

Chapter 2

The Drama of Responsible Research and Innovation: The Ups and Downs of a Policy Concept



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Abstract This contribution addresses the question why Responsible Research and Innovation (RRI) is facing problems to succeed as concept for research and innovation policy in the European Commission, despite the EC’s 20 years of history of funding research activities and coordination and support actions that address science and society relations. Our analysis highlights four interrelated elements that contribute to the instability of RRI as policy concept, i.e. semantic, legal, financial and institutional fragility. We use Sabatier’s advocacy coalition approach (1998) to explain how these elements of fragility developed and how the ups and downs of RRI as policy concept played out. We identify three opposing advocacy coalitions with regards to RRI and analyze their belief systems and resources.

2.1 Introduction

The European Union (EU) has been emphasizing for more than two decades the importance of citizen involvement in policy making (Commission of the European Communities 2001). The call for stronger citizen involvement extended also to research and innovation (R & I) policies. As a consequence, since the late 1990s the European Commission (EC) has supported in its successive “Framework Programmes for Research and Technological Development” (FP) research-, innovation- and coordination activities that address the better alignment of science and society. The Commission promoted such activities already in FP5 (1998–2002) with the funding line “Ethical Legal and Social Aspects” (ELSA) of research (Zwart et al. 2014) and continued to do so between 2002 and 2006 in FP6 and from 2007 to 2013 in FP7 with the successive funding lines “Science in Society” and “Science

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and Society” (Owen et al. 2012). In the years from 2014 to 2020 the Commission operated in the FP Horizon 2020 (H2020) the funding line “Science in and with Society” (SwafS) and based its activities on the umbrella concept and cross cutting issue “Responsible Research and Innovation” (RRI). Despite this long tradition of funding activities to promote the alignment of science and society, the institutionalization of RRI in the EU is far from linear. On the contrary, in the current FP, Horizon Europe (HEU), which is planned to run from 2021 to 2028, the policy concept RRI is no longer mentioned as cross cutting issue and disappeared almost entirely from foundational legal texts (Meier and Byland 2020). Moreover, in contrast to H2020, a standalone programme for the promotion of RRI and a separate policy unit for its implementation ceased to exist.

In this chapter, we focus on the question why RRI struggled to become a widely accepted policy concept in EU R & I policies. Looking for answers we sketch the history of RRI in the EU R & I funding and explain the development of RRI by analyzing the conceptual, legal, financial and institutional status of RRI in the EC policy context. Outlining the essentials of Sabatier’s (1998) Advocacy Coalition Framework (ACF) relevant for our analysis we create a typology of three differing Advocacy Coalitions (AC). We analyse their composition, belief systems and resources to describe a fourfold fragility of RRI within the EC. We argue that the “Pro RRI” AC was divided and unable to establish RRI as a long-lasting policy concept and failed to prevail against the disapproval or indifference of competing ACs who either rejected RRI altogether or favored alternative concepts. We also describe a series of compromises the “Pro RRI” AC in the EC have struck to accommodate internal and external critics. At the end of the chapter, we briefly reflect on openings and potential strategies to rescue RRI as a formative and implementable policy concept within the EC funding framework.

For this contribution we mainly use peer reviewed publications, grey literature and policy documents on the history and development of the RRI concept. In this respect, we distinguish several strands of work. A substantial part of the literature and documents focuses on the genesis and development of RRI as an academic concept (e.g., Rip 2014; Felt 2018; Timmermans and Blok 2018; Owen and Pansera 2019a, b). In addition, there is literature on “de-facto-RRI” (e.g., Randles 2017). This concept indicates initiatives which sail under different flags than RRI – e.g., gender equality, bioethics, corporate social responsibility, (participatory) technology assessment – but cover overlapping territories. Another corpus of literature relates to predecessors of the SwafS programme (e.g., Zwart et al. 2014), the research projects they supported (European Commission 2020), the uptake of RRI in H2020 as cross cutting issue (Novitzky et al. 2020) and RRI policies and practices in EU Member States (Mejlgaard et al. 2019; Christensen et al. 2020). A small section of the literature deals with the question of how RRI was institutionalized as a policy concept; in other words, with the politicking and struggles in European bureaucracy (Rip 2014, 2016; Owen et al. 2012; Macq et al. 2020; Meier and Byland 2020; Strand and Spaapen 2021). For this article we combined the aforementioned strands of literature to better understand the challenges “institutional entrepreneurs” (Randles 2017: 16) encountered within and outside the EC when they tried to institutionalize RRI in the

European FP. We complement this literature with our reflections and experiences gained from participating in many RRI project since 2014.¹

2.2 Short History of RRI

Within the EC, the policy concept of RRI and its predecessors is a response to a legitimization crisis of R & I policy making in the aftermath of major public controversies about, e.g., genetically modified organisms and mad cow disease (Macq et al. 2020). First foundations for RRI as a concept were laid early in the millennium with the White Paper on European Governance (Commission of the European Communities 2001). This document called for a “scientific reference system” in order to support policy making by “structured and open networks” (ibid. 19) through participation and access to reliable information. The paper strongly advocated public participation in policy making and stated that the “[L]egitimacy [of the EU] today depends on involvement and participation” (ibid. 19). In 2001, the EC set up the Science and Society Action Plan (EC 2002), in which the connection between science and citizens was key and active participation was seen as two-way communication. This was meant to not only informing people, but also letting them actively take part and express their views. As a consequence, in 2002, the funding programme “Science and Society” (SaS) was introduced in the FP6.

