

Lessons from RRI in the Making

Overview


The purpose of this brief is to summarise for policy and other stakeholder audiences the extensive empirical research which informed the Res-AGorA team's understanding of 'RRI-in-the-making', highlighting the key lessons and policy implications of our work. It was clear from the outset that the notion of responsibility in Research and Innovation (R&I) is a contested phenomenon that is continually evolving and is historically and geographically situated. Developing a deep understanding of how the concept of RRI has emerged was critical in enabling the co-construction of a framework to assist and guide strategic decision makers and practitioners in Europe. The goal is to make R&I systems more responsible: responsive, inclusive and sustainable in the contemporary moment, with reference to the societal, technological, political and economic challenges and opportunities facing Europe currently.

Table of Content:

- 1. Where did RRI come from?** We used **Scientometric Analysis** to construct a genealogy of responsibility discourses in research and innovation, analysing the emergence and characterisation of RRI.
- 2. How is responsibility de-facto understood, contested, and practiced?** We conducted and analysed an **extensive programme of in-depth case studies** across a range of research and innovation situations and contexts to draw lessons on the institutionalisation and governance challenges of responsible research and innovation.
- 3. How does RRI differ across Europe?** We created **RRI Trends**, a research method and on-line resource for monitoring the awareness, similarities and differences in understandings and practice of RRI in 16 European countries, giving external practitioners full access to the data collected in web-based open-access form.
- 4. How can a co-construction methodology support the development of an RRI governance instrument?** We put inclusive and deliberative methodologies into practice by conducting five **co-construction stakeholder workshops**, with an emphasis on learning; this process supported the development of a stable and robust **Res-AGorA Responsibility Navigator** and a systematic collaborative **Co-construction Method**.
- 5. Lessons and Policy Implications**
We conclude this brief by summarising the lessons and policy implications emerging from our empirical research programme.

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The Res-AGorA Project

Res-AGorA is a three-year, EU FP7 project (2013-2016) which has co-constructed with practitioners and strategic decision makers a good-practice framework, the "Responsibility Navigator"  which facilitates reflective processes involving multiple kinds of stakeholder and policy-maker towards the generic aim of making European research and innovation more responsible, responsive, and sustainable.

The development of this framework builds on three years of intensive empirical research comprising: an extensive programme of in-depth case-studies; systematic 'scientometric' literature analysis; country-level monitoring (RRI-Trends) and five broad-based co-construction stakeholder workshops.

The resulting Res-AGorA Responsibility Navigator was conceived as a means to provide orientation without normatively steering research and innovation in a certain direction. Furthermore Res-AGorA's "Co-construction Method" is a collaborative methodology designed to systematically support and facilitate the practical use of the Responsibility Navigator with stakeholders.

The Responsibility Navigator, the Co-construction Method and accompanying materials are offered to change agents who wish to navigate towards Responsible Research and Innovation.

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1. *Where did RRI come from? Findings from a scientometric analysis of the literature*¹.

The precise use of the term Responsible Research and Innovation (RRI) has a very recent history, stemming from the Science in Society programme within DG Research of the European Commission, with a sudden upswing in its deployment in the academic and policy literature as recently as 2011. Of course, discussion of responsibility in science has a much longer history, arising as a topic of interest alongside the period of enlightenment in the 18th century.

In order to understand better the historical development and changing thematic emphases in the discourse of responsibility in R&I, and the place and characterization of RRI within it, we undertook a systematic ‘deep dive’ into the academic and policy/practitioner literature. We deployed the CorText² tool to undertake content analysis of a corpus of more than 200 documents, selected for their use of phrases “Responsible Research and Innovation”, “RRI” and other specific related terms.

