

Report on International Workshops

Deliverable 16.1

Work Package 16

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Abstract	This deliverable gives a summary of the two international workshops held in Berlin, Germany. The key outcomes regarding RRI keys and dimensions as well as specifics regarding research conducting and funding organisations are described.
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1 Introduction

This report is dedicated to providing an overview of the outcomes of two international workshops which took place in Berlin, Germany on the 20th and 21st of September 2017 at the offices of the Helmholtz Association, as part of the RRI-Practice WP16 “Best Practices”. The purpose of the workshop was to provide the project with detailed information on the actual state-of-the-art, existing barriers and drivers in the implementation of RRI in organisations around the Globe, as well as to present best practices. As originally planned, particular attention was paid in the discussion on commonalities, as these will form the backbone for the development of a common action Roadmap for the EC. At the same time, considering the wide national differences represented in the project, we also focused on the identification of cultural specificities and value systems that affect the implementation of RRI dimensions. An important aim of the workshops is to help the development of the RRI Outlooks that will be developed for each of these organisations.

Invited were representatives of research funding and research conducting organisations from the countries represented in the RRI-Practice consortium. The full representation that we achieved provided a unique setting, that enabled the exchange and discussions of a wide range of themes around RRI implementation and the contextual parameters in each setting, country and region. Following, is a summary of the discussions in the workshops, along with our approach to designing spaces for debates in the field of RRI. The first part of the workshops provided participants with opportunities to introduce their organisations’ particular take on RRI implementation while the second part focused on each of the RRI keys (Gender, Public Engagement, Open Access, Science Education) as well as the RRI dimensions (Anticipation, Reflection/Reflexivity, Inclusive Deliberation). The workshops, one for the research conducting organisations and the other for the research funding organisations, ran in parallel, with occasional plenary sessions to allow for exchanges between the two main groups of participants.

2 Overview

This section provides an overall description of the attendees and the agenda of the workshops. In terms of attendance, there was full representation of the countries and the organisations involved in the project. This is particular positive, since workshop attendance meant a very long trip for many participants and many busy days of purely volunteer work. This fact, along with the individual feedback that the project team received, shows a true interest in RRI as well as in discussing and collaborating with their peers in this field. This bodes well for subsequent work in the project, since a key part of the work programme is the development of individual Outlooks in the implementation of RRI for these organisations that will require their full cooperation.

Overall, participants represented the upper level of management in their respective organisations with responsibilities closely linked to RRI. Some of the organisational representatives are also members of the project Advisory Board and as a result, took part in both the workshop discussions and the project consortium discussions afterwards. Discussions in the workshops were split between research conducting and research funding organisations. The two workshops ran in parallel with common plenary sessions in order to allow for wider discussions and comparisons amongst the different types of organisations that are targeted in the project. In addition to reflecting on commonalities between the organisations, national specifics regarding cultural specificities or political frames in the context of science and technology were discussed.

List of Participants

Workshop participants representing research conducting and research funding organisations:

Parveen Arora: Ministry of Science and Technology, Government of India; India
Liam Blackwell: The Engineering and Physical Sciences Research Council; United Kingdom
Bram Bregman: Radboud Innovation; The Netherlands
Zoya Damianova: Applied Research and Communications Fund (ARC Fund); Bulgaria
Anne-Maree Dowd: Commonwealth Scientific and Industrial Research Organisation; Australia
David Gillum: Arizona State University; U.S.A.
Joachim Knebel: Karlsruhe Institute of Technology; Germany
Kostadin Kostadinov: Ministry of Education and Science; Bulgaria
Fred Kronz: National Science Foundation; U.S.A.
Leopoldo Laricchia-Robbio: Fondazione Telethon; Italy
Barbara Mantelli: University of Padova; Italy
Wil Meulepas: Wageningen University & Research; The Netherlands
Sérgio Robles Reis de Queiroz: São Paulo Research Foundation; Brazil
Munir Salomão Skaf: University Campinas; Brazil
Kristin Sverdrup: Oslo and Akershus University College; Norway
Françoise Touboul: Commissariat à l'énergie atomique et aux énergies alternatives; France
Ellen Veie: The Research Council of Norway; Norway
Sören Wiesenfeldt: Helmholtz Association; Germany
Grace Williams: Exeter University; United Kingdom
Gong Xu: National Natural Science Foundation of China; China
Yandong Zhao: Chinese Academy of Science and Technology for Development (CASTED); China
Yonghe Zheng: National Natural Science Foundation of China; China
Astrid Zuurbier: The Netherlands Organisation for Scientific Research; The Netherlands

Participants from the Advisory Board:

René von Schomberg: Team leader Science Policy; European Commission; Belgium
Krista Varantola: Emeritus Professor at the University of Tampere; board member of All European Academies (ALLEA); Council of Finnish Academies; Finland
Jan Staman: member of the European Commission Horizon 2020 experts group on Strategic Foresight for R&I Policy; The Netherlands
Sören Wiesenfeldt: Head of the Research Section; Helmholtz Association of German Research Centres; Germany
Liam Blackwell: ICT Theme Leader; Engineering and Physical Sciences Research Council; UK
Xu Gong: Division Director of the Bureau of Policy; National Natural Science Foundation of China; China
Parveen Arora: Scientist 'G' and Head, CHORD Division; Department of Science and Technology, Ministry of Science and Technology, Government of India; India
Fred Kronz: Program Director of the Science, Technology and Society Program; National Science Foundation; USA
Sérgio Robles Reis de Queiroz: São Paulo Research Foundation; Brazil
Anne-Maree Dowd: Executive Manager for Planning, Performance and Evaluation Strategy, Market Vision and Innovation; CSIRO; Australia

Participants from the RRI-Practice project:

Simone Arnaldi: University of Padova (UNIPD); Italy
Peta Ashworth: University of Queensland (UQ); Australia
Luca Consoli: Radboud University Nijmegen (RU); The Netherlands
Zoya Damianova: Applied Research and Communications Fund (ARC Fund); Bulgaria
Tess Doezema: Arizona State University (ASU); U.S.A.
Cathrine Egeland: Oslo and Akershus University College of Applied Sciences (HiOA); Norway

Ellen-Marie Forsberg: Oslo and Akershus University College of Applied Sciences (HiOA); Norway
Alexei Grinbaum: Commissariat à l'énergie atomique et aux énergies alternatives (CEA); France
Julia Hahn: Karlsruhe Institute of Technology (KIT); Germany
Marko Hajdinjak: Applied Research and Communications Fund (ARC Fund); Bulgaria
Tatiana Maximova-Mentzoni: Oslo and Akershus University College of Applied Sciences (HiOA); Norway
Leonhard Hennen: Karlsruhe Institute of Technology (KIT); Germany
Konstantin Ivanov: Applied Research and Communications Fund (ARC Fund); Bulgaria
Amit Kumar: Research and Information System for Developing Countries (RIS); India
Pavel Kulakov: Karlsruhe Institute of Technology (KIT); Germany
Miltos Ladikas: Karlsruhe Institute of Technology (KIT); Germany
Miao Liao: Chinese Academy of Science and Technology for Development (CASTED); China
David Ludwig: Wageningen University & Research (WUR); The Netherlands
Phil Macnaghten: Wageningen University & Research (WUR); The Netherlands
Marko Monteiro: Universidade Estadual de Campinas (FUNCAMP); Brazil
Richard Owen: University of Bristol (BRI); United Kingdom
Luis Reyes-Galindo: Universidade Estadual de Campinas (FUNCAMP); Brazil
Constanze Scherz: Karlsruhe Institute of Technology (KIT); Germany
Semso Sehic: University of Queensland (UQ); Australia
Clare Shelley-Egan: Oslo and Akershus University College of Applied Sciences (HiOA); Norway
Ravi Srinivas: Research and Information System for Developing Countries (RIS); India
Liliya Tukhvatulina: Tomsk Polytech University (TPU); Russia (Associated partner)
Franke van der Molen: Radboud University Nijmegen (RU); The Netherlands
Mathis Walter: Karlsruhe Institute of Technology (KIT); Germany
Go Yoshizawa: Osaka University; Japan (Associated partner)
Yandong Zhao: Chinese Academy of Science and Technology for Development (CASTED); China
Mario Pansera: University of Bristol (BRI); United Kingdom

Agenda of the Workshops

RRI Practice WORKSHOPS – September 20th

AGENDA

12.00 – 13.00 – *Opening Lunch*

WORKSHOPS

13.00 – 13.20 – **Welcome and Introduction**

The RRI-Practice Project & aims of the Workshop

Ellen-Marie Forsberg, Oslo and Akershus University College of Applied Sciences, Norway

Miltos Ladikas, Karlsruhe Institute of Technology, Germany

13.20 – 14.00 – **Keynote**

The Helmholtz Association and Perspectives of Science Policy Today

Sören Wiesenfeldt, Helmholtz Association, Germany

14.00 – 15.30 – **Workshops**

Parallel workshop sessions

Session I:

Research Conducting Organisations: Organisational approaches to RRI and visions for best practices

Each organisation present their perspectives (maximum 10 minutes per organisation)

Session II:

Research Funding Organisations: Organisational approaches to RRI and visions for best practices

Each organisation present their perspectives (maximum 10 minutes per organisation)

15.30 – 16.00 – *Coffee Break*

16.00 – 17.00 – **Workshops**

Continued parallel workshop sessions

Session I:

Research Conducting Organisations: Organisational approaches to RRI and visions for best practices (cont.)