In this line of reasoning, participation is key for policy making. In 2003, a report on governance within the EU emphasized the powerful role of citizen participation and how to include them in governance and in offering policy recommendations. The rationale was to strengthen the interface between science and policy making and encourage active participation of society at large in policy making (Banthien et al. 2003). It was not only the idea of a responsible R & I system, but there were general debates within the EU about changing governance and policy as well as the legal system towards increasing the rights of and creating more openness towards citizens. So, the needs of bringing research closer to society, understanding and shaping governance in a way that policy decisions are more connected to societal needs and to making research and the applications of science and technology more democratic and responsible, were the main attempts that constituted the basic ideas of RRI.

A step towards citizen inclusion in policy making was the Lisbon Treaty – signed in 2007 and entered into force in 2009 – which contained ideas of the aforementioned White Paper. Article 8 places citizen participation, engagement, transparency and involvement at the core of participatory democracy (Official Journal of the European Union 2007). These principles were integrated in FP7, in which the

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“Science and Society” programme was renamed to “Science in Society”. However, within the Commission these ideas were not met with undivided agreement. In 2010, the appointment of a new Director General in the Directorate General Research and Innovation (DG RTD) and pursuant changes led to marginalization of science and society activities. “The dedicated Science and Society Directorate was cut, the number of policy officers working on science-society issues was downsized to 40 staff members (...) and regrouped in a unit named “Ethics and Gender” (...): there was no longer a directorate or even a unit specifically dedicated to science-society issues. Finally, the Science in Society Programme was not renewed in the Commission’s proposal for Horizon 2020” (Macq et al. 2020).

The changeful history of the term RRI proper begins in this context as a “survival strategy” (ibid.) for science-society activities. One policy officer recalls the situation: “You have to remember that it all happened in a period of downsizing. (...) So, we had to refocus on our core objectives. (...) How was it possible to transform what we had learned in the Science-Society programme in a more politically relevant action? (...) In a day-long brainstorming meeting gathering in all the staff members, we happened to coin the expression RRI” (Macq et al. 2020: 502).

There were also meetings about RRI at the European Commission’s Directorate General (DG) Research in Brussels and at the French Embassy in London. There, experts from academia and policy tried to come to a common understanding of the concept (Owen et al. 2012) and René von Schomberg, a civil servant from DG Research, circulated a paper which captured his basic idea of RRI. It defined RRI as “transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on 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: 9).

The process of policy development for more democratic research and innovation was taken forward by Gilles Laroche, head of the “Science in Society” Funding Programme. He created a number of funding instruments to assist research and coordination on RRI in FP7 and established an expert group to advise the EC on issues of developing appropriate governance frameworks to mainstream RRI. He also sought an opinion from the European Group of Ethics, the expert group providing the Commission with high quality and independent opinion on ethical aspects of science and new technologies in connection with EU legislation or policies (Owen et al. 2012).

A statement that EU Commissioner Máire Geoghegan-Quinn made in 2012 at one of the follow-up meetings on Science in Society in Europe, marked the first tangible, high-level support for the concept of RRI (ibid.). She stated that “Research and innovation must respond to the needs and ambitions of society, reflect its values and be responsible [...] our duty as policy makers [is] to shape a governance framework that encourages responsible research and innovation” (Geoghegan-Quinn 2012, quoted in Timmermans 2021).

FP7 was already in operation and for the remaining period the EC was willing to fund a programme (a research and coordination action) on RRI (Owen et al. 2012).

The actors within the EC who promoted RRI were able to position RRI and its topics in H2020. RRI received a prominent place as a cross cutting issue in H2020 and a dedicated SwafS Programme with a separate administrative unit. Thus, SwafS was able to fund RRI activities, albeit with what a 2017 expert commission considered a “relatively low budget” (European Commission 2017: 173).

The SwafS programme pursued the overarching goal to stimulate the research on and application of an operative and mutually beneficial cooperation of science and society, thereby promoting an understanding of science that is aligned with the values, needs and expectations of society. At its core, it was based on the rationale that European societies’ ability to develop in a positive and sustainable way depends largely on their innovation capacity and ability to create and exploit knowledge in a socially inclusive and democratic manner. The SwafS programme was key for the conceptual development of RRI and raising awareness for RRI. One of its main aims was to help embed RRI as cross-cutting issue in H2020. As such, the SwafS programme and the EC’s interpretation of RRI as “five keys” of (1) gender equality, (2) public engagement, (3) science education, (4) open access/open data, (5) ethics governance are practically inseparable.

In November 2014, RRI as a policy concept reached its normative zenith in the EC with the “Rome Declaration on Responsible Research and Innovation in Europe”. In this document, the organizers and participants of the conference “Science, Innovation and Society: achieving Responsible Research and Innovation” called for action to promote RRI within European Institutions, Member States, regional authorities and research and innovation funding organizations. The idea was to build capacity for RRI, review and adapt metrics and narratives for research and innovation and implement institutional changes that foster RRI (European Commission 2014).