Key findings from our analysis are:

- RRI has a very recent history, with a very small corpus of texts written by a limited number of authors. This small band of authors is shown to be closely associated with European projects on RRI funded by the European Commission.
- Not only is the RRI literature dwarfed by, but it remains institutionally separated from, the larger/classical literature on responsibility in science. RRI authors are almost exclusively from the Social Sciences and Humanities (SSH) whilst the earlier/larger corpus is authored by natural and physical scientists. The ambition of inter-disciplinarity between social scientists and natural and physical scientists is not (yet) a reality, according to the criteria of cross-linked authorships.
- The larger corpus witnesses the dominance and institutionalization of earlier themes such as ethics; Impact Assessment; Corporate Social Responsibility. The new literature on RRI does not (yet) show connections to these earlier literatures, i.e. it has not emerged *from* them, and is not yet creating bridges to them, rather it exists so far as a separate branch.
- However, given its youth, the RRI corpus (in its precise definition) shows remarkable convergence around three themes:
 - Governance: RRI advocates a widening of societal actors participating in the governance of R&I
 - Objectives: RRI advocates orienting R&I towards addressing societal problems (grand challenges)
 - Meaning of responsibility: RRI advocates a shift from retrospective accounts (accountability, liability) to prospective (anticipative) future-oriented accounts.

¹ Tancoigne, E.; Randles, S.; Joly, P.-B. (2015): ‘A Scientometric Analysis of the new Discursive Space of RRI’ short version, <http://Res-AGorA.eu/case-studies/> stage 3 cases; Tancoigne, E.; Randles, S.; Joly, P.-B. (2015): ‘Power and the Performativity of Language: A Scientometric Analysis of the new discursive space of RRI (under journal review); Tancoigne, E.; Randles, S.; Joly, P.-B.: ‘Evolution of a concept: A Scientometric Analysis of RRI’, in Lindner, R. et al. (eds.) (2016): *Navigating Towards Shared Responsibility in Research and Innovation : Approach, Process and Results of the Res-AGorA Project*, Res-AGorA, Karlsruhe. Chapter 4

² Developed by the Institute for Research and Innovation, Paris. ifris.org/en/presentation/

2. *How is responsibility across a range of research and innovation situations de-facto understood, contested, governed and practiced?* Lessons from an extensive programme of in-depth case studies.

Over two dozen in-depth case studies were undertaken in three phases, over two years³. The cases were selected to reflect a full variety of R&I situations, encompassing different entry points and foci, from the role and impact of specific governance instruments and processes, to cases on organisational and institutional change, to whole multi-actor innovation systems responses. The case studies were iteratively and increasingly guided by the Res-AGorA Research Model⁴. A few examples of cases taken from our wide and extensive final portfolio of cases⁵ are:

- National research funding priority-setting in Denmark: tracing Research2015, an initiative to make the process of decision-making on societal challenge oriented funding more inclusive to a wider range of actors.
- The response of a nanotoxicology lab and constellation of small nanotech firms in Italy to the European Commission's voluntary code of conduct for responsible nanosciences and nanotechnologies
- 'Garage Innovation': regulatory questions in the governance of new/ alternative communities of practice in 3-D printing and alternative spaces of drug development.
- Comparing fracking in Austria and UK: how it is differently framed, enacted, and responsive, in terms of national policy, in the two countries.
- A group of cases on organisations and institutional change: Responsible innovation and the Good University the case of Arizona State University; seeds of RRI-in-the-making and the opening of a dialogue at the Fraunhofer Gesellschaft, Germany; re-thinking CSR in 3 multi-national corporations Nestlé, Syngenta and Monsanto.
- Participatory Guarantee Schemes in Bolivia and other emerging markets: tracing a multi-level governance response which takes form at national and municipal levels and works to legitimate the grass-roots innovation processes of local farmers and consumers. The approach reorients policies for ecological agriculture towards the societal objective of food security by integrating family farming systems, local multi-actor technology platforms and alternative certification for domestic markets into the existing food systems.

In understanding *de-facto* responsible research and innovation, we developed the twinned concepts of *Responsibilisation*⁶, a process by which actors involved internalise issues of concern, enabled by appropriate organisational conditions and governance mechanisms and *Deep Institutionalisation*⁷, being the deep embedding of understandings of responsibility into practices, governance processes, organisational structures and incentives. In contrast, in a number of instances we found examples of converse effects and coined the terms *responsibility-wash*; *responsibility-overload*; and *responsibility-relabeling*⁸ as tactical responses evident in some cases.

