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PERSPECTIVE



The clothes of the emperor. An essay on RRI in and around Brussels

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ABSTRACT

In its current Framework Programme for Research and Innovation, Horizon 2020, the European Commission identified Responsible Research and Innovation (RRI) as a cross-cutting issue. The responsibility for RRI as a cross-cutting issue lies with the subprogramme Science with and for Society (SwafS). A recurrent theme in the SwafS Expert Advisory Group meetings was the lack of clarity about what RRI is supposed to be. This is an entrance point into a broader reflection on RRI discourse being like the new clothes of the emperor – or perhaps there is not even an emperor (yet). What is happening in and around RRI can be interpreted as conferring reality on this emperor (RRI) by clothing him.

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Horizon 2020; European Commission; Responsible Research and Innovation; projected reality

In its current Framework Programme for Research and Innovation, Horizon 2020, the European Commission identified Responsible Research and Innovation (RRI) as a cross-cutting issue (see Appendix 1 for the most recent description on the Commission's website). This has drawn both scholarly attention (fuelled by project funding from the European Commission), and references from scientific organizations when they explore possibilities to address versions of RRI. When I say 'Brussels', as in my title, I follow a common way of talking to refer to the European Commission and its services, and the activities around them, in this case in particular the Framework Programme Horizon 2020.

I have been involved in the activities in 'Brussels' in an Expert Advisory Group (EAG) for the sub-programme Science with and for Society (SwafS), as chair from the start (Spring 2014 to end of 2015), and, since then as vice-chair (the rules for Horizon 2020 do not allow chairs to continue for longer than two years). The responsibility for RRI as a cross-cutting issue in Horizon 2020 lies with this sub-programme SwafS. When I was proposed as chair, I was a bit doubtful because RRI appeared to be an umbrella term covering a number of themes (originally called 'keys') which were not clearly related to RRI (see Appendix 1, on implementation). I had written on RRI myself, drawing attention to its apparently open-ended character by discussing the various levels at which it was played out (Fisher and Rip 2013), and how it could be seen as an attempt at social innovation (Rip 2014a).

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This doubt was reinforced when a recurrent theme in the EAG meetings was the complaint of its members that it was unclear to them what RRI was supposed to be.¹ These comments eventually led me (as chair) to write a short note on RRI and how we could address it. The note was circulated among the members of the EAG in January 2015; it is reproduced in Appendix 2, an exhibit as it were for the case about RRI I am going to make in this essay.

When I mentioned this to colleagues, it struck me (and them) as curious. There is an EAG, advising on SwafS and RRI, but it does not know what RRI is. How can it then do its job, even if its job is quite limited?² It is not my intention in this essay to unravel the convolutions of the Brussels bureaucracy. I want to use this happening to ask a question about RRI that needs to be addressed: is the RRI discourse more than a matter of the emperor's new clothes?

One might actually question whether there is an emperor at all. But then, as the famous Thomas theorem has it, 'If men define situations as real, they are real in their consequences'.³ For our case of RRI, the appropriate formulation might be: 'Even if an entity is not real, the fact that it is a topic of discourse and interaction may make it real over time'. I will develop this point in three steps, mobilizing relevant literatures and my experiences in and around 'Brussels'.

A diagnosis of the situation, in three steps

The first step is the observation that RRI being on the agenda is a part of larger developments.⁴ Also, its emergence under several cognate terms like 'responsible development' as in the case of nanotechnology (Fisher and Rip 2013) has antecedents, as in the discussion of, and movements about, responsibility of scientists, for example around the *Bulletin of Atomic Scientists* (established in 1945 in response to the atomic bomb), and in the 1960s, about links of science with the military, and emerging environmental issues.

A further type of dynamic is visible in the way some companies and some government agencies are interested in responsible innovation, even if this transgresses their traditional role and remit. The driver here can be characterized as a wish for legitimacy with respect to relevant audiences. This can be positioned as a need for a social licence to operate (Hall and Lacey 2015; Rip 2014a) for private corporations, but also for government agencies, even if their remit is different. Such a driver can be internalized and in that sense be authentic, or it can be a strategic move to create legitimacy. Actually, it can be both, as with the Codes of Conduct for Nanotechnology that have been proposed, including one on the website of a chemical company, BASF. Insofar as there is a move for firms to take greater accountability for their own actions, there is a shift away from 'business as usual'. The net effect (if this accountability is taken up) would be a shift in the division of moral labour (Rip 2014a; Rip, forthcoming).