A major disruptive moment in the development of RRI happened in a June 2015 speech in Brussels when Carlos Moedas, the incoming EU Commissioner for R & I, set three new goals for EU R & I policy which he summarized as “Open Innovation, Open Science and Open to the World” (Moedas 2015). From this moment, RRI had to align with this new competing policy concept (Rip 2016), which shares commonalities with RRI but also important differences (Shelley-Egan et al. 2020).

As already mentioned, science and society activities continuously faced also opposition from within the Commission. The Commission’s proposal for H2020 originally did not include the concept of RRI. SwafS and RRI were only included after the European Parliament requested amendments of the FP (Macq et al. 2020). By 2014, “the policy winds inside DG RTD were again blowing away from and event against RRI” (Strand and Spaapen 2021: 6). Onlookers observe that “listening to policy-makers in Brussels, or reading the research policies at the entry into the Ninth framework programme for research and innovation (...), RRI seems to be a sinking ship, if not already at the bottom of the Atlantic Ocean” (ibid.: 9). Again, the Commissions’ proposal for the next FP, Horizon Europe, did not foresee a specific SwafS Programme. This time however, petitions (Sis.Net 2018) and contributions by advocates of science and society activities to official public consultations for Horizon Europe (Schoisswohl 2019; Pathway Declaration 2019) that called for

continued attention and funding of RRI were only duly noticed (European Commission 2019) but remained without much effect (Meier and Byland 2020).

So, why did RRI not emerge and continue as an influential policy concept, despite two decades of practice in addressing science-society interrelations with EC funding?

2.3 RRI as a Fragile Policy Concept

In this section we argue that RRI suffers from fragility as a policy concept in several dimensions, i.e., Conceptual, financial, legal and institutional. By fragility we mean that the actors championing RRI were not able to stabilize and sustain over the period of the 8th Framework Programme, Horizon 2020, (1) a clear and accepted definition of RRI, (2) the legal foundation necessary to fund a separate RRI programme, formerly called “Science with and for Society” (SwafS), as well as (3) the financial and (4) institutional resources they were able to secure in Horizon 2020.

2.3.1 Conceptual Fragility

In Table 2.1 we put together several subsequent definitions the European Commission used to explain the concept of RRI between the years 2011 and 2021. It shows that during that time the definition was in a constant flux and adapted to different circumstances.

Table 2.1 Selected definitions of RRI by the European Commission (2011–2021)

RRI is a “transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on 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: 9)

“Responsible research and innovation is a process for better aligning R & I 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” (Competitiveness Council 4-5 December 2014, quoted in European Commission 2016: 17)

“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. Responsible 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” (EC 2021)

Von Schomberg's initial RRI definition in 2011 highlights interaction with "societal actors" and, as policy process, indicates the partners in dialogue, i.e. societal actors and innovators. He explicates the goals of the dialogue as "(ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products" (72).

The definition from 2014 repeats the policy process-oriented character of RRI and the idea of aligning R & I with "values needs and expectations of society" (European Commission 2016). It stresses cooperation and adds specific areas, i.e. "science education, definition of research agendas, access to research results and the application of new knowledge in full compliance with gender and ethics considerations" (ibid.). These areas resemble the six keys of RRI. However, the number of keys does not remain stable and changes over time; it is reduced from six to five (Rip 2016), combining ethics and governance.

The 2021 RRI definition adds the ideas of anticipation and assessment of "potential implication and societal expectations with regard to research and innovation", advocated by academic researchers of RRI, to the concept, however by using language such as RRI being an "approach" that "implies" the alignment of research and innovation with "the values, needs and expectations of society" it blurs the line between the political expectation and policy implementation (cf. Novitzky et al. 2020). Instead of policy or policy principle it talks about RRI as "package" – a composite resembling the five keys – that cover multi-actor and public engagement, open access, gender equality, research ethics and integrity as well as scientific training and science education (EC 2021).

2.3.2 *Financial Fragility*

Current American President Joe Biden, making critical remarks on his political opponent's commitments in 2008, had quoted his father frequently saying: "Don't tell me what you value, show me your budget, and I'll tell you what you value" (Biden 2008). The same reference could be made of the normative commitments to creating a more responsible research and innovation policy in the European Commission in the Horizon Europe funding programme. The budget dedicated to programmes related to science society relationships has consistently increased since FP6. In F6 the "Science and Society" funding line was allocated 88 Mio Euro; in the following FP7, "Science and Society" was equipped with 280 Mio Euro. In H2020, the SwafS Programme had a budget of 462 Mio Euro (Meier and Byland 2020). However, the steady budgetary increase stopped with H2020. In Horizon Europe, funding for activities that relate to RRI activities have been reduced. The Funding Programme "Reforming and enhancing the EU Research and Innovation system" has a budget of altogether 400 Mio Euro, which will be distributed across 14 action lines (ibid.).

2.3.3 *Legal Fragility*

RRI as a funding line also turned out to be fragile in its legal foundation. In H2020, RRI was explicitly mentioned in the legal basis of the European FP. As already mentioned, RRI was implemented firstly through the establishment of a dedicated SwafS Programme and secondly, as a cross-cutting issue under Article 14 a, “RRI including gender”. In Horizon Europe, this is no longer the case. The new FP does not foresee “SwafS”-like activities and science and society activities as subsumed under the topic of “Widening and Enhancing the European Research Area ERA”.