Session II:

Research Funding Organisations & Organisational approaches to RRI and visions for best practices (cont.)

17.00 – 17.30 – **Plenary**

RRI dimensions exercise and discussions

Richard Owen, University of Exeter/Bristol, U.K.

19.30 – *Invited Dinner at Clärchens Ballhaus (Auguststr. 24, 10117 Berlin)*

Continued discussions over dinner

RRI WORKSHOPS– September 21st

AGENDA

08.30 – 10.00 – Workshops

Parallel sessions with focus groups

Research Conducting Organisations: Facilitated group discussions on organisational barriers and drivers & potential actions for outlooks specifically focussing on the European Commission's RRI keys, and more generally RRI related dimensions (such as Anticipation, Inclusion, Reflection and Responsiveness).

08:30 – 09:00: **Gender**

09:00 – 09:30: **Public Engagement**

09:30 – 10:00: **Ethics**

Research Funding Organisations: Facilitated group discussions on organisational barriers and drivers & potential actions for outlooks specifically focussing on the European Commission's RRI keys, and more generally RRI related dimensions (such as Anticipation, Inclusion, Reflection and Responsiveness).

08:30 – 09:00: **Gender**

09:00 – 09:30: **Public Engagement**

09:30 – 10:00: **Ethics**

10.00 – 10.30 – *Coffee Break*

10.30 – 12.00 – Workshops

Parallel sessions with focus groups (cont.)

Research Conducting Organisations: Organisational barriers and drivers & potential actions for outlooks

10:30 – 11:00: **Open Access**

11:00 – 11:30: **Science Education**

11:30 – 12:00: **RRI Dimensions**

Research Funding Organisations: Organisational barriers and drivers & potential actions for outlooks

10:30 – 11:00: **Open Access**

11:00 – 11:30: **Science Education**

11:30 – 12:00: **RRI Dimensions**

12.00 – 13.00 – Plenary

Summary of discussions, final reflections and next steps

Ellen-Marie Forsberg, Oslo and Akershus University College of Applied Sciences, Norway

Miltos Ladikas, Karlsruhe Institute of Technology, Germany

13.00 – 14.00 – *Goodbye and light lunch*

3 Approach

The RRI-Practice International Workshops were combined in order to bring together the different representatives of research funding and conducting institutions. Since these organisations are functioning within a unique national context, it was important to allow for time for the participants to get to know the various forms and processes particular to each organisation. As a main aim of the workshops was to explore the understanding of responsibility in research and innovation in general, the concept of RRI in particular, best practices, as well as experiences with drivers and barriers, it was important to allow for in-depth group discussions and reflections in the plenary.

The first day of the workshops was dedicated to organisational description vis a vis RRI. After a general introduction to the project and main goals, a key note by Dr Sören Wiesenfeldt (Head, Research Policy) gave a detailed overview of the Helmholtz Association in Germany. Next to providing insights into how Helmholtz is structured and which key issues it focuses on, this was also a way to “set the tone” for the further presentations and discussions. Therefore, main aspects presented were the mission of Helmholtz, which is focused on providing systems solutions for grand challenges as well as the different areas of research (energy, environment, health, space, matter and key technologies). The key note also presented some insights into RRI in Helmholtz, mainly providing examples of how the RRI Keys are used. This included ethics in research, school programmes or knowledge transfer in science education, mentoring programmes in gender and diversity, open access policies as well as the use of evaluation panels and committees in order to achieving set goals.

Overall, the approach of the workshops was to allow for time to present the individual organisations within the frame of RRI. In the first parallel sessions participants were divided into two groups: research funders and research conductors. It should be noted that this distinction was not always so clear cut and that some organisations overlapped with other areas (such as policy advise or think tanks). In this session, the participants introduced their organisations and reflected on RRI barriers, drivers as well as best practices. This sparked discussion on the implementation of RRI as well as overall challenges facing research organisations today.

After these group sessions, there was a plenary session for an exercise on the RRI dimensions. Here participants were asked to fill out a table in which they could indicate the level of implementation of anticipation, inclusion and reflexivity in their organisation. This was done at aggregate level and anonymously, the only distinction being whether the organisation is a funder or conductor.

The second day of the workshops was committed to the RRI keys and dimensions. Participants continued in their peer groups as this discussion built on the understanding established during the first day. A brief introduction to the individual keys, done by members of the consortium, and a focused discussion afterwards proved to be a useful approach to covering the many issues related to the keys and dimensions. In a final plenary session, the outcomes of the group discussions were presented by rapporteurs in order to inform everyone on the issues raised. The plenary session also gave time to a final discussion among the entire group.

Overall the approach of separate group sessions as well as plenary discussions was instructive, allowing for in depth discussions at group level as well as more general reflections in the plenaries. The challenge of such workshops is always time: ensuring the participation of high-level experts is not an easy task, especially from far away countries. Therefore, the participation level was very satisfactory and the decision to have parallel workshops with the combination of group sessions and plenary discussions was correct.

4 Main Outcomes of the Workshops

In the following the main insights of the two workshops are described. The first part was dedicated to introductions of the research funding and research conducting organisations, with a focus on aspects of RRI and experiences with related issues and approaches. Based on this, the second part placed emphasis on the RRI keys (Gender, Open Access, Engagement, Ethics and Science Education) and dimensions (Anticipation, Reflection/Reflexivity, Inclusive Deliberation) and allowed for more detailed discussions in parallel sessions.

4.1 Parallel Session I: Organisational approaches to RRI and visions for best practices

The parallel sessions of the first workshop were dedicated to introducing the various organisations represented in relation to RRI implementation. For this, participants were divided into two groups: research funding and research conducting organisations. This allowed for more time for the individual presentations and for discussions in peer groups. In the first session, participants were asked to present their organisations, which was sometimes done with slides giving the general facts on the organisations (see Annex). Participants were also asked to give first reflections on RRI and best practices or policies that are already in place in their organisations. This proved to be a useful first step to introduce everyone as well as initiate opening discussions on RRI in each organisation.

4.1.1 Key Messages from the Funding Organisations regarding RRI

The Engineering and Physical Sciences Research Council, EPSRC (United Kingdom) presented by Liam Blackwell begun with public engagement in 2010 as a way to encounter the distance between researchers and the public. After this initial step, there was a progression with several more steps especially focusing on RRI issues in Nanotechnology, Synthetic Biology as well as ICT. Mainstreaming of RRI was done by the EPSRC “RRI framework”. Important here was that people have to “learn it [RRI] by themselves” and that barriers for implementation may lie in the funding system itself. Unique in this aspect, is that EPSRC is the first organisation of its kind with a specific RRI-Integration Programme. Regarding mainstreaming and the motivation of researchers to use RRI, it seems difficult and tricky to do so. There is no easy way as this implies a redefinition of “high quality research” and subsequently changing the decision making and evaluation processes. This includes defining “world class research” as “responsible research”. Here it is key for researchers to self-identify with RRI. A possible way forward could be to require researchers to explain why RRI is not relevant to them as part of the evaluation, so to spark further reflection on this issue.