³ Edler, J.; Randles, S.; Gee, S.; (2014) *Preliminary Lessons from the Case Study Programme* Res-AGorA Project Deliverable Report D3.5, May, <http://Res-AGorA.eu/eu-deliverables/>

⁴ Walhout, B.; Kuhlmann, S.; Dorbeck-Jung, B.; Edler, J.; Randles, S.; Gee, S. (2014): *Research Heuristic and Key Concepts*, Res-AGorA Project Deliverable Report D2.2, <http://Res-AGorA.eu/eu-deliverables/> Walhout, B.; Kuhlmann, S.; Ordanez-Matamoros, G.; Edler, J. (2016): *The Res-AGorA Approach: Concepts and Research Model*, in: Lindner, R. et al (eds.) (2016): *Navigating Towards Shared Responsibility in Research and Innovation: Approach, Process and Results of the Res-AGorA Project*, Res-AGorA, Karlsruhe.

⁵ See the full suite of Res-AGorA case studies at <http://Res-AGorA.eu/case-studies/>

⁶ Dorbeck-Jung, B. and Shelley Egan, C. (2013): 'Meta-Regulation and Nanotechnologies: The Challenge of Responsibilisation within the European Commission's Code of Conduct for Responsible Nanosciences and Nanotechnologies', *Nanoethics*, 7, 55-68

⁷ Randles, S.; Dorbeck-Jung, B.; Lindner, R.; Rip, A. (2014): 'Report of the Roundtable at S.Net 2013: Where to next for Responsible Innovation?', in Coenen, C.; Dijkstra, A.; Fautz, C.; Guivant, J.; Milburn, C.; van Lente, H. (eds.): *Innovation and Responsibility*, Heidelberg

⁸ Randles, S.; Gee, S.; and Edler, J. (2015): *Governance and the Institutionalisation of Responsible Research and Innovation in Europe: Transversal Lessons from an Extensive Programme of Case Studies: Stakeholder Report* Res-AGorA Deliverable Report D3.6, <http://Res-AGorA.eu/eu-deliverables/>

Analysis was undertaken comparing and contrasting the cases, looking for similarities and differences and common themes. Through this process we produced the following *13 transversal lessons on the governance and institutionalisation of responsibility*⁹ in Research and Innovation (R&I), as shown in Table 1.

Table 1 – Thirteen transversal lessons on the governance and institutionalisation of responsibility in R&I

<i>Overarching Lesson</i>	
1.	Responsibilisation and Deep Institutionalisation: this refers to a process of cultural change which internalises social values by embedding them into practices and processes. A holistic concept that brings the remaining twelve lessons together.
<i>Participation and inclusion</i>	
2.	Transformative interaction: transformation is more likely to occur when the process is built on genuine engagement that is inclusive, open and transparent, fostering mutual trust and understanding from the initial framing of an issue onwards.
3.	Intermediation and moderation: strong trusted neutral brokerage is required to enable diverse communities (in terms of location, perceptions, interests, capacity etc) to participate in a process that is perceived to be legitimate and credible.
<i>Knowledge and understanding</i>	
4.	Anticipation: ethical codes that support a long term responsibility are based on consideration of alternative futures and can adapt to changing contexts to support a guardianship culture.
5.	Knowledge: to be effective within responsibility discourses, evidence must be valid, adequate and trusted; hence it must be robust, transparent, inclusive, contextualised and sourced from a variety of stakeholders.
6.	Timing: tensions across different temporal horizons must be managed recognising the dynamic nature of situations and contexts.
<i>Integrating across scales</i>	
7.	Multi-level governance: this requires accounting for multiple levels of governance within and between organisations and political scales (e.g. regional, national, EU, global) and seeking synergies between top-down and bottom-up processes.
8.	Alignment: aligning and synchronising the normative goals, objectives and procedures of instruments and measures across different levels to achieve consistency and clarity.
9.	Boundary objects: shared objects (e.g. data) or processes (e.g. training) play an important role in translating between governance levels and supporting actors operating between boundaries in line with Lessons 7 and 8.
<i>Institutional Change</i>	
10.	Institutional Change: creating a responsible research and innovation culture requires both institutionalisation (stabilisation) of new, and de-institutionalisation (modification) of current, behaviours, structures and procedures.
11.	Capabilities: systematically developing skills and competences that enable actors at all levels to fully participate in responsible research and innovation transformation processes.
12.	Capacities: the means and resources to create conditions for responsibilisation and to build a collective capacity for RRI at a societal level must be established.
13.	Institutional leadership and entrepreneurship: from individual actors as leaders and ‘change agents’, to a broader culture of institutional entrepreneurialism, leadership is necessary to drive a range of normative societal, collective, responsibility objectives.