The legal texts of Horizon Europe mention RRI only marginally. In Art. 2(2)c promoting RRI by “taking into account the precautionary principle” is one of the operational objectives of the Specific Programme. However, gender, ethics, open science and the link between science and society are mentioned elsewhere. These, as opposed to the application of the precautionary principle another related but not similar concept, are not legally binding but guidance for interpretation. Recital 51, a legally non-operationalized policy principle, says that “With the aim of deepening the relationship between science and society and maximising the benefits of their interactions, the Programme should engage and involve all societal actors, such as citizens and civil society organisations, in co-designing and co-creating responsible research and innovation (RRI) agendas, content and throughout processes that address citizens’ and civil society’s concerns, needs and expectations, promoting science education, making scientific knowledge publicly accessible, and facilitating participation by citizens and civil society organisations in its activities. This should be done across the Programme and through dedicated activities in the part ‘Widening Participation and Strengthening the ERA’” (Official Journal of the European Union 2021).

2.3.4 *Institutional Fragility*

The institutional stability, i.e., the standing within the DG, the temporal continuity, autonomy and number of staff members, of the administrative unit that is responsible for RRI within DG RTD reflects in several ways the status of RRI within the EC policy implementation framework. In this respect, the unit over the years had its ups and downs and ultimately over time became more institutionally fragile.

Looking back to 2001 when a “Science and Society” Directorate was installed within DG Research, the status as Directorate – rather than a “subaltern ‘unit’ or ‘programme’ – was an important step in institutionalizing citizen participation in the EC” (Macq et al. 2020). The Directorate was composed of several units dedicated to governance, ethics, gender equality, and raising awareness of young people about science. In 2014, there was a separate SwafS unit (B7) which was responsible for the Programme and supported by Unit B of the European Research Executive Agency. In addition, there were two sub-units for Gender and RRI. Ethics and Open Access were addressed in separate units.

In 2019 the institutional status of the SwafS unit was downgraded. The SwafS unit was dissolved, and its parts were integrated in the new Unit “Open Science” (G.4). In FP7, the Directorate had a staff of 140 (Macq et al. 2020). This number was now reduced to 40 people.

2.4 Advocacy Coalitions in Responsible Research and Innovation

2.4.1 *Sabatier’s Advocacy Coalition Approach*

In this section we will use the Advocacy Coalition framework (ACF, Sabatier 1998) to explain how the abovementioned elements of fragility came about. The ACF is particularly well suited to explain policy developments over years because it focusses on heterogenous advocacy networks and the role of beliefs in policy making (Weible et al. 2009).

Sabatier developed the ACF over several years beginning in the early 1980ies (Sabatier 1988), later developing and adapting the concept. The most important key premises for our paper are that Sabatier, in order to explain policy processes, focuses on (1) policy subsystems, (2) the struggle of heterogenous advocacy coalitions within such subsystems and (3) the importance of belief systems.

Sabatier holds that “the most useful unit of analysis for understanding the overall policy process in modern industrial societies is not any specific governmental organization or program but rather a policy subsystem or domain. A subsystem consists of actors from a variety of public and private organizations who are actively concerned with a policy problem or issue [...] and who regularly seek to influence public policy in that domain” (ibid. 99). An advocacy coalition contains “people from a variety of positions (elected and agency officials, interest group leaders, researchers) who share a particular belief system” and “who show a non-trivial degree of coordinated activity over time” (Cairney 2015).

Most importantly, he points out that the theories, the programs and public policy “involve value priorities, perceptions of important causal relationships [and] perceptions of world states [...]” (ibid.). Sabatier maintains that beliefs play an important role in politics; people engage in politics to translate their beliefs into action. In this respect he distinguishes between “core beliefs”, “policy core” beliefs and “secondary aspects”. “Core” beliefs are fundamental beliefs, unlikely to change (like a ‘religious conversion’) but too broad to guide detailed policy (such as one’s views on human nature). ‘Policy core’ are more specific (such as the proper balance between government and market or how to achieve optimum research and innovation) but still unlikely to change. ‘Secondary Aspects’ relate to the implementation of policy. These are the most likely to change, as people learn about the effects of, say, regulations versus economic incentives.

In the R & I policy subsystem we detect three main ACs i.e., the “Pro RRI AC”, the AC “RRI critics and actors unaware of RRI” and the AC “De-facto RRI”. ACs are

heterogeneous in their composition and comprise of policy makers, academics, representatives from industry, research funding organizations (RFOs) as well as civil society organizations (CSOs). The Pro RRI AC disagrees on secondary aspects of RRI and is therefore further internally divided into two sub-groups. The struggle between, and within, these three ACs explain the difficulties of institutionalizing RRI within the EC.

2.4.2 “Pro RRI” AC

The “Pro RRI” AC consists of actors from research (Sudolska et al. 2019), research funding, policy making, and civil society that support RRI at a European and national level. However, the AC is internally divided into two interlinked sub-groups. Klaasen et al. (2019) call these groups “policy concept of RRI” and “academic RRI”. We will name them, drawing on a distinction originally coined by Steve Fuller and recently revived by Dani Shanley (2020), the “high” and “low church” of RRI. Steve Fuller distinguished between two strands of Science Technology and Society (STS) studies advocates: a “more academic oriented” group and another one that is “more closely related to practitioners (...) in policy-making, education or civil society”. RRI is a “legacy of the more explicitly political, responsive strand of STS, in terms of its more explicit normative commitments, as well as its relationship to policy-making, education and civil society” (ibid.). However, the RRI community also continues and re-enacts the division in STS with internal debates about how to conceive of, ground and conceptualize, as well as promote a R & I system that is more in accord with societal needs.