The Research Council Norway, RCN, represented by Ellen Veie, funds various research and has a double role as a funder and a policy advisor. It is funded by 16 different ministries and since 2015 has stated a new strategy in which they make clear that besides a funder, they are also a societal actor and as such, responsible for the research they fund. The background here was that during past evaluations (2001 and 2011) demands were raised that RCN should focus on being a “change agent” and address societal challenges. For this it was important to develop new competences and integrate grand societal challenges as a core part of the RCN thinking. This also meant crossing disciplines and sections. Important here was to understand that problems lie not only in the results of research but within the system and processes themselves. An ELSA programme has been functioning since the 1990s, in the beginning as a standalone and since 2001 as a new department that combined different research parts. Furthermore, the inclusion of these issues in calls as well as the stimulation and support of industry partners have been important. Overall, RRI is a learning process in which there is

need to educate young researchers in workshops or educational programmes. There have been a lot of learning effects from the UK (EPSRC) regarding these issues. The RRI keys are used (although not framed as RRI), especially gender, ethics and open access. Challenges are inter- and transdisciplinary projects, which are very demanding and take a lot of time. These approaches tend to challenge experts so it is important that they understand that they need other disciplines as well to move forward. This requires specific support from the side of the funder.

The National Science Foundation NSF (USA), was represented by Fred Kronz, who introduced several initiatives, mentioning though that overall the funding for science, technology and society programmes is not very high. Some of these include: EPSRCoR (Established Programme to Stimulate Competitive Research) since 1979, supporting competitive research and spreading research infrastructures between the States; Ethics Education in Science & Engineering (EASE) Programme 2005-2013 aimed at improving ethics education in S&T through 6-10 awards per year; COMPETES Acts (introduced 2007) which promotes excellence and includes ethical aspects; “Cultivating Cultures for Ethical STEM” (2014) focused on courses and changing the culture of research; Projects on Gender, Diversity as well as Participation. Overall, there is no central RRI office, but many projects that can be understood as RRI focused. Around the turn of the century, there was a lot of focus on Nanotechnology and NSF was the only agency supporting ELSI-research. In that respect, it is important to support long-term thinking and not only short-term economic gains as is often done. More work should be done on excellence, understood also as producing responsible academics.

The Netherlands Organisation for Scientific Research NWO was introduced by Astrid Zuurbier as a classic funding organisation, which gives the obligation in each call to knowledge utilisation, data management, open science policy and transparent procedures. NWO has a Code of Conduct, a RRI programme as well as support of top sector innovation in collaboration with industry. The new national research agenda was developed together with society and industry, showing the importance of engaging relevant stakeholders. Room for improvement is in the Gender and Diversity programme, which overall shows that there are transitional processes taking place through which the science system has to be better adapted to current needs. The definition of the policy of science is unclear and a re-thinking of our understanding of the quality of science and excellence has to happen. Here “listening is crucial for understanding”.

The São Paulo Research Foundation Brazil was presented by Sérgio Robles Reis de Queiroz who described it as a State Agency, which funds various areas. The presentation focused on the RRI keys and their application within the organisation. The focus of Ethics is mainly on research integrity (e.g. research fraud) and compliance. Open Access is key in order to increase visibility of research results. The Gender key shows in the empirical growth of women in research, yet specific programmes were not mentioned. Engagement with society is represented in special programmes which support research for innovation and collaborations. In general, RRI as a term is not known, yet many activities can be related.

The Ministry of Science and Technology India, represented by Parveen Arora has the challenge of integrating different national contexts and philosophies. India has had a science and technology policy since 1958, which overall focuses on the national development of S&T and economic growth as a main driver. In the Indian context science is seen as being in the service of society. This shows a relation to RRI even if the term is not explicitly used. Important for responsible innovation is to have parameters that can show how challenges are approached, especially when often there are trade-offs of commercialisation and the societal good. A new policy in 2013 tried to integrate social aspects but has had no implementation in practice. The goal of focusing science more on social good is often difficult due to the lack of instruments to translate this into practice and various interests. This also includes bridging the translation processes between industry and society, since often the public funding structures and industry processes are disconnected. Challenges here are the need for

mechanisms and synergies between different actors as well as bringing the infrastructures to a critical level to actually address big issues. RRI can be a useful general framework as a basis for comparison.

Commonwealth Scientific and Industrial Research Organisation CSIRO Australia represented by Anne-Maree Dowd, is the federal government agency for research. In her introduction, the focus was on the perspective of RRI and what this means within an organization such as CSIRO. Important is the need to listen and check and align aims. For this, systems, processes and behaviour need to be analysed. Further, checking if the decision-making processes are actually based on the principles they are promoting, is key to assessing according to RRI. Overall, science as well as corporations need a strong cultural change or flip towards impact pathways that promote and enable a “thinking to the end”. Furthermore, there is a strong need for communication about risk and consequences as well as what one can actually get back from investments. As such, work on the impact evaluation of RRI implementation is paramount in its success.

Fondazione Telethon, Italy as introduced by Leopoldo Laricchia-Robbio, is a charity based on donations and as such, a different type of research funding organisation. There are two interdisciplinary research institutes, which can be regarded as doing RRI even though they do not use the term. They support research activities and create networks. Further, there is a research integrity policy based on the Anglo-Saxon Peer Review system. Regarding other RRI keys, there is no Gender policy in place, but there is a meritocratic system. There are about 50% women and 4 out of 6 directors are female. Since the very beginning there has been an Open Access policy as well as funding for this is in place.

The National Natural Science Foundation of China was represented by Yonghe Zheng who focused on a new policy which gives priority to support basic research and respond to global challenges. There is, as in most organisations, no specific RRI mandate but various activities on the different keys. These include research integrity regarding the Ethics key focused on “responsible conduct” and the obligation of ethical reviews mainly on Biotechnologies. A Gender policy has been implemented since 2010 which also supports young scientists. Regarding Open Access there is a declaration and funded projects are obliged to publish in open access journals.

The Ministry of Education and Science Bulgaria, supports and promotes high level research and was introduced by Kostadin Kostadinov who shared his own experiences and vision of RRI. Focus here was on the RRI dimensions, such as inclusiveness, which is particularly important for young scientists. There is a brain drain problem, which is addressed with initiatives in education. One was described as students on schools working together with scientists in the field of mathematics and together taking part in competitions. Also for three years there has a science museum for children. This shows that regarding RRI knowledge and technology transfer should be a priority, incorporating this from the very beginning. The Gender issues was seen as not a big problem in Bulgaria since there are many women in high positions.

4.1.2 Key Messages from the Conducting Organisations regarding RRI

The University Campinas Brazil was presented by Munir Salomão Skaf who next to presenting general facts on the university stressed the research-orientation of the university with strong ties to industry and innovation foci. Social economic and racial inclusion plays a more important role than discussions on Gender. Some policies are in place regarding RRI issues as well, especially regarding Open Access. For this, there are shared research facilities that can be used by university staff as well as non-university people. Data management policies and cyber-infrastructure are new and under

development in cooperation with other universities. There is an institutional project for data management (from policy to access). Such an Open Science initiative is innovative in Brazil. Overall, there is reluctance because people are worried about restrictions to creativity, if RRI aspects are implemented.

The University of Padova Italy was represented by Barbara Mantelli, who reported that Padova is the best rated research university in Italy. It is a large and traditional organisation, in which the logic of freedom is seen as fundamental, as a part of the university's identity. The familiarity of RRI is limited, often responsibility is understood as impact. There are formal and centralised processes for Ethics and Gender (e.g. ethics committees, offices on gender equality). Regarding societal engagement, the processes are usually individual efforts of people, informal and not centralised. Regarding open data there is a lack of policy as well as infrastructure and awareness on the individual level. There is a need to work together to better this. Useful would be an approach which identifies problems and issues and solutions through a bottom-up line and then spreads this top-down. Main barriers are "Italian bureaucracy" and "language" (e.g. administrative office does not speak the same language as scientists). Also, incorporating RRI in performance assessment reports by identifying indicators can be helpful.