⁹ Randles, S.; Edler, J.; Gee, S.; Gough, C. (2016): ‘Res-AGorA case studies: Drawing Transversal Lessons, in: Lindner, R. et al. (eds.) (2016): *Navigating Towards Shared Responsibility in Research and Innovation: Approach, Process and Results of the Res-AGorA Project*, Res-AGorA, Karlsruhe. Chapter 7.

3. How does RRI differ across Europe? Lessons from RRI Trends^{10, 11}

RRI-Trends within Res-AGorA monitors responsible research and innovation across 16 European countries. The monitoring scheme has examined selected public and private research funding and research performing organisations, based on a uniform approach across countries. RRI-Trends provides stand-alone country reports but also allows for comparative analyses across organisations and countries.

A main result of RRI-Trends¹² is that while the notion of ‘RRI’ is emerging in several organisational sites, it is not a mainstreamed concept across the European research and innovation actor landscape. In many research funding and performing organisations, both public and private, the RRI terminology is simply not used. This does not imply, however, that concerns, practices and governance arrangements relating to responsibility in research and innovation are not salient. On the contrary, we find widespread examples of thorough organisational commitment to responsible research and innovation, even if these are established under different headings, such as Corporate Social responsibility (CSR), sustainability schemes or diversity management in private companies, or in codes of conduct, research integrity training or gender equality plans at universities.

Another key observation is the heterogeneity of governance arrangements for responsible research and innovation across countries and types of actors. Inclusive governance mechanisms, such as citizen and Civic Society Organisation engagement, feature prominently in some countries while they play less of a role in others. Likewise, open access and open data are core responsibility concerns within some organisations but are not noticeably important within other settings. This diversity of bottom-up responses to what it means to be responsible in different research and innovation situations, organisation types, and national political, economic, social, and cultural contexts is highlighted by the empirical work in RRI-Trends; it is also acknowledged within the ambition of developing a governance framework for RRI. In Res-AGorA, this result is reflected and translated into a principle of subsidiarity as a component of the practitioner orienting framework supporting strategic decision makers implementing the **Responsibility Navigator**. RRI-Trends was conducted through three waves of empirical work summarized in Table 2.

Table 2: Three waves of RRI-Trends

Wave	Focus	Main questions	Methods
Wave 1 Jan.-Apr 2014	The broad national policy- and actor-landscape for RRI	Which RRI dimensions are manifest? Who are the main actors? In which techno-scientific areas are RRI issues pertinent?	Analysis of 10 selected core policy papers
Wave 2 Nov.– Feb. 2015	Research and innovation funding and performing organisations in both the public and private sector	How is RRI, explicitly and implicitly, being addressed? Which mechanisms are applied to enhance responsibility? What are the perceived barriers to RRI?	Document analyses in combination with interviews covering 1 public funding agency, 1 private research foundation, 10 universities, and 2 companies in each country
Wave 3 Jul. – Oct. 2015	Civil society organisations (CSOs)	How is RRI, explicitly and implicitly, being addressed? Which mechanisms are applied to enhance responsibility? What are the perceived barriers to RRI?	Document analyses in combination with interviews covering 1 CSO in each country

¹⁰ See ritrends.Res-AGorA.eu/reports/custom/

¹¹ Griessler, E.; Mejgaard, N.; Pochhacker, N. (2014): First Annual RRI Monitoring Report Res-AGorA Deliverable Report D5.12, Res-AGorA.eu/eu-deliverables/.