We adopt the distinction between high and low church in order to differentiate sub-groups within the Pro RRI AC. The two sub-groups share intellectual roots and a core belief and thus belong to the same scientific/intellectual movement. However, high and low church disagree on several issues of policy beliefs and secondary aspects. The high church focuses on “theory and concept formation” (ibid.) and comprises of academics, national policy makers and RFOs that develop or use contesting or overlapping concepts of science society relationship. The low church focuses on “practice and policy” and includes national and European policy makers and RFOs – the latter mainly from the SwafS – and its preceding and subsequent administrative units that advocate the previously mentioned ‘five keys’ of RRI.

Advocates of the more theoretically founded concept of responsible innovation (RI) and critics of a solely policy-oriented application of RRI from the high church acknowledge the common roots of RRI and RI. For example, Owen and Pansera state that “RRI emerged in parallel with the academic discourse of RI and they overlap in some areas” (Owen and Pansera 2019b: 4). They also agree with von Schomberg’s initial definition and concede that “some useful and insightful research and a community of scholars (...) emerged” from RRI. Owen and Pansera acknowledge that the RRI concept was “leaning on ethics and technology assessment traditions” (2019a: 35) which they consider as one of the roots of RI (ibid. 28). Yet, they repeatedly and strictly insist to demarcate RI and RRI, and claim that they are not “the same things” (Owen and Pansera 2019a: 27). However, this claim of a clear-cut

distinction between the two strands is difficult to uphold given the manifold connections between RRI and RI.

RRI and RI are not only linked by common intellectual traditions but also by actors that cooperate to advocate the concepts. René von Schomberg, e.g., one of the key promoters of RRI within the EC, is a civil servant and holds a PhD in philosophy and STS and regularly contributes to theoretical discussions on RI and RRI. Other members of the former SwafS staff are trained in STS as well. In addition, STS scholars repeatedly contributed to RRI policy development with policy papers (Felt et al. 2007), participating in the European Advisory Group that advised on SwafS Work Programmes (Rip 2016) and suggesting indicators for RRI (Strand et al. 2015).

Actors of the low church depend on inspiration and advice from the high church about the concept and implementation of responsibility in R & I (Macq et al. 2020). However, policy makers from the low church are not necessarily willing or able to heed advice from the high church. In policy discussions it is also argued that debates over the theoretical foundations within the RI discourse, advocated by the high church hinder the translation and implementation of the normative idea into policy implementation and action while also unnerving policy makers.

Actors from the high church, in turn, depend on funding from the low church (e.g., via the SwafS Programme). However, these high church members are not necessarily convinced about the underlying five keys the EC promotes, and repeatedly try to work around them. Beneficiaries of SwafS projects carefully tried to maneuver between the five keys required by the low church and the ARRI framework, something they considered “in line with the original rationale” of the intellectual tradition from which RRI originated. Strand and Spaapen (2021) describe how researchers carefully try to split between the requirements of the low church and their own scientific conviction: “What developed was a sort of subversive humanism, usually the mildest sort, in which the formal deliverable of FP7 and Horizon 2020 RRI projects complied with the 5 or 6 keys approach and delivered results on them, while the academic outputs – written and oral – took a freer stance towards the keys. Sometimes the subversive humanism also included attempts at simultaneously embracing the key approach and the philosophical origin of RRI and somehow integrate them or expand the former with the latter.” (ibid. 3)

2.4.3 *Belief System*

For “core beliefs” of the Pro RRI AC we draw on Timmermans and Blok (2018) who adapted Kuhn’s paradigm concept and analyzed the assumptions on which different concepts of RRI are based and contrasted them with the “dominant innovation paradigm”. They understand paradigm as normative “worldview held by a particular community, in a particular context and at a particular point in time” (Timmermans and Blok 2018). In this way, the concept of paradigm overlaps with Sabatier’s core beliefs of the ACF, a term that we use in this chapter.

As regards core beliefs, the Pro RRI AC perceives innovation overall as positive. However, it also sees potential negative consequences, which have to be avoided. It

understands innovation primarily as technological innovation, although some strands of RRI include service and process innovation as well. In their perspective, innovation is an economic phenomenon aimed at producing marketable goods and profit. However, RRI sometimes includes societal and/or ethical dimension, which is either complementary or partly replacing a narrow market-oriented mission perspective of the dominant innovation paradigm. RRI perceives research and/or science and innovation as connected. It introduces in the innovation process moral knowledge, societal values, interests and implications of R & I as new types of knowledge. For societal reasons it also adds citizens to innovation as new actors e.g., in co-construction. RRI believes in increased steerability of innovation towards societal desirability and ethical acceptability. Respective governance processes should either happen in politics or the innovation process itself. Innovation should be transparent and/or open. RRI is basically committed to consequentialist ethics, however, broadens ethical evaluation of R & I to moral values and/or societal values. It adds gender, inclusiveness and rights as ends in themselves to the evaluation of R & I (Timmermans and Blok 2018).