The Applied Research and Communications Fund ARC Fund Bulgaria was described by Zoya Damianova who focused on the challenges of bridging research into society. ARC Fund is a non-governmental organization conducting social research with most of funding coming from the EU. It is qualified as public equivalent organization. Responsibility is understood as ethical responsibility coupled with public engagement in defining objectives and bringing research back to society, with the aim to institute science as an integral part of society. Regarding the keys, they work with ethics for instance in a project on children and internet safety. In this project, they also do science education in their work with a safer internet centre which trains teachers on how to educate children in digital and media literacy at the University of Sofia. For engagement, a main tool used is citizen's panels. The RRI dimensions can help enrich the keys.

Exeter University United Kingdom was introduced by Grace Williams who mentioned the strong focus on public engagement and how the university has worked to catalyse practices in this area. The culture at Exeter University encourages co-creation and collaboration. Public engagement is a broad umbrella for the activities ranging from public lectures to involving citizens in research. This focus on changing the university's culture towards more inclusiveness also comes from national catalysts to promote change with extra funding possibilities. Important were the individual researchers that considered it useful to engage with non-academics in research. It is key to think of engagement throughout the whole research circle. There remain many challenges then and now. When the funding dried out it was difficult to continuously engage people. Due to the current strong focus on industry partnerships focus on public engagement is reducing. Yet, the vice chancellor uses these activities of engagement to promote the university.

Wageningen University & Research The Netherlands was represented by Wil Meulepas. As an institution, it focuses on very specific domains which are framed according to societal challenges. Overall the university has a high number of PhD students in relation to Bachelor or Master and combines university and market-oriented research institutes with a flat organisational structure. Regarding RRI, as a term it is unknown to researchers, yet when mentioning the keys of RRI it seems to be "old wine in new bottles", meaning, they are well versed in all aspects of RRI. Important questions regarding RRI implementation could be: what are your intentions as a researcher? And on a higher level: are you willing to incorporate RRI in the organisation?

The Chinese Academy of Science and Technology for Development (CASTED) China as presented by Yandong Zhao is a policy research organisation. CASTED mainly conducts studies to support the Ministry of Science and Technology. In general, responsibility is important to Chinese science and technology policy. Yet, there seems to be a conflict between RRI and traditional “governmentalism”. Often, economic development is the first priority, while the social aspects take last place. A challenge for RRI is the Chinese “scientism”, which describes the belief that science is the key element pushing progress and implies that scientists have a high status but limits reflections as well as a top-down policy-making system. In recent years, social changes brought in possibilities to implement RRI ideas to China. It is becoming clearer that society can no longer depend on traditional ways of development since these are not sustainable. There is a need to switch to an innovation-driven model. Also, the Chinese public is now better aware of their rights and is becoming a more active partner in science. There are governmental initiatives for social changes. Regarding RRI, the keys can be seen in several activities. For Ethics, participation in European projects (e.g. Global Ethics in Science and Technology GEST) is important. There are studies on how to promote women scientists taking Gender into account. Public engagement is used to develop policies such as the medium and long term plans, which integrated public opinions via websites. Until now there seems to be no focus on Open Access or Science Education. RRI as a term is now also part of the 5-year plan, which determines science and technology development. Overall, challenges in the Chinese context are: How to translate RRI in the Chinese context? It is important to educate policy makers in science education, not only the public. How to further promote responsible policy making for RRI?

The Commissariat à l'énergie atomique et aux énergies alternatives France, presented by Françoise Touboul is a public research organisation that includes a specific mission on science education as well as communication to the public. This mission is given by the government. Because CEA does research in response to societal challenges, including sustainability, it considers itself as doing RRI. Although as a term RRI is not usually used in CEA, overlaps can be found with Corporate Social Responsibility. RRI has been brought into CEA by the EU. As a long-time nuclear research centre, communication with the public is of specific importance. There are local information commissions which present research and its impacts in order to promote actual dialogue with the public. Careers days, science festivals and more than 600 multimedia resources are forms of engaging that CEA uses. A driver for RRI is the reality of it through Horizon 2020 calls and projects, which place requirements on organisations. Another driver would be to relate RRI to CSR. A barrier can be a feeling of being accused in the sense of “do you mean I’m not responsible?”. Further maintaining research autonomy while focusing on and being driven by societal challenges can be difficult.

Arizona State University U.S.A. which was represented by David Gillum is a large university with many students and foci. The 8 ‘design aspirations’ for the university – including e.g. ‘leverage our place’, ‘use-inspired research’, ‘transform society’, ‘value entrepreneurship’, ‘be socially embedded’ and ‘engage globally’ - can function as a driver for RRI. . Yet, RRI is not specifically talked about. Individual criteria for being responsible can be taking ownership, being accountable for successes and failures, complying with safety standards, fostering healthy comradery and producing open and transparent science. There are several good RRI practices at ASU; ASU’s office of equity, open repositories, ethics committees, etc. However, science education and public engagement is conducted only in a fragmented way. Anticipation is mostly about acquiring funding. There is no systematic work on the AIRR dimensions.

The Karlsruhe Institute of Technology KIT Germany was represented by Joachim Knebel and Constanze Scherz who explained the unique structure coming from the unification of a national research institute and a university. A new strategy has been implemented for KIT focusing on various research areas based on a top down approach as well as discussions and evaluations on all levels within the organisation. Related to RRI it can be noted that KIT has a large research infrastructure, so there is responsibility to handle large-scale technologies also in the long run. Furthermore, responsibility is relevant regarding promotion of young talents, innovation and technology transfer

processes (strong connections to society), as well as concerning resources. Ethical guidelines highlight aspects such as ethical responsibility, being responsible for actions, quality, Gender and diversity. Open Access is on KIT's agenda because it is often a requirement for funds. This mainly concerns publications as often data is not open. A challenge for the organisation is dealing with the demand to conduct research as well as teach. Also, transdisciplinary approaches to science are becoming more and more important. Here new forms of work need to be established, such as social laboratories. Integrating RRI thinking in education, especially in engineering science, will be challenging.

Radboud University The Netherlands was introduced by Bram Bregman who raised questions that arise when thinking about RRI and its realisation at universities and research organisations. Challenges are putting emphasis on societal impacts but not knowing how to actually do this or finding measures or indicators. Many activities are happening such as Open Access initiatives, but they remain uncoupled with key indicators. It is important to create useful indicators on societal responsibility since these are missing. The indicators that are used at a national level as well as at Radboud University do not account for societal impact. There needs to be a better balance between "valorisation" and societal impact. Further, the business model of the faculties works against RRI. Interfaculty cooperation is important but very challenging, also because of limited funds that have to be split. Further, when considering who the most important strategic stakeholders are, a top down approach isn't useful. Instead, examples of RRI and societal impact in quality, not quantity, are needed. Narratives and convincing stories on how research affects society are needed.

The University of Queensland UQ Australia was represented by Semso Sehic who described the focus on science and technology of UQ as one of the oldest universities of the country. Funding comes from the Australian government as well as philanthropic funds. A commercialisation division at the university is in place in order to sell innovations. The government places a strong focus on research and innovation initiatives. UQ has ethics committees and research integrity advisors at the individual faculties, which promote interdisciplinary ethics. There is a strong awareness to be compliant also regarding public opinions. A responsible code of conduct can be seen as an "ethos" which frames research. One of the key issues of the university's new strategy is financial security. Proving impact is an essential aspect in order to gain funding. Open Access is represented in explicit policies, but difficulties arise in the details, as it is often unclear how to actually do it. Openness and transparency are aspects, yet reflexivity is not mentioned at all, which has to do with Australian culture, in which this doesn't play a role.

A brief discussion followed the presentations of the conducting organisations. Due to the time limits this could only touch on some aspects. Main points were how to initiate change towards more responsibility. Here it was suggested that using the term "irresponsibility" could be a way to raise awareness and changing practices. Also discussed was the issue of impact. Since many organisations stress this as a key aspect, it is an important indicator. The question was raised that if research doesn't have impact, is it responsible? It is relatively easy to measure performance in science in terms of Nobel prizes or citations. But it is difficult to establish indicators of societal impact. For instance, if we consider art institutes; how can impact be measured? Further, the idea was mentioned that case studies can provide indicators. Being socially responsible is also a difficult rhetoric and especially difficult for a classic university. Universities should be accountable to society in terms of transparency of using money and how this is invested. Overall it seems there are opportunities for RRI, such as in China where social changes are taking place. For example, RRI can offers ways forward and new perspectives in conflict situation.