Actually, a shift in organization of moral labour is also implied in the scholarly definitions of, and policy documents about,⁵ RRI which envision reflexive institutional transformations towards shared forward-looking responsibility for innovation as a complex, dynamic and collective process (Owen, Bessant, and Heintz 2013). Such institutional transformations are visible in a few cases, but are mainly a vision at the moment, and it will take time for them to materialize, if they ever do. Still, they drive debate and activities, and in that sense can be treated as contributing to the reality of RRI. In any case, we see

第一步是观察到，将RRI（负责任研究与创新）纳入议程是更大范围发展的组成部分

另一种动态可以体现在一些公司和政府机构对负责任创新的兴趣上，即使这超越了它们传统的角色和职责范围。这种动力可以被描述为一种针对相关受众寻求合法性的需求。这可以被定位为获得“社会运营许可”

适用于私营公司，也适用于政府机构，

它可以是两者的结合

anticipations on such possibilities which can interact and reinforce one another so as to eventually create a more stable, and in some sense better situation – also for RRI.

Of course, reflexive institutional changes are a broader phenomenon. For technology assessment, with its more than 40 years of institutionalized history, I have argued that its evolution and possible futures have to be seen against such a broad backdrop (Rip 2011). This observation then links up with overall scholarly diagnoses of contemporary society as ‘late modernity’, ‘post-industrial society’, and showing dynamics of ‘reflexive modernization’ (Beck 1992; Beck, Bonß, and Lau 2003; Beck, Giddens, and Lash 1994). The promise articulated in these notions should be tempered, however, by considering how actors need to acquire and maintain a social licence to operate, and how this is linked to practices of neo-liberalism which have become pervasive over the last few decades.

Thus, the present interest in the open-ended idea of RRI can be understood as RRI being an occasion for a number of threads of development and of challenges and debates coming together under what is essentially a blanket term. In providing many things to many actors, RRI offers a space where further developments are explored and experienced.⁶ Through such interactions and occasional boundary work, this space becomes furbished, further articulated and perhaps settled (stabilized),⁷ with the label RRI holding in place a patchwork of interacting dynamics.

The second step in my diagnosis is that in addition to these background dynamics, there is also an identifiable start of RRI as a label. Since 2009, and particularly since 2011, the term, and the acronym, RRI has quickly ballooned and become fashionable, with its own commentators and observers (this has been traced in detail by Tancoigne, Randles, and Joly [2014]; and by de Saille [2015]). Thus, it might be a passing fashion, but even then it will leave residues, when it is taken up in research funding, research programmes and research performing organizations (cf. Fisher and Rip [2013] on the multi-level nature of the developments).

What happens is that RRI offers interesting opportunities for actors to take up, exactly because of its open-ended nature. This is also the thrust of the Chair’s note to EAG SwaFS (Appendix 2): select from the current spectrum of characterizations of RRI so as to exploit opportunities to do a good job. Characterizations of RRI, and more broadly, the web of understandings around it, with multiple inputs, should thus be seen and evaluated in the light of the opportunities they create (or do not) and the capacities they encourage (or discourage), rather than how far they conform to one or another characterization of what RRI ‘is’. When this happens, and the opportunities taken up get institutionalized, there will be residues, whether they are still labelled RRI or not.

This consideration of fashions and residues leads to the third step in the diagnosis: what is visible already at the moment. There are RRI dynamics in ‘Brussels’. Staff and observers trace the ups and downs of the concept, monitor what is happening at the top level and in interactions with Member States, and speculate whether RRI might disappear again, or be reduced to a background reference. In its present instantiation, RRI is said to consist of five (previously six)⁸ keys: gender, ethics, open science, education to science, engagement of citizens and civil society in research and innovation activities (see Appendix 1, especially under ‘implementation’). As the EAG Chair’s note intimates, these RRI keys have more to do with the bureaucracy of maintaining SwaFS/RRI as a cross-cutting theme than with the conceptual foundations of RRI (for example, as articulated in Stilgoe, Owen, and

说白了和UX一样
还没定好 行业也
迷迷糊糊的

RRI作为一个宽
泛术语, 为多种
发展线索、挑战
和争论提供了交
汇的平台。对许
多行为者而言,
RRI提供了一个
可以探索和经历
进一步发展的空
间。通过这样的
互动以及偶尔的
边界工作, 这个
空间得以完善、
进一步阐释, 并
可能趋于稳定
(被“固定”),
使得带有RRI标
签的这一块“动态
交互的拼图”得以
维系

开放性本质使其为各行者提供了有趣的机遇

性别、伦理、开放科学、科学教育, 以及公民和民间社会在研究与创新活动中的参与

Macnaghten [2013]). A recent development in the bureaucracy in ‘Brussels’ may strike at the heart of the fashion of RRI. When in 2015 the new Commissioner Carlos Moedas (for Research and Innovation) came in, he introduced his own approach, **“三个O”方法：开放创新、开放科学、开放世界** the three Os: Open innovation, Open science, Open to the world.⁹ One effect that is visible is that the Advisory Group Swafs/RRI has to take it into account, and is now asked to advise on a new fashionable concept, ‘citizen science’, which has diverging and somewhat contested interpretations.

