not work out equally well in all cases. But, our participants mainly appreciated the workshop and stated to have learned a lot and to have improved their knowledge on RRI, which they aim to spread and to use in their future working activity.