4.2 Plenary: Dimensions of RRI

As an interactive exercise, the dimensions of RRI were used in form of a questionnaire table which was passed out to all participants from the organisations. The main goal was to gain insights into their assessment of where their organisations can be placed regarding the dimensions of RRI. The participants (universities and research funding organizations) were first introduced to the indicators and to examples of RRI practices in three dimensions (first and second columns in Table below) i.e. Anticipation, Reflexivity and Inclusive Deliberation. Then, they were asked to provide a self-assessment about the present status of their organization by circling the statements in columns Embryonic, Developing and Integrated and Embedded.

Type of organisation:

Role:

Dimension	Indicator Description	Example Methods and Tools	Indicator Measure (please circle statement that best applies)		
R&I = Research and Innovation			Embryonic	Developing	Integrated and embedded
Anticipation	Articulates and reflects on potential intended and unintended applications, impacts and interactions of R&I	Foresight methods	Little or no reference to, or communication of, anticipatory activities related to R&I within organisational mission, policies, strategic documents.	Clear evidence of anticipatory activities in organizational mission, website, policies and strategic documents	Anticipatory activities related to R&I at the core of the organizational discourse. These are prominent in its strategies, policies & communications
	Articulates risks and uncertainties concerning R&I	Technology Assessment	Few or no institutional leaders (e.g. organisational management, research leaders) act as champions to promote anticipatory activities around R&I	Presence of one or more champions committed to anticipatory activities around R&I and fostering organisational change	Organisation's leaders and staff are fully committed to implementing anticipatory activities within R&I
	Critically engages with visions and promissory statements of expectation	Scenarios			
	Strives to better understand socio-technical pathways and	Vision assessment	Little or no attempt to support and resource anticipatory activities	Clear evidence of anticipatory practices within	Anticipatory practices are institutionalised within

	<p>scenarios</p> <p>Ensures that anticipatory knowledge is responded to, informing and shaping R&I agendas and trajectories</p> <p>Integrates and embeds anticipatory knowledge into R&I as part of a multi disciplinary process of knowledge co-production and adaptive learning</p>		<p>within R&I. Few or only sporadic anticipatory activities evident. Little opportunity for staff and stakeholders to access institutional resources and opportunities for anticipation</p> <p>Few incentives, rewards and little recognition for investing in anticipatory activities: these are not a priority</p> <p>Little or no evidence that R&I at the institution are responsive to anticipatory knowledge</p>	<p>R&I, sometimes of an experimental and explorative nature. Some opportunities for staff and stakeholders to access institutional resources</p> <p>Some informal or formal incentives and recognition mechanisms in place, or clear plans for these</p> <p>Some evidence that anticipatory knowledge informs and shapes R&I: the organisation is striving to achieve a more responsive model of R&I</p>	<p>organizational routines and governance. Anticipatory activities well resourced, coordinated and systematically embedded into R&I. Training is supported</p> <p>Organisation has formal / informal incentives, recognition and reward mechanisms</p> <p>Anticipatory, reflexive and deliberative knowledge are systematically combined, integrated and embedded into R&I with tangible results and outcomes</p>
Dimension	Indicator Description	Example Methods and Tools	Indicator Measure		
R&I = Research and Innovation			Embryonic	Developing	Integrated and embedded
Reflection / Reflexivity	<p>Reflects (individually, as an institution) on underlying purposes of, motivations for and values underpinning R&I</p> <p>Reflects on the broader societal, political, ethical and environmental dimensions of R&I</p>	<p>Processes of broad ethical reflection and oversight (i.e. including but exceeding current codes of research integrity and ethics)</p>	<p>Little or no reference to, or communication of, activities demonstrating reflection in relation to R&I at the organisation within its mission, policies, strategic documents and communications</p>	<p>Clear evidence of a commitment to reflection concerning R&I in organizational mission, policies, strategic documents and communications</p>	<p>Reflection concerning R&I is at the core of the organizational discourse, being prominent in its values, strategies, policies and communications</p>

	<p>Reflects on risks, uncertainties, areas of ignorance and ethical dilemmas</p> <p>Critically reflects on the norms, socio- political contexts, regulatory and policy contexts in which R&I is undertaken</p> <p>Reflects on own institutional practices, behaviours and approaches to knowledge production for R&I</p> <p>Ensures that reflexive knowledge is responded to, informing and shaping R&I</p> <p>Integrates and embeds reflexive knowledge into R&I as a multi disciplinary process of knowledge co-production and adaptive learning</p>	<p>Multidisciplinary collaborations, notably across sciences, humanities and social sciences</p> <p>Integrated modes of knowledge co-production</p> <p>Embedded social scientists and ethicists in laboratories and projects</p> <p>Technology assessment</p> <p>Vision assessment</p> <p>Values-sensitive design</p> <p>Midstream modulation approaches</p>	<p>Reflection is not promoted by the organisation's leadership and there are only few champions who promote reflection in R&I</p> <p>Little or no attempt to make time for, support and resource reflection within R&I. Few or only sporadic activities with little opportunity for staff and stakeholders to access institutional resources and opportunities for reflexivity</p> <p>Few incentives, rewards and little recognition for investing in reflection: this is not a priority for the institution or its staff</p> <p>Little or no evidence of processes of reflection that inform and shape R&I. Focus may be purely on technology push or linear models of R&I</p>	<p>One or more champions committed to actively promoting reflection around R&I and fostering organisational change</p> <p>Clear evidence of reflexive practices within R&I, formally or informally, which may be exploratory. Some opportunities for staff and stakeholders to access institutional resources for reflection</p> <p>Reflection is incentivised and recognised by the institution, or there are, or clear plans for this</p> <p>Some evidence of activities of reflection to which R&I at the institution responds: the organisation is striving to achieve a more responsive model of R&I</p>	<p>The organisation's leaders and staff are fully committed to implementing reflexive activities within R&I, leading by example</p> <p>Reflexive practices are institutionalised within organizational routines and governance. They are well resourced, co-ordinated and systematically embedded into R&I. Training is supported</p> <p>Reflection is formally incentivised, recognised and rewarded: it is a clear institutional priority</p> <p>Reflexive, anticipatory and deliberative knowledge are systematically combined, integrated and embedded into R&I with tangible results and outcomes</p>
Dimension	Indicator Description	Example Methods and	Indicator Measure		

		Tools			
R&I = Research and Innovation			Embryonic	Developing	Integrated and embedded
Inclusive deliberation	Opens up the purposes, envisioned applications and impacts of R&I, and associated risks and uncertainties, to inclusive deliberation	Consensus conferences	Little or no reference to, or communication of, stakeholder and public engagement activities related to R&I within organisational mission, policies and strategic documents beyond open access	Clear evidence in strategy and policy documents and in communications that public and stakeholder engagement related to R&I is an organisational priority	Clear, visible commitment to open, inclusive deliberation, co-creation and knowledge co-production. A key feature of organisational discourse and a priority
	Invites, engages and deliberates (early and iteratively throughout the R&I process) with a diverse range of stakeholders and publics	Citizens' juries and panels			
	Invites public and stakeholder participation in R&I research agenda setting	Anticipatory focus groups	Few or no institutional leaders act as champions to promote inclusive deliberation around R&I	Presence of one or more champions committed to fostering inclusive deliberation around R&I	Organisation's leaders and staff are fully committed to implementing inclusive deliberation within R&I
		Science cafes	Little or no attempt to support and resource inclusive deliberation within R&I beyond open access. Few or only isolated activities. Little opportunity for staff and stakeholders to access institutional resources, spaces and opportunities for stakeholder and public engagement		
	Engages in broadly – configured knowledge co-production as a trans – disciplinary endeavour	Deliberative mapping		Clear evidence of stakeholder and public engagement within R&I that includes but goes beyond open access. Opportunities for staff and stakeholders to access institutional resources for engagement	Public and stakeholder engagement is embedded in R&I and institutionalised within governance and organizational routines. Engagement activities around R&I and training well resourced and co-ordinated.
	Ensures open access to R&I agendas, processes and outputs to facilitate and support informed debate and reflection	Lay membership of advisory and decision making bodies			
		Constructive technology assessment			
Ensures that deliberative	Participatory R&I agenda setting	Little or no evidence of processes			

	<p>knowledge is responded to, informing and shaping R&I</p> <p>Integrates and embeds deliberative knowledge into R&I as a process of knowledge co-production and adaptive learning</p>	<p>Constitution of grand challenges and thematic research programmes</p>	<p>of inclusive deliberation that inform and shape R&I. Focus may be purely on science communication and / or open access</p>	<p>Some evidence of deliberative activities to which R&I at the institution responds: the organisation is striving to achieve a more responsive model of R&I</p>	<p>Reflexive, anticipatory and deliberative knowledge are systematically combined, integrated and embedded into R&I with tangible results and outcomes</p>
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The AIRR exercise was completed by 15 participants. The results show that most of the participants situate the RRI activity in their organization in a “developing” stage. This exercise might be also extended to other key individuals in the organizations involved in RRI practices.