Parallel to the ‘Brussels’ developments, there are also RRI dynamics at the level of research performing and research funding organizations, which by now include some concrete practices (cf. Fisher and Rip [2013] on multi-level dynamics; Rodríguez, Fisher, and Schuurbiers [2013] on research solicitation trends). There are links with the ‘Brussels’ dynamics through organizations referring to Horizon 2020’s cross-cutting issue, and European events formulating challenges for organizations. Notable here was a big conference held under the auspices of the Italian Presidency (of the European Union) in November 2014. It produced the so-called Rome Declaration, reproduced in Appendix 3 as another exhibit, because it was the first time organizations were addressed in terms of what they should do, and the Declaration was discussed and more or less approved in a number of subsequent European meetings. These meso-level dynamics are important because they lead to some institutional embedding, independent of what the position of RRI is on the formal agenda in ‘Brussels’.

A further part of the landscape are the scholarly activities addressing RRI. Interestingly, scholars are being funded to study and observe RRI even though it is not ‘real yet’ – which has the effect of making it more real, at least as an academic topic. Related to this, and reminiscent of the curious situation of the EAG we started with, we observe that sometimes, scholars are being asked, or take such initiatives themselves, to deliver professionalized training in RRI for research actors and firms while at the same time operating under an open-ended understanding of what RRI is. Also, we observe a distance between scholarly articulations of the foundational issues that underlie RRI and the present instantiation of RRI at the European Commission with the help of the five keys. There is a lack of interaction between the scholarly base and the current RRI work programme, partly of course because of the difference in timing, with insights becoming available only after a new work programme has to be specified.

在没有清晰定义RRI“是什么”的情况下就工作计划提供建议的奇怪情形，确实表明RRI可能

是一位没有穿衣服的皇帝。甚至可能根本没有皇帝存在，仅仅是一个时尚的标签

The future of RRI in Horizon 2020 (and after) is not assured, even if there are definitely opportunities, and the overall context may be favourable in spite of difficulties within the European Commission’s bureaucracy. The curious situation of the Swafs/RRI EAG **advising on the work programme without having a clear idea what RRI ‘is’ indeed suggests that RRI may be an emperor without clothes, or that there may not even be an emperor at all, only a fashionable label.**¹⁰ Still, there are attempts to clothe the emperor – including the EAG Chair’s note. Clothing the emperor makes him more real.¹¹

If the clothes help construct the emperor, then EAGs but also scholars and organizations are co-responsible for the construct. Latour, in *Reassembling the Social* (2005), has claimed that social scientists should not help actors in their attempts to confer reality.¹² But social scientists cannot avoid doing so, and had better be reflexive about

it. This is of course a long-standing issue, and has been debated, also in the world of science and technology studies (STS) (e.g. Webster 2007, and comments on his essay).

One immediate point is that RRI, in Brussels and in the Member States, is a source of financial and symbolic resources for social scientists and humanities scholars (at the moment, in particular ethicists). Thus, they have an interest in assuring its future (or have to find other sources of financing). This is legitimate; social science and humanities research require funding. But it should not lead to a neglect of the basic question about what sort of path is emerging for RRI, with what kind of path dependencies (in Rip 2014a I explored this question). In other words, what kind of emperor is being constructed. This basic reflexive question can be raised in different ways, for instance by undermining received opinions. I actually did so when querying whether the R of responsible in RRI is actually useful, and another term might be better, like ‘inclusive innovation’.¹³

Definitely helpful will be to not see institutional change, by now a key element of RRI in the ‘Brussels’ documents, and visible in a number of places elsewhere, as implementation of an authoritative version of RRI. That would only lead to struggles about the ‘right’ version to start with. **Instead, RRI functions more as a boundary object: weakly structured overall, but strongly structured in its specific places/sectors/manifestations** (Star and Griesemer 1989). A clear example is how national level RRI programmes like the UK Engineering and Physical Sciences Research Council (EPSRC’s) anticipate, reflect, engage and act framework (Owen 2014) and the Dutch Maatschappelijk Verantwoord Innoveren (MVI) programme are relatively explicit and specific, because they are closer to actual research and innovation where RRI can be implemented.¹⁴