¹² Mejgaard, N.; and Griessler, E. (2016): ‘Monitoring RRI in Europe, Approach and Key Observations’, in: Lindner, R. et al. (eds.) (2016): *Navigating Towards Shared Responsibility in Research and Innovation : Approach, Process and Results of the Res-AGorA Project*, Res-AGorA, Karlsruhe. Chapter 13

4. How can a co-construction methodology support the development of an RRI governance instrument? (the Res-AGorA Responsibility Navigator) with a diverse composition of stakeholders from across Europe? The Res-AGorA Co-construction Method¹³

The Res-AGorA research team has been committed throughout to the genuine implementation of inclusive participatory methods in our own research practice, as demonstrated by the final phase of empirical work with stakeholders: the **Co-construction Method**.

The empirical research conducted up to this point (lessons from the scientometric literature analysis, case studies, and country monitoring) informed the construction of a prototype framework for the governance of responsibility in R&I. However, this was only the start. The prototype was then taken into five participative co-construction multi-stakeholder workshops held across Europe, between March and June 2015 (see Table 3). Although members of the Res-AGorA research team participated in all of the workshops, giving short documented presentations, the format of all workshops focused on open dialogue between the participants, in plenary and break-out formats. All of the workshops were facilitated by an independent facilitator¹⁴ who was not part of the Res-AGorA team, using a variety of group facilitation and participation methods. The Res-AGorA members that were present took notes and were encouraged to listen rather than contribute to discussions. A total of 80 participants attended the workshops (excluding the Res-AGorA team members).

Table 3 – The five co-construction stakeholder workshops

Workshop	Theme/participants	Location
1	RRI in relation to shale-gas research	Copenhagen
2	RRI in the context of GMO	Vienna
3	RRI in relation to funding strategies	Amsterdam
4	RRI in context of research performing organisations	Berlin
5	Empowering the governance of RRI in Europe (strategic decision makers representing the full range of relevant organisations: government policy, research funding & performing organisations, business, and civil society organisations)	Brussels

A synthesis report¹⁵ combined the conclusions and recommendations for the further refinement of the preliminary governance framework, with recommendations for good-practice in co-construction methods developed from the organisers experience of designing, organising and reflecting on the experience of running the workshops¹⁶.

A number of changes were made to the governance framework as a result of the recommendations from the workshops and in response to the research team’s personal reflections from the workshops, confronting how their prototype framework was being understood (or not) by practitioner audiences. As a result, the team developed the orientation ‘thinking tool’, the **Res-AGorA Responsibility Navigator**¹⁷, consisting of ten guiding principles. The purpose of the **Responsibility Navigator** is to guide strategic decision makers and practitioners towards good practice in deliberative processes. The **Navigator** also highlights the importance of creating ap-

¹³ Bryndum, N. et al. (2016): ‘The Res-AGorA Workshop Method: Engaging Diverse Stakeholders’, in Lindner, R. et al. (eds.) (2016): *Navigating Towards Shared Responsibility in Research and Innovation : Approach, Process and Results of the Res-AGorA Project*, Res-AGorA, Karlsruhe. Chapter 6

¹⁴With thanks to Christoph Mandl who independently and expertly facilitated all 5 workshops.

¹⁵ Lang, A .and Greissler, E. (2015): *Position paper on key elements for the governance of RRI: synthesis report on five thematic stakeholder workshops*, Res-AGorA Deliverable D4.10 <http://Res-AGorA.eu/eu-deliverables/>

¹⁶ Lang, A. and Bryndum, N (2015): ‘Stakeholders navigating through rough waters: Five workshops on Responsible Research and Innovation (RRI)’ Res-AGorA.eu/publications

¹⁷ Kuhlmann et al. (2015): *Responsibility Navigator*, Karlsruhe http://res-agora.eu/assets/Res-AGorA_Responsibility_Navigator.pdf

and see Res-AGorA [Policy Note #2 Navigating towards RRI](#) & #3 Policy Note (forthcoming)

propriate institutional conditions, system level incentives, rewards, and institutional capacities, alongside developing the capabilities and skills of practitioners.