The high church claims the academic heritage of STS and emphasizes the rich and diverse tradition of ELSA, ethics, STS and technology assessment (Klassen et al. 2019). It emphasizes the importance of analytical and conceptual rigor and is less concerned with political and institutional viability in a concrete organizational environment such as the EC. It criticizes RRI because of its origins in EC policies, its conceptual foundation in the five keys and its approach towards implementation. RRI, from this perspective, is only a “policy artefact” (Owen and Pansera 2019b: 3) and “policy-driven discourse” (Owen and Pansera 2019a: 26) that originates from the EC and the “Science in Society” Programme. They argue that the “RRI keys have more to do with the bureaucracy of maintaining the SwafS/RRI as a cross-cutting theme than with the conceptual foundations of RRI” (Rip 2016: 292). The high church considers the five keys as analytically weak and claims that they, and the translation of RRI into a cross cutting policy agenda, turned RRI into “a somewhat disparate set of activities and agendas” (Owen and Pansera 2019a). Proponents of RI suggest a competing concept to RRI. Jack Stilgoe and others define RI as “taking care of the future through collective stewardship of science and innovation in the present” (Stilgoe et al. 2013: 1570). As opposed to the normative, policy oriented ‘keys’ they emphasize four process dimensions: Anticipation, Inclusion, Reflexivity and Responsiveness (AIRR, *ibid.*).

In contrast to the high church, the low church is more concerned with political viability than conceptual accuracy. It considers the academic theorization of RRI as vague and fuzzy, hard to communicate and to put into practice in an agonistic political environment. It believes that RRI, in order to succeed in R & I politics, must provide an easily understandable und communicable concept that connects well with already implemented and accepted policies.

High and low church are also divided in secondary aspects of their belief system, their approach towards implementation and impact assessment of RRI, in Sabatier’s terms the secondary aspects of their belief system.

As already mentioned, the low church must prove the value of RRI in a policy environment. Thus, it strives to measure input, output and, particularly, impact and

benefit of RRI with indicators that should be “specific, measurable, attainable, relevant and timely” (SMART) (Strand and Spaapen 2021: 3).

The high church has different ideas about evaluation than SMART indicators, as the “Expert Group on Policy Indicators for Responsible Research and Innovation” case exemplifies (Strand et al. 2015). The European Commission tasked this group to “help identify existing indicators and to propose new indicators that can measure impacts of RRI activities in qualitative and quantitative terms” (Strand and Spaapen 2021: 3). Focusing on the RRI keys, the indicators were to follow the aforementioned SMART concept. Thus, as one member of the expert group recalled, the mandate was “quite far from von Schomberg’s vision of philosophically informed self-governance among researchers who sought reflection and deliberation in civil society” (ibid.). Yet, the expert group applied “the same mild brand of subversive humanisms” (ibid.) and proposed mostly qualitative indicators that gave researchers the freedom to choose the ones most appropriate for their line of research, thus not fitting to the idea of SMART criteria requested by DG RTD.

In contrast to this qualitative, open and flexible approach towards evaluation, the MoRRI project, which was funded thereafter by DG RTD from 2014 to 2018, was intended to be more aligned with the needs of the low church to produce “measurable indicators that apparently could work in a command-and-control type of governance system” (ibid. 4).

As concerns implementation, the high church is critical of RRI because of the emphasis on isolated keys and the lack of a “coherent discourse” failing to engage with innovation systems and therefore offering “little prospect for systemic, transformational change” (Owen and Pansera 2019a: 27). As an alternative, the high church claims that RI endeavors towards “deeper institutional and systemic transformation (...), striving for innovation (and science aimed at this) that is more anticipatory, more reflexive, more inclusive, deliberative, open and, in total more responsive” (ibid.).

2.4.4 Resources

The Pro-RRI AC controls symbolic, but little financial, legal and institutional resources. Both churches are on the margin of their respective fields (Timmermans and Blok 2018). The high church was able to muster a strong academic tradition, but they are outsiders in innovation and innovation studies. In addition, their symbolic capital was hard to convert into action because of the division within the AC about RRI definitions and about how to evaluate impact and benefits.

As concerns financial resources, the low church was able to allocate some H2020 funding for the SwafS programme. The SwafS unit also possessed the legal resource of being tasked with the establishment of RRI as cross-cutting issue in H2020. However, in fact, it ran into implementation problems when translating the concept of RRI into actual work programmes, calls and projects outside SwafS (Novitzky et al. 2020). In terms of institutional resources, the SwafS unit increasingly lost backing within DG RTD. Supportive senior staff were replaced by rather skeptical superiors and the supporters of RRI within the EC had difficulties gathering

sufficient political and academic backing outside the Commission to push through their RRI agenda. Staff in the SwafS unit were reduced and finally the separate unit disappeared altogether. In addition, FP negotiations are an opaque process between EC, Member States, the Parliament and strong stakeholders. RRI supporters from within the EC were marginalized and their external supporters lacked knowledge about, and access to, deliberative fora where Horizon Europe was negotiated. Moreover, academics had difficulties acting jointly because of a lack of organization for day to day lobbying. When they did make joint efforts to impact RRI policies the Commission duly noted their concerns but their activities had little impact on actual policies.