Research funding organizations, now targeted to do something (for example in the Rome Declaration (see Appendix 3)), are not the only sites where the emperor becomes clothed. Also companies, by themselves and as collectives, can and do occasionally offer to move in the direction of RRI for a mix of reasons, providing further clothes to the emperor. Recently, Michelin, the world’s largest buyer of natural rubber, announced a new zero-deforestation policy, setting the bar for the rest of the industry. Its goal is to produce rubber responsibly.¹⁵ Another example, where one can also see real-life struggles, is the Round Table on Responsible Soy, which offers certification of soy production practices to those firms who apply and satisfy the criteria.¹⁶ Members of the Round Table are Monsanto, Syngenta, Cargill, Nidera, BP, Shell (which are all interested parties), but also Wereldnatuurfonds and Solidaridad. One could applaud this as an action of ‘good firms’, but at least Monsanto’s record is not without blemishes. Critical societal groups have looked into the criteria for certification, and labelled them, at least in part, as ‘greenwash’ (cf. the concerns of de Hoop, Pols, and Romijn [2016]). And they have been alerting various actors (organizations) like supermarkets to what they see as problematic with the certification.

All this is possible because the term ‘responsible’ allows various interpretations and specifications (see further Rip, forthcoming). The struggle here is about social licence to operate, which is sought by the Round Table, and contested by some critical societal groups. There is no easy resolution.

Whatever happens, in this example of the Round Table on Responsible Soy, as well as in my other examples, it provides clothes for the emperor, as long as the reference to RRI is visible, directly or indirectly. The eventual garb will be a patchwork, and some re-stitching

相反，RRI更多地作为一种边界对象运作：总体上结构松散，但在其特定领域/部门/表现形式中具有很强的结构性

might be done. Or maybe some unstitching, as when RRI comes under fire in Brussels. So, constructing emperors happens, with many actors collaborating, intentionally and unintentionally. The outcome may well be different from original intentions of some core groups, let alone social scientists and humanities scholars mixed in the *melée*. Their special task might be to make the construction more reflexive, or at least, to introduce reflexive moments. This is what I set out to do in this essay.

Notes

1. The EAG is special in Horizon 2020 because it is made up of so-called experts (eight in total) as well as members of EAGs of each of the other parts of Horizon 2020 (20 in total, not necessarily experts, but interested in SwafS/RRI), to reflect the cross-cutting nature of RRI in Horizon 2020. The complaints about the unclarity of RRI came from the experts as well as the members from the other EAGs.
2. The EAG provides inputs in the work of the Commission's Services to create a strategic vision for Horizon 2020 every two years, and to write up a work programme indicating the calls for proposals that will go out. The Commission's staff has inputs as well, and they take in advice from ad hoc consultations, and from Program Committees having representatives of Member States (of the European Union) as members.
3. This particular, and often quoted, formulation appears in Thomas and Thomas (1928, 572). The theorem has the phenomenon of self-fulfilling prophecies as one, sometimes dramatic, example (Merton 1948). The origin and citation history of the theorem is discussed at length in Merton (1995).
4. One interesting example is that the term 'responsible' is now used quite easily, up to the notion of 'responsible tourism'. A recent example is the advertisement of the World Wildlife Fund on coral reefs and protected areas (on the back cover of *Time Magazine*, 11–18 July 2016), where a contrast is made with 'careless tourism'. Here, 'responsible' is used as in the admonition 'be responsible', meaning that you should act like an adult, do what is appropriate and do it on your own accord – so showing that you are adult. (For a detailed analysis of the variety of evolving meanings of 'responsible' and 'responsibility', see Rip [1981].)
5. Some examples are quoted in Appendix 2.
6. Tancoigne, Randles, and Joly (2014), in their analysis of a corpus of texts on responsible innovation, call it a 'discursive space'.
7. Rip and Joly (2012), in their report to EU-SPRI Forum, develop this notion of 'spaces' in science, technology and innovation policy, that will be furnished and stabilize, using EU Framework programs like BRITE and EURAM in the early 1980s as one of their examples (drawing on earlier studies by Edler).
8. The sixth key, 'governance' – a central concept for RRI in the scholarly literature, as well in some of the EU-funded projects – was deleted, reportedly because it was difficult to apply in the work programmes of Horizon 2020.
9. He did so in his so-called 'landmark' speech in June 2015, http://europa.eu/rapid/press-release_SPEECH-15-5243_en.htm. There is now also a lavishly produced booklet produced by the Commission, 'Open Innovation, Open Science, Open to the World – A Vision for Europe' (2016). <http://bookshop.europa.eu/en/open-innovation-open-science-open-to-the-world-pbKI0416263/>.
10. I have used RRI as one example of a fashion in science, comparing it to 'Big Science', 'Mode 2 Knowledge Production', and more recently, 'Grand Challenges', fashionable terms with some substance (Rip 2014b). In all these cases, there are residues after the original fashion has passed.
11. This way of putting the point resonates with Latour's argument about the weakness of the 'naked truth' ('dangerously close to nothingness' and in need of allies of different kinds). 'I prefer truth warmly clothed, incarnated and strong' (Latour 1989, 115).