5. Policy Lessons and Implications

What makes Res-AGorA unique among the many RRI research projects currently funded by DG Research is the depth and breadth of its underpinning empirical research programme. This briefing note demonstrates how the empirical research combines multiple methods and fully mobilises the different studies throughout the full three year journey towards the development of the **Responsibility Navigator**. This methodological approach of fully integrating robust scientific research with stakeholder engagement provides an exemplar of how to empirically research RRI in-the-making.

We have identified a number of important lessons and implications for RRI policy and programme development within a changing relationship between science and society:

- Responsibility in Research and Innovation is shown to be a historically unfolding, context-specific, emergent process. From this observation, now validated through empirical research, we offer the concept **RRI-in-the-Making**. It is important that policy makers at the European and Member state levels and within individual organisations work with this reality, and that they adjust and adapt the spirit of responsible research and innovation to their own circumstances, mobilizing bottom-up inclusive processes in the spirit of **RRI-in-the-Making**.
- The interpretation of what it means to be responsible in Research and Innovation (R&I) differs from context to context, presenting a landscape of variety, from the bottom up. Furthermore, the actors themselves are best placed to determine this content through intra- and inter-organisational collective negotiations and action. We caution against top-down prescription of what the focal elements of responsibility should be. Gender equality, science education and open access may be important considerations for some actors but not for others, who may have other pressing societal and justice concerns that they wish to improve and transform. Genuine bottom-up inclusive processes will help actors to uncover and formalize what these priorities are. On the contrary, to fix the normative content of RRI risks it becoming a bureaucratic tick-box exercise, an example of **responsibility-wash** where the ambition of RRI remains on the organizational surface and does not become **deeply institutionalized**.
- Across Europe, and between different actor groups, there is an uneven distribution of the awareness and relevance of RRI. The most developed countries in RRI terms are in North and West Europe (UK, the Netherlands and Scandinavia). Here, in fact, national policies are already well advanced, for example, within Research Councils. A blanket top-down policy will not sit well with this reality. However, support for networking activities to practically spread and exchange experience on the design and implementation of RRI, according to different actor groups and R&I situations, would be a useful policy contribution at the European level to address this unevenness. East and southern European countries would need support in terms of additional resources to make decisions and capacity-build their own RRI, relevant to their current and anticipated societal, technological, and economic context-dependent future.
- The small but emerging corpus of social-science authored RRI literature shows remarkable convergence towards three core themes which provide a common and generic heartland to RRI. They are i) a new form of (participatory/inclusive) governance in the relationship between science and society; ii) an objective focus on pressing societal problems (grand challenges); and iii) an anticipative futures oriented perspective. These three themes provide a common generic core, from which adapted normative content can emerge, case by case and context by context.
- The empirical research confirmed again and again that actors operate within structural and incentive constraints of political economy or wider organizational culture which condition their room for manoeuvre in terms of realising transformative change, both emphasizing speed and quantity over careful and inclusive deliberation. European and national policy makers have a significant role to play in influencing these conditions if the ambition of RRI is to become a practical reality.

Significantly, RES-AGorA has provided a suite of practical facilitation and reflection tools for stakeholders. The case studies, transversal governance lessons, the database available to practitioners to analyse country and organization level responses to RRI, and the practical hands-on facilitating tools the **Responsibility Navigator** and the **Co-construction Method** are all now available to assist policy makers and practitioners within organisations to help them to make concrete progress on the practical implementation of Responsibility in Research and Innovation.

The Policy Note #1 will be followed by two further notes:

- Policy Note #2 [Navigating towards responsible research and innovation](#)
- Policy Note #3 **Res-AGorA Outputs and Outcomes: Bringing it all together forthcoming**

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While every caution has been taken to represent the views of the interviewees and participants, the final representation remains the responsibility of the authors. The views and opinions expressed in this Policy-Note may not be taken as official views of the Res-AGorA nor of the external participants.

The Res-AGorA book is forthcoming and will be for download from the Res-AGorA website.

Visit the Res-AGorA website: <http://www.res-agera.eu/>

See the Res-AGorA video: [Potentials and barriers of RRI](#)

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