2.4.5 AC “RRI Critics and Actors Unaware of RRI”

The AC “RRI critics and actors unaware of RRI” consists of national and European policy makers and RFOs, as well as stakeholders from research and industry who are critical or ignorant of the concept of RRI.

2.4.6 Belief System

Again, we draw on Timmermans and Blok (2018) to characterize the core beliefs of this AC. Proponents of this AC have a positive perspective on innovation, which creates social benefit and contributes to tackling societal challenges. They perceive innovation as mainly technological and as economic phenomenon aimed at producing marketable goods and profit. In this perspective, science, research and innovation are separate. Stakeholders are basically involved in innovation for economic reasons. Steering innovation is limited to the marketability of innovation within constraints set by legal and regulatory frameworks. Innovation processes are not open and transparent but kept clandestine to protect the innovator’s competitive advantage and exclusive access. The AC follows consequentialist ethics, which considers only benefits and technical risk in the evaluation of technology. As Roger Strand summarizes poignantly, this group “sees science and technology as *the locomotive force of a knowledge economy that is on tracks, going in the right direction and being (our only?) promise of job creation and economic growth. The problem (...) is not that the train is going too fast and out of control; rather, it is being slowed down by the insufficient participation of citizens and civil society. Distrustful and ungrateful citizens are (sometimes) protesting in the middle of railroad and more often just not being supportive and helpful*” (Strand 2020, emphasis in original).

Ideas like RRI directly challenge this AC’s core belief of “how science, innovation and society relationships (...) are organized and configured” (Owen and Pansera 2019b: 5). From this perspective RRI is potentially damaging to R & I in specific, and the economy and society in general. RI, and also RRI, “runs headlong into

political imperatives based largely on economic growth and productivity; vested interests; and engrained institutional norms, cultures, behaviors and organizational practices” (Owen and Pansera 2019b: 27). In addition, “it may be seen to challenge the principle both of market governance and scientific autonomy. It can be perceived as introducing an additional burden of responsibility for at least some who may feel their independence to be infringed and who, to be blunt, feel they have better things to do with their precious time” (Owen and Pansera 2019b: 6).

Macq et al. (2020: 497) quote an EC officer involved in science policy who recollects his/her colleagues’ attitudes towards science society relationships. They had, “a very positivist vision of science. They (had) what I call the ‘old physicist’ syndrome (...) They say ‘hey, how can we make young people like science’”. As one interviewee states, the Director General of DG RTD was also very critical of RRI. He “does not like [science and society issues], this is why in 2012 he reduced all the services that were working for them. (...) His mindset is, above all, to get back to the good old face to face where research is the business of the academia and the industry. So, to get back to this face to face without the complications brought by this third actor [civil society]”.

As concerns policy core beliefs and secondary aspects, critics of RRI in this coalition point out that the concept is hard to understand, and its results are hard to measure. RRI critics from basic research point to the importance of curiosity-driven research and the autonomy of science and see RRI as a centralized governance framework that limits independence and contradicts the political system advocated by believers of the Republic of Science (Polanyi 1962; cf. critically Braun & Griessler 2018). This said, the majority of practicing researchers have not heard of RRI, nor as normative concept or implemented policy in research funding and governance. For this group, when mentioning RRI and its component elements, they do not reflect on it as an integrated process but as individual and mostly voluntary or tick-box humanistic activities addressing the respective parts that are covered by the separate ‘keys’.

2.4.7 Resources

This AC’s most important and powerful resource is its ability to hold and appoint influential key positions in politics and civil service, enabling it to control legal, institutional and financial resources and to use these resources to sustain the AC’s core beliefs which then are expressed in policies. The ups and downs of RRI and public engagement in the FP are connected with changing political and administrative key personnel (Macq et al. 2020). When Commissioner Phillipe Busquin held office, public participation in science started to mean more than information of the public but also public participation in decision-making. In 2010, Commissioner Máire Geogegan-Quinn came into office and supported RRI. However, in 2015 the new Commissioner, Carlos Moedas, branded the three O’s as new policy goals for EU R & I policies. Yet, it is not only politicians who are key for policy development.

Senior civil servants are central actors as well. When the new Directorate General of DG-RTD who was not supportive of science and society issues was appointed, science and society activities were cut back and the Directorate for Science and Society was discontinued; its staff seriously reduced, re-organized and dispersed. There is a constant pressure on the European Union to dedicate its resources to further the economic competitiveness agenda of the EC and RRI, as discussed above, does not sit well with this aim. Also, believers of the Republic of Science who would like to see science as a positivist enterprise that works well in a Triple Helix constellation between policy, academia and industry (Leydesdorff 2010) see the emergence of RRI as a hindrance to both their effectiveness agenda and the resources required to archive their economic mission.

2.4.8 AC “*de facto rri*”

The term “de-facto-rri” delineates bottom-up processes of experimentation and describes “what actors already do, in collective fora, in order to embed institutionalized interpretations of what it means to be responsible; these interpretations are then translated into practices, processes and organizational structures, and outcomes of research and innovation” (Randles 2017: 20).