12. Latour (2005, 23, 30): ‘The task of defining and ordering the social should be left to the actors themselves, not taken up by the analyst’. ‘ANT simply doesn’t take as its job to stabilize the social on behalf of the people it studies; such a duty is to be left entirely to the ‘actors themselves’ (...).’ Of course, Latour can save himself by saying that an analyst who starts ‘defining and ordering’ becomes an actor, but that would undermine the whole edifice of Actor-Network Theory. By keeping the analyst in separate compound, a reserve would be created. While there cannot be a ‘nowhere’ position from which the analyst does his analysis and communicates with other ‘nowhere’ people. Nor can followers of actors (stalkers?) remain invisible.
13. I am on the record as proposing this, if only to raise questions about the emperor and his clothes, during one of the plenary session of the Go4 Joint Final Conference, Brussels, 14–15 January 2016. The Conference was organized to show and discuss the results of four projects on RRI, funded through the Science-in-Society Program of the European Commission’s 7th Framework Program. I have developed this point in my keynote address, Challenges to RRI, to the Synenergine Forum (Synthetic Biology – visions of the future), Amsterdam, 24 June 2016, organized by the Dutch Rathenau Institute for the European Commission funded (7th Framework Program) Mobilisation and Mutual Learning Action Project Synenergine.
14. This can be a double-edged sword, though, as is visible for the Dutch MVI program where the strong link with the various Ministries makes it difficult to have projects addressing foundational issues.
15. See the op-ed piece by Carter Roberts, President of the World Wild Life Fund, *Time Magazine*, 25 July 2016, 21. The quote continues:

Its goal is to produce rubber responsibly, working in places like Indonesia’s Thirty Hills region to design wildlife-friendly plantations that offer sustainable income for local communities. The move comes on the heels of the U.N.’s 2014 Climate Summit in New York City, where 53 of the world’s largest companies – sans the rubber industry – pledged to eliminate deforestation from their supply chains.
16. The Round Table appears to be active and relatively successful (<http://www.responsiblesoy.org/en/>). For this example, I draw on Hanssen and De Vriend (2011), who did an interesting study (in Dutch) on the role of social media around biotechnology.
17. I use the term ‘characterization’ rather than ‘definition’ to avoid the suggestion that there is a formal definition.
18. A description of the six dimensions of RRI can be found on http://ec.europa.eu/research/science-society/document_library/pdf_06/responsible-research-and-innovation-leaflet_en.pdf.

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Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributor

Arie Rip is Professor of Philosophy of Science and Technology in the School of Management and Governance of the University of Twente. He is a key figure in the Centre for Studies of Science, Technology and Society. The Centre comprises studies of new technology and users, long-term developments of technology and the consumer society, technology assessment, in particular

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Appendices

Appendix 1

RRI on Commission's website

<http://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation>, downloaded 24 October 2016

Responsible Research and Innovation (RRI)

Responsible research and innovation is an approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation, with the aim to foster the design of inclusive and sustainable research and innovation.



RRI implies that societal actors (researchers, citizens, policy makers, business, third sector organizations, etc.) work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of society.

In practice, RRI is implemented as a package that includes multi-actor and public engagement in research and innovation, enabling easier access to scientific results, the take up of gender and ethics in the research and innovation content and process, and formal and informal science education.

Implementing RRI in Horizon 2020

RRI is key action of the ‘Science with and for Society’ objective. RRI actions will be promoted via ‘Science with and for Society’ objective via:

- actions on thematic elements of RRI (public engagement, open access, gender, ethics, science education), and
- via integrated actions that for example promote institutional change, to foster the uptake of the RRI approach by stakeholders and institutions.

RRI is furthermore a ‘cross-cutting issue’ in Horizon 2020, which will be promoted throughout Horizon 2020 objectives. In many cases, inter- and transdisciplinary solutions will have to be developed, which cut across the multiple specific objectives of Horizon 2020. Within the specific objectives of programme, actions can focus on thematic elements of RRI, as well as on more integrated approaches to promote RRI uptake.