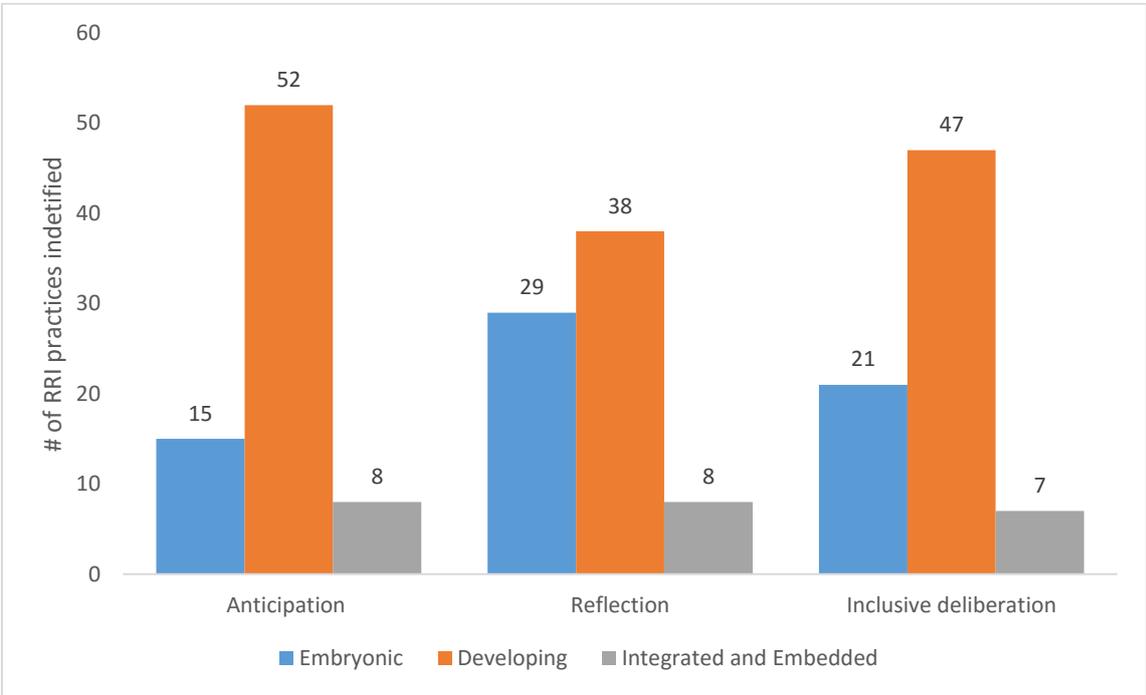


Figure 1 Results of the AIRR Self-Assessment exercise

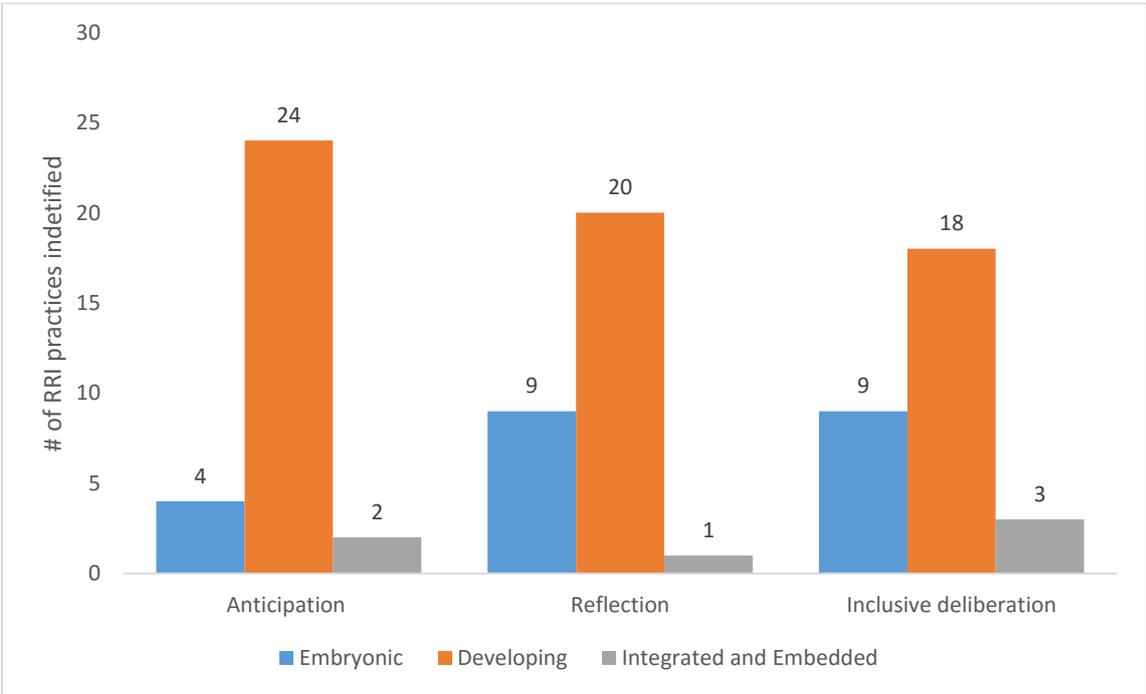


Figure 2 Research Funding Organizations

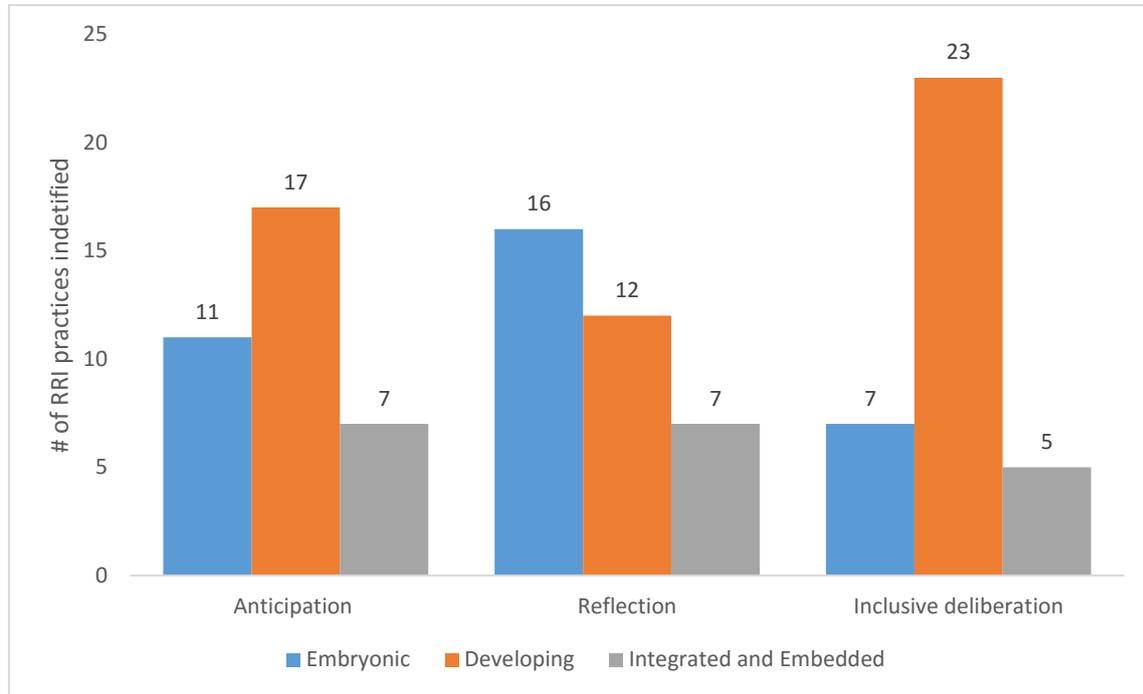


Figure 3 Research Conducting Organizations

4.3 Parallel Sessions II: Discussions on RRI Keys and Dimensions

The second workshop day was dedicated to gaining insights into the RRI keys as well as the dimensions. In order to organically develop the discussions within the two peer groups we continued with two parallel sessions, one with the research funding representatives and the other with the research conducting. As on the day before, this proved to be a useful approach to allow for more focused discussions. For each key and for the dimensions a brief introduction was given by one of the members of the consortium which was followed by group discussions. These are summed up in the following.