Appendix 2

About RRI

A note for EAG SwafS, by Arie Rip (Chair), circulated 15 January 2015

Introduction: why this note?

In our earlier meetings, there were comments about the unclarity of the notion of RRI, and a request to create some clarity. This note offers an overview; the selections and comments are the author’s personal responsibility.

Different characterizations¹⁷ of RRI circulate, that is one source of unclarity about what RRI ‘is’. I put quotes around ‘is’, because there may not be something well-defined to be called RRI, or at least not yet. Cf. Rip (2014a) who speaks of RRI being a social innovation, and therefore necessarily still unclear. The implication is that we should not focus on discussing what RRI is in general, but which characterization of RRI we can use to allow us to do a good job.

In characterizing RRI three entrance points can be distinguished: one emphasizing process (e.g. being mutually responsive), another emphasizing outcomes (e.g. working towards Grand Challenges), and a third starting by articulating what is ‘responsible’ (as happens in the scholarly literature, often with emphasis on prospective responsibility). In addition, there are notions and activities which can be seen as versions of RRI without the term being used.

Actually, there was a predecessor to RRI in the domain of nanoscience and nanotechnologies: responsible development (of nanotechnology). In the 2006 Midterm Review of the US National Nanotechnology Initiative, a definition was attempted:

Responsible development of nanotechnology can be characterized as the balancing of efforts to maximize the technology’s positive contributions and minimize its negative consequences. (...) It implies a commitment to develop and use technology to help meet the most pressing human and societal needs, while making every reasonable effort to anticipate and mitigate adverse implications or unintended consequences.

This, by the way, is an example of articulation of ‘responsible’, and with the help of a consequentialist ethics perspective.

According to Tancoigne, Randles, and Joly (2014), who did a bibliometric search, the dedicated use of the term RRI in the literature started with a few isolated occurrences in 2008, and became common in 2011 (indications are the 2011 reports by René Von Schomberg and Hilary Sutcliffe). There was also the 16–17 May 2011 workshop organized by DG Research and Innovation, collecting a variety of European actors to brainstorm about possible meanings and articulations of RRI. Later in 2011, it was agreed that RRI would be a cross-cutting theme in Horizon 2020.

Clearly, while the issues involved are of longer standing, the actual use of the notion of RRI is recent. It spread quickly, and the easy use of the acronym RRI indicates its becoming established discursively.

RRI at the Commission

In the documents of (or linked to) the Commission, there are two main streams of characterizations of RRI, for brevity called the Von Schomberg stream and the SiS stream. By now, there is also a formulation used in the report of the meeting of the Competitiveness Council in December 2014 (which appears to follow the opening text in the Rome Declaration) which may become a third stream.

A characterization drawn up by Von Schomberg, in consultation with his colleagues in the Commission, and often quoted in the literature, is primarily oriented towards process:

A transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society). (Von Schomberg 2011)

In later versions, there is also reference to European values, and European Union treaty texts. For example:

Responsible Research and Innovation means that societal actors work together during the whole research and innovation process in order to better align both the process and its outcomes, with the values, needs and expectations of European society. (Directorate-General for Research and Innovation 2012)

The SiS stream originally emphasized six so-called keys, derived from the SiS Programme in FP7, to structure the practical work of running a programme. This was quite visible in 2012, see EU Commissioner for Research, Innovation, and Science Máire Geoghegan-Quinn in her opening speech for the EU Presidency Conference on Science in Dialogue, towards a European model for responsible research and innovation, Odense, 23 April 2012: ‘Horizon 2020 will support the six keys to responsible research and innovation ... and will highlight responsible research and societal engagement throughout the programme’ (quoted from the official text handed out at the conference). Geoghegan-Quinn M. (2012). http://ec.europa.eu/commission_2010-2014/geoghegan-quinn/headlines/speeches/2012/documents/20120423-dialogue-conference-speech_en.pdf.

The keys are visible in the Workprogramme 2014–2015 and in the brochure about RRI. In our Strategic Vision, we summarized it as the ‘RRI package’:

RRI is a package implementing five different and complementary agendas within Research and Innovation: gender, ethics, open science, education to science, multi-actor engagement and in particular the engagement of citizens and civil society in research and innovation activities.

In our Strategic Vision, we quote various characterizations, some of them combining elements from both main streams of characterization:

Horizon 2020 Specific Programme (in its Annex I-b) underlines the importance of the complementarities and cross-cutting issues between the various parts of Horizon 2020, notably for Science and Society: ‘The relationship and interaction between science and society as well as the promotion of responsible research and innovation, science education, science communication and culture shall be deepened and public confidence in science and innovation reinforced by activities of Horizon 2020 favouring the informed engagement of and a dialogue with citizens and civil society in research and innovation’.

And more explicitly:

RRI is an approach that allows all societal actors (researchers, citizens, policy makers, business, third sector organisations etc.) to work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of European society. RRI focuses on the participation of citizens and civil society organisations in research and innovation, the gender and ethical dimensions, the free accessibility to scientific knowledge and formal and informal science education.

The latest characterization of RRI, in the report of the meeting of the Competitiveness Council in December 2014, appears to link up with the text of the Horizon 2020 Specific Programme:

Responsible research and innovation is a process for better aligning research and innovation with the values, needs and expectations of society. It implies close cooperation between all stakeholders in various strands comprising: science education, definition of research agendas, access to research results and the application of new knowledge in full compliance with gender and ethics considerations.

All these characterizations have been formulated in discussion/negotiation with relevant parties, and are themselves input in subsequent discussion and negotiation. For example, if a report of a meeting of the Competitiveness Council contains a characterization (for whatever reason), as it does now, it can then be quoted as endorsed by the Competitiveness Council.

As EAG, we can choose for one of the existing more or less authoritative characterizations, or perhaps select and recombine. For SwafS, we can work with our own Strategic Vision, but that is not sufficient for RRI, whatever RRI may turn out to be eventually. Actually, last year we circumvented the problem of characterization by exhorting the other parts of Horizon 2020 to pay attention to RRI issues by developing their own diagnosis applicable to their domain, and promised to help them.

One difficulty in becoming more concrete is that the characterizations are not formulated as problem-challenge/solution sequences. Instead, they are about desirable directions to go. Actually, the Commission's Unit B7, responsible for SwafS, has tried to come up with problem-challenge sequences in earlier presentations, in particular:

- Betting on 'technology acceptance' by way of good marketing only, is no longer a valid option
- Diversity in Research and Innovation is a must for achieving greater creativity and promoting better results
- Early and continuous iterative engagement of society in Research and Innovation is key to innovation adequacy and acceptability

One can see how these diagnoses lead to items in the RRI package. They link up to innovation enactors' concerns about acceptance and better results.

Characterizations of RRI as part of background analysis and diagnosis by experts/analysts

By now, there is something of a secondary industry of meetings, projects and publications about RRI; there is even a new scholarly journal, the *Journal of Responsible Innovation*. A good collection (even if it has a bit of an Anglosaxon bias) is Owen, Bessant, and Heintz (2013).

From the range of background analyses I select two which have interesting takes on responsible/responsibility, and offer relevant empirical considerations (copies of the papers are attached to this note).

- (1) Rip (2014a). Rip emphasizes that responsibility is distributed and to some extent institutionalized, and part of evolving divisions of moral labour. RRI is a way of opening up existing divisions of moral labour, and negotiating about new divisions of labour. He offers an analysis of the paths (and thus reductions of complexity) that appear to occur.

- (2) Stilgoe, Owen, and Macnaghten (2013). Stilgoe et al. discuss various ways to articulate responsible innovation, and come up with a broad definition of prospective responsibility: 'Responsible innovation means taking care of the future through collective stewardship of science and innovation in the present'. This is a contrast with retrospective responsibility which focuses on accountability and liability. They offer a case study of the UK EPSRC's framework for responsible innovation, as applied to a geo-engineering project (a stage-gate analysis).

Clearly, these are background considerations. We can profit from them, occasionally when formulating items in the calls for 2016–2017, and generally to position what we are doing in broader frameworks.

Other relevant activities and insights, at different levels

There is a variety of discourses and practices, whether explicitly referring to RRI or not.

Technology developers and innovation enactors, and in their own way also regulators, think in terms of their needing a 'social licence to operate'. For nanotechnology, this has led to formulations of more or less explicit codes of conduct. Funding agencies feel similar pressures, although their 'operation' is different from that of firms. The UK EPSRC is a clear example (see Stilgoe, Owen, and Macnaghten 2013), the Netherlands (and for some time, Norway) have funding programmes to contribute to RRI.

At the level of individual scientists and research performing institutions, there has been a social responsibility of science movement, definitely since 1945 (cf. Bulletin of the Atomic Scientists), and since the late 1960s/early 1970s the Science, Technology and Society (STS) movement. The two movements overlap, but have different styles, the former being more into moral responsibility, the latter more into critical action. Scholars/experts can be associated with these movements.