4.3.1 RRI Keys and Dimensions: Funding Organisations

Gender

Gender is a main issue for organisations and has many activities surrounding it. There are targets, quotas and strategies in place in many countries, but questions such as: how do we understand gender?, how do we approach it?, what methods do we use to achieve gender balance?, require more research. Mentoring programs for women seem to be an underused practice. It seems the term gender needs to be broadened to include diversity. Here it is important that the inclusion of a diverse group of people is also about enabling a diversity of thought and challenging the way we think. Training the evaluation committees in gender and diversity awareness is important and should focus on awareness of unconscious biases. In India, main issues are how to bring women back into research

after for example family breaks, so increasing the mobility of female scientists. In this context there is a need to support families as well as a proper representation of women. For countries such as Brazil and Bulgaria, ethnic diversity is just as important as gender balance. In China, there are quotas in place and there is also a focus on age issues. In general, it seems that some disciplines are well balanced, others not. In order to promote senior positions for women evaluations may prioritise women project leaders.

Public Engagement

This aspect is inherently about a two-way dialogue process, not only the one-way communication of research results. In practice, though, public engagement approaches can range from media activities of the press offices, publications, websites and open days to collaborations with NGOs or citizens. It seems that engagement is often not high on the agenda of the organisations, especially when it comes to asking the public to co-develop science agendas. On issues such as climate or health, more engagement activities are done than in other fields. Also, there needs to be engagement on topics between the ministries, the parliament, public authorities (such as funding bodies) and representatives of the public. The question is also whether all stakeholders want to listen to the public's opinion, which is unsure even in democratic societies such as Norway. Key for engagement is also a strategy for inclusion of the results of the dialogue, which increases its legitimacy. Engagement and dialogue can provide feedback on and evaluation of policies and strategies.

Ethics

This involves traditional research ethics as well as being reflexive about the research processes themselves, meaning reflection on impacts and expectations of society. There is also the responsibility to run a funding organisation in an ethical way, for instance related to ensuring that researchers are accountable for the funds they receive and that there is transparency in spending. This means that the funding organisations' role is also to follow up on how the money is used. There have to be mechanisms in place to identify problems, for example, an office that investigates if funding is used properly. The bigger the projects, the higher the need for this kind of following up. Also, there is the question of how far the funding organisations are responsible, for example in the case that researchers sell innovations that are produced with public money. At which stage does the responsibility end?

Furthermore, the education of researchers regarding ethical issues is important. This should go further than research ethics and include RRI aspects and could be embedded in education stages from Bachelor to the PhD. Overall, ethics should be in the core of the research questions, otherwise it ends up being a tick box exercise. Ethical issues can pop up during the entire project and need to be addressed. An idea could be to follow up a cluster of projects and invite them to discuss common ethical issues and how to approach these. A driver for the inclusion of ethics are contractual obligations. There is a certain flexibility for the funding organisations to, for example, provide additional funding during the project or even take away funds if ethical aspects are neglected. A challenge is the autonomy of researchers and that it is difficult to persuade them to be reflexive. Therefore, contractual methods can be helpful to change behaviour. This can also include providing grants and cooperative agreements to foster exchange. Next to this, people also need to be inspired to change, not only do the minimum.

Open Access

Barriers here are missing policies and practical approaches to support Open Access. With regard to open data, there are legal issues to take into account such as meta-data or privacy. There are

potential conflicts of interests between funders and universities on how open data can or should be. Also, the price of publishing is too high and often exceeds budgets, even though funding agencies accept open access costs in project dissemination budgets. There is a clear need to initiate negotiations with the scientific publishing industry. The question here is who should discuss this: the funders, or the universities? There have been activities such as a declaration in Amsterdam in which 20 of the largest universities decided not to subscribe to certain journals to protest against high costs. When publishing research results, the ambition should be gold Open Access, a minimum should be green. A separation should be made between scientific excellence which also shows in the number of publications and the outreach outside of the academic community, which is more about knowledge translation or utilisation. One should regard Open Access in the context of Open Science which includes the accessibility of knowledge that goes beyond academic publication to include easy and understandable versions of project results.

Science Education

Science education goes beyond the regular university teaching and the university curriculum. It is about enhancing science literacy, for example among teachers, students and the general public. It is high on the agenda in form of separate directorates, which develop curriculums, innovative teaching techniques or support science museums for engagement. There are research programmes on science education for all levels, which also improve infrastructures at universities and, as the example of China shows, increases science popularization, especially for children. Funding organisations are only one of the actors that are important for science education, next to ministries for example. Overall, there is growing awareness of the importance of these initiatives, yet there are still blind spots. There is the question on how RRI is embedded in Science Education itself, also for researchers themselves. Often the role of the research is not reflected on, but the focus is on science for science' sake.

RRI Dimensions

Conservative organisations, linear thinking models and focus on basic research can be barriers to implementing the RRI dimensions. Also, there are many bottom-up activities that can be regarded as RRI and related to the dimensions, yet it seems there is not enough reflection on this at the top levels. Often boards and executive teams are the biggest barriers, since they are concerned with the reputation of the organisation on traditional indicators or its financial security. Therefore, it can be useful to look at the RRI dimensions from a business perspective and for example “sell them” RRI. Yet, selling this impact perspective can be challenging depending on the composition of the boards and the norms they follow. The agreement on the importance of RRI does not have the same effects as actual proactive action on RRI issues. For this, resources, change agents and incentives are needed. RRI champions are plentiful, but often not on the level that can actually change the organisations. Here it might be helpful to include various actors in boards and decision processes in to avoid too narrow perspectives and to find ways of operationalisation. This can then initiate cultural and cognitive change which is needed for RRI. In all organisations, there are different departments and programmes with various approaches, which makes it difficult to reflect in a broader way or engage in co-production. Furthermore, in science, often a few academics are very powerful and therefore influence decisions. Here, governance structures are key, and questions about who gets funding, how do we assess proposals and who is represented in the boards.

4.3.2 RRI Keys and Dimensions: Conducting Organisations

Gender

For the issue of gender, it is important to consider childcare opportunities, work-life balance and maternity leave. Crucial questions are also the problems of Gender equality programmes in the sense of positive discrimination. This also includes the question of which norms are represented in such programmes. In a way, a positive bias is necessary until equality is reached. In China and Russia for example, as past socialist countries, gender equality is considered a central principle. Yet, after reform and marketization, the status of women is declining in all areas including scientific fields. Policymakers aimed at improving equality and before 2010 the general principle accepted was that gender equality was achieved by treating women equally. Yet, since 2010 it has become clear that positive discrimination is necessary. In the past Soviet Union it was considered that there was no Gender inequality, yet now in the market economy with new structures of salaries or positions problems arise, but are not discussed. This shows that Gender equality is a cultural issue and that the perception of whether it is progressing, digressing or staying the same depends on the particular context. Even though discrimination is seen as illegal there needs to also be more awareness on the daily biases. For example, in Brazil salaries are the same for men and women, yet there is an imbalance in form of a lack of women in different areas. It is important here that the way women are portrayed for example in the media is important, showing female leadership publically.