Recently, there are linkages (co-alescences) between critical societal groups (some more constructive than others), NGOs etc. which see themselves as part of a broad movement about science and technology and its embedding in society. Cf. the recent (January 2015) conference in Paris on re-inventing the alliance between science and society.

SwafS and RRI can link up with all these activities and their background positions. Concretely, we might support activities within the Member States, as we mention already in our Strategic Vision. We have to be careful, of course, to avoid alliances that would appear to be biased.

Conclusions?

A number of conclusions were mentioned already (printed in bold). In general, there appears to be an emphasis on process approaches, and on 'safe' outcomes like a reference to Grand Challenges or European Treaties. For the SwafS Workprogramme 2016–2017, we can draw upon this note for the calls aimed at understanding (knowledge base) and institutional change.

Appendix 3

Rome Declaration on RRI in Europe

https://ec.europa.eu/research/swafs/pdf/rome_declaration_RRI_final_21_November.pdf

RRI is the on-going process of aligning research and innovation to the values, needs and expectations of society.

Decisions in research and innovation must consider the principles on which the European Union is founded, that is, the respect of human dignity, freedom, democracy, equality, the rule of law and the respect of human rights, including the rights of persons belonging to minorities.

RRI requires that all stakeholders including civil society are responsive to each other and take shared responsibility for the processes and outcomes of research and innovation. This means working together in: science education; the definition of research agendas; the conduct of research; the access to research results; and the application of new knowledge in society- in full respect of gender equality, the gender dimension in research and ethics considerations.¹⁸

More than a decade of research and pilot activities on the interplay between science and society points to three main findings. First, we cannot achieve technology acceptance by way of good marketing. Second, diversity in research and innovation as well as the gender perspective is vital for enhancing creativity and improving scientific quality. And third, early and continuous engagement of all stakeholders is essential for sustainable, desirable and acceptable innovation. Hence, excellence today is about more than ground-breaking discoveries – it includes openness, responsibility and the co-production of knowledge.

The benefits of RRI go beyond alignment with society: it ensures that research and innovation deliver on the promise of smart, inclusive and sustainable solutions to our societal challenges; it engages new perspectives, new innovators and new talent from across our diverse European society, allowing to identify solutions which would otherwise go unnoticed; it builds trust between citizens, and public and private institutions in supporting research and innovation; and it reassures society about embracing innovative products and services; it assesses the risks and the way these risks should be managed.

European regions and countries are already engaged in this approach. Societal demands for ambitious environmental policies led to creative social and technological innovations such as fuel efficient vehicles, solar devices or mobility and recycling solutions based on sharing.

Therefore, we, the participants and organizers of the conference ‘Science, Innovation and Society: achieving Responsible Research and Innovation’ held in Rome on 19–21 November 2014 under the auspices of the Italian Presidency, consider it as our collective duty to further promote RRI in an integrated way.

We call on European Institutions, EU Member States and their R&I Funding and Performing Organisations, business and civil society to make RRI a central objective across all relevant policies and activities, including in shaping the European Research Area and the Innovation Union.

The present declaration builds on the 2009 Lund Declaration, which called for an emphasis on societal challenges, and on the 2013 Vilnius Declaration, which underlined that a resilient partnership with all relevant actors is required if research is to serve society.

We believe the conditions are now right for RRI to underpin European research and innovation endeavour and therefore call on all stakeholders to work together for inclusive and sustainable solutions to our societal challenges.

Call for action

We call on European Institutions, Member States, Regional Authorities and R&I Funding Organisations to:

Build capacity for RRI by:

- Promoting and securing resources for RRI activities at the national, regional and local level;
- Integrating RRI in the design and implementation of research and innovation programmes;
- Networking existing initiatives that support RRI knowhow, expertise and competence, within and between EU Member States and between sectors;
- Supporting global RRI initiatives in view of the global nature of our grand challenges.

Review and adapt metrics and narratives for research and innovation by:

- Monitoring the performance of R&I Funding and Performing Organisations with respect to RRI as well as the socio-economic impacts of RRI;
- Providing guidelines for the implementation and assessment of RRI;
- Setting and communicating a forward-looking vision of RRI.

We call on public and private R&I Performing Organisations to:

Implement institutional changes that foster RRI by:

- Reviewing their own procedures and practices in order to identify possible RRI barriers and opportunities at organization level;
- Creating experimental spaces to engage civil society actors in the research process as sources of knowledge and partners in innovation;
- Developing and implementing strategies and guidelines for the acknowledgment and promotion of RRI;
- Adapting curricula and developing trainings to foster awareness, know-how, expertise and competence of RRI;
- Including RRI criteria in the evaluation and assessment of research staff.