Public Engagement

Public Engagement can mean many different things to people, overall it can be understood as a two-way communication for mutual benefits. For this the culture of engagement is important. For example, in Bulgaria there is a lack of culture when it comes to engaging with lay publics. Therefore, engagement is challenging but rewarding especially when understanding that people want their opinions to be heard and to have a say in policy development. Most of the time it has been about emerging technologies and new areas of science like synthetic biology. Even in these emerging areas, lay people have opinions, which should be part of the research process. Here it is not about numbers or a one-time exercise, but a process and impact that influences the policy system. For this, engagement needs to be structurally embedded without failing because of bureaucratic knots. In France, when there are big issues such as the energy transition, some representatives don't want to collaborate with the public, while others see an opportunity. In energy transition projects, NGOs are included as they can help develop storylines and narratives about the future to implementing new smart energy systems. Engagement like this, is the only way to ensure that the public acknowledges and accepts these processes. This shows a kind of two-way impact.

In Australia, the public demands engagement from academia but academia is responding somewhat reluctantly. Yet it is important to see that the public has the power, not academia. As part of science education, it is important to teach students how to engage with the public. Questions arise such as why do we reach out to the public, who is that public and whose responsibility is it to do this outreach? In Brazil, the public is receptive and susceptible to news media. There is a strong movement nationwide to defund research and public universities. This is because scientists are seen as living in castles and not focusing on relevant issues for society. This means the media has to be reached and there must be an institutional force, such as a communication office, to reach out and show how important science is. These examples show the different needs depending on the countries and their specific contexts. In some the public is more involved in setting the research agendas, in others problems arise because of misunderstandings resulting in a need for two-way communication to be institutionalised.

Ethics

Ethics is comprised of two different topics: research integrity and the ethics of scientific research, meaning ethical reflection. Overall the level of ethics debates in the conducting organisations is seen as satisfactory. Rules, guidelines and policies are in place and tend to be followed. Furthermore, there are ethics committees that deal with issues such as research on humans or animals. Beyond this, for example in Australia there are bottom-up activities where students raise issues of interest for discussion. Improvement can be done in the area of education, e.g. mandatory trainings on research ethics. For the RRI Practice project a question is whether there should be laws on state or federal level on ethical issues or if this should be done on a voluntary basis. Within the organisations it seems that research ethics is regarded an add-on in the sense that it takes time and can bring obstacles. It is sometimes seen as a “necessary burden” which people try to resist or avoid if possible. Some organisations provide ethics templates for grant proposals in which text blocks are given. The question is whether this approach is sufficient or if there should be narrative reflections. There need to be options for this, which RRI-Practice could provide. Connections between such ethics instruments and the notion of responsibility need to be made.

Open Access

Under the heading of Open Access there are processes of providing online access to scientific information, which is then freely available and reusable. Green and gold open access are mentioned and ways of implementation are described. These can be in form of legal guidelines that are mandatory, but also as cultural, informal routines that help promote the use of repositories. Here links between open access publishing and performance reviews could be useful. Furthermore, there need to be resources for open access and promotion of the usefulness of this. A driver of open access are the funding organisations, who make this part of their requirements for receiving funds. In Brazil for example, resistance comes from scientists themselves, who are concerned with the decline in the quality of research. In Australia, federal funding does not fund gold access, but publications have to be put into the repository. In China, researchers are not yet accustomed to the open access culture and are worried about idea theft and their intellectual property. Similarly, in Russia, there is a lack of communication between researchers, understanding of open access and concerns about losing competitive benefits. Russia does have a lot of journals in Russian language, which are mostly online and fully open access. Problematic for open access are predatory publishers. Research ethics commitments (protecting the confidentiality of research subjects) can be a challenge for open data.

Science Education

In order to enable high quality public engagement, it is necessary to support citizens in acquiring scientific knowledge. This is where science education is key. This can include student and teacher trainings and continuous education. Science education also include education on RRI itself. For this, valuing these activities within organisations is important. This includes budgets, incentives and providing RRI content for stakeholders. Furthermore, websites or even events like workshops can be helpful here. Continuous RRI education programmes, which engage a large number of different stakeholders is important. Also, events such as open talks or open doors are used. These educational activities can be found everywhere, yet it is sometimes institutionalised (also with a budget), other times a side project of scientists. A barrier can be the pressures of evaluation, which focus mainly on publications and patents and do not acknowledge these extra activities. Exeter University does have this as part of their promotion requirements. These educational activities can also help to bring more researchers into the area of societal implication of S&T as well as RRI. There is still much to do, especially regarding finding out the needs of educators for bringing science to people. This can include creating educational tools for teachers or opening laboratories for students. The question

remains whether this is two-way communication or providing literacy according to what scientists think people need.

RRI Dimensions

The RRI dimensions provide a procedural way of thinking about RRI, which poses the problem of how to operationalise this. The RRI keys are easier to define and identify than the dimensions. Yet, as the dimension of reflexivity shows, capacities to reflect on risks, uncertainties but also norms or policies are essential. For this to work, the benefits of these dimensions have to be “sold”; this could be in form of skilled communication of best practices or concrete examples of evidence. Further, programmes, budgets as well as the focus of the management level is needed in order to show the importance of this approach and to design tools and methods for anticipation and reflection for researchers. Some organisations may have a self-perception of excellence in the area of the dimensions, yet reality might be different. As for the matrix of the dimensions, it is useful for starting a conversation but needs to be made more user-friendly for the organisations. This also has to do with the wording, especially when thinking about translations into different languages. Also, there may be very different ideas of anticipation and reflexivity. This can range from who is hired to the orientation of research according to societal problems or more technical ones. A driver can be the need for long-term thinking, since we have to imagine futures and anticipate challenges and develop approaches for science. For example, energy transitions force use to think anticipatory. Barriers can be budget cuts or only investing in particular areas of strategic expertise. Finally, a too linear view of science can be a barrier since what is needed is interdisciplinary ways of bringing various people together.

5 Conclusions of the Workshops

The workshops proved to be an essential part of the project as a whole. As this report shows, the discussions and reflections that took place in the groups are extremely useful for the further steps in the project. For RRI to become an agent of change we need to find common ways forward. This includes the exchange with potential change agents that share their expertise and experiences but also take back the insights they gained during the workshops into their organisations. The workshops offered a frame to share and discuss, especially focused on drivers and barriers for RRI. The two groups of conducting and funding organisations also show the different perspectives of research systems in the various countries.

The project team is in the process of incorporating the results of the discussions in the workshops in its work programme. Further input from the Advisory Board is considered in addition to this. The next step is to consider each of the following issues that summarise the main points made in the workshop discussions:

RRI is not known as a term, apart for the organisations that have dealings with relevant European Commission projects. This is nevertheless not a problem in introducing the concept of RRI since all organisations are aware of the RRI Keys and have discussed and/or implemented special programmes for them. Therefore they Keys prove a useful way to access the organisations and to understand what activities are already being done and where challenges, drivers and barriers lie regarding RRI implementation.

Where there is experience with the implementation of the RRI term, it is not based on the Keys but rather on the Dimensions. This poses an immediate conflict in the understanding of the term but can be solved by including the Dimensions as well as the Keys in the discussions with organisations.

Next to the internal structure of the organisations themselves, the context in which the organisations work, is the most important determinant in the implementation of RRI. This refers both to the specific local research culture and the national characteristics in each organisational setting. Societal priorities determine the discussions on RRI and decision making structures determine its implementation.

RRI implementation can take the form of “hard implementation” e.g. legal obligations for quotas, or “soft implementation” such as self-reflection on research processes. Both are valid forms of implementation and should be promoted. Several organisations mentioned that RRI indicators would be a helpful tool for broader implementation.

The RRI Keys need better definition, as the discussions during the workshops showed. Gender for instance should include “diversity” that is in many cases a higher research priority. Also, Education is too vague to be discussed as a single entity. Ethics should be perhaps combined with Research Integrity. Open Access cannot be separated from the discussion on research finances and property rights, and should be connected to the emerging broader concept of Open Science.

RRI impact evaluation is key in the implementation of RRI, since it is needed in order to provide a full implementation plan. This can be particularly tricky for the Dimensions of RRI that rely on interactive “soft” implementation processes. Further, this kind of evaluation needs to be connected to already existing forms within the organisations and be able to include qualitative as well as quantitative aspects.

Several organisations mentioned the importance of relating RRI to the concept of excellence in research, in the sense of creating a shared understanding that science cannot be excellent if it is not

also responsible. Strengthening this conceptual connection may break down cultural barriers to RRI in both research funding and research conducting organisations.



Group picture of the participants of the international workshops