The “de facto RRI” AC is a very loose assembly of separate communities that include actors from research performing and funding organisations, civil society organisations, and businesses which work with concepts that overlap or partly compete with RRI. Since the latter is an umbrella concept with many different predecessors inside and outside academia, there exist many communities which have performed de facto rri activities for many years. Communities who strive to increase anticipation and reflexivity in R & I have been developing methods of expert based and participatory technology assessment for decades (Grunwald 2011, 2014). There is also a strong community that promotes public engagement in R & I, e.g., via action research, citizen- and open science. Another community exists which has been devoted to science communication and research education for many years. The issue of gender equality has a very long tradition and a strong community inside and outside academia. The same is true for research ethics which has a particularly rich tradition of bioethics (Beauchamp and Childress 2001) ethics committees (e.g., AREC 2013; Shelley-Egan et al. 2015), bioethics conventions (e.g. Oviedo Convention, Nuremberg code), ELSA research (Zwart et al. 2014) and institutions trying to safeguard research integrity (ESF and ALLEA 2017). RRI and concepts like Sustainable Development Goals, sustainability, inter- and transdisciplinarity, as well attempts to better integrate Social Sciences and Humanities (SSH) into natural and engineering sciences (STEM) all have overlapping goals. In business, Corporate Social Responsibility (CSR), which overlaps but also differs from RRI, has been practiced for many years (Blok et al. 2015; Iatridis and Schroeder 2016; Lubberink et al. 2015; Braun 2019).

The loose assembly of different communities is united in the core belief that R & I must change by taking up the respective value of the particular community. Although the separate communities might sympathise with RRI in general, they emphasize the differences between their own concept and RRI and are more concerned with advancing their own concept than joining forces with the RRI community. As indicated, this group does not possess a unified belief system, and not a set of institutional or financial resources. Being critical of and on the margins of traditional positivist science and solely economic output focused innovation, they are struggling to secure their institutional position and the resources required within the ecosystem of the European research arena. This makes this group unreliable allies of the RRI cause as, even if members agree with some or many ambitions of the RRI belief system they do not want to see their hard-fought positions jeopardized and do not see RRI as an overall policy or political frame that could be useful to support what they consider important.

2.5 Conclusions

In this paper we explain the development of RRI as policy concept within EC policy making by having identified a conceptual, legal, financial and institutional fragility of RRI in the EC policy context. We adopted the ACF to explain the dimensions of fragility. In doing so, we focused primarily on the two ACs, the “Pro RRI AC” and the AC “RRI critics and actors unaware of RRI”, which are most important for answering our question. We mapped their actors, belief systems and resources. We also sketched a third AC, a loose assembly of different communities dealing with ‘de facto rri’ in different kinds of organizations and areas.

Analysis of literature and documents showed that the definition of RRI is unstable over time. This does not only result from conceptual differences, but also as a “discursive strateg(y)” to be able to promote RRI in the specific EC context” (Randles 2017: 23 ff.). It results from a succession of compromises the promoters of RRI in the EC have struck to accommodate internal and external critics. A first compromise concerned RRI and the dominant innovation paradigm that perceives R & I as an engine for jobs and economic growth. Von Schomberg’s definition of RRI (2011) tries to accommodate this tension and shifts the discourse around societal actors and innovators towards “the innovation process and marketable products”. This creates a tension with more radical proponents of the STS tradition. A second, administrative compromise was coining RRI as keys and as an umbrella concept. The keys were an attempt to link RRI to the institutional history and practices within the EC by bringing together already existing policy strands. This created tensions with those who would like to see RRI as a more radical change in R & I policy and understood the emerging policy concept of the keys as doing more ‘business as usual’. A third compromise concerned the manifold conceptual disagreements about the definition of RRI between advocates of RRI within the EC and leading academics outside the Commission. Proponents of RRI within the EC repeatedly

had to reconcile various disagreements about RRI which shows in the ever-changing definition of RRI by its proponents resulted in those sympathetic to the cause within the EC to attempt to reconcile the various disagreements. These included trying to place RRI within the dominant R & I paradigm of economic growth, linking RRI with existing EC funding traditions, and taking up criticism from the academic RI communities by borrowing their notion of anticipation and reflection.

Owen and Pansera observe that “by adopting RRI the Science in Society programme successfully secured a home (and budget) for itself in the transition to Horizon 2020, where innovation, set in the context of the European knowledge economy, was now a key driver. In doing so RRI was a convenient umbrella term under which to repackage a set activities and action lines that had previously been focused more on science and society, extending these to (it was hoped) include innovation, in particular aimed at supporting societal (‘grand’) challenges facing Europe” (Owen and Pansera 2019b: 4).

Strand and Spaapen (2021: 3) arrive at the same conclusion, only formulated slightly different. They observe that the EC adopted RRI with little regard to “constructivist philosophy” but “translated the intellectual traditions that formed the basis of RRI into operational tasks, or ‘keys’ (...) that could be verified by a box-ticking exercise”.

Loeber et al. (2022) observe, that the, however, in their perspective, unwanted conceptual unclarity of the policy concept of RRI, provided space for bottom-up experimentation and New Public Governance in policy implementation.

However, we argue with Randles (2017), that the ambiguous and flexible use of RRI in different EC contexts came with costs. It prevented RRI from becoming a coherent, strong and convincing narrative that could be considered the remedy to problems which multiple audiences would see as legitimate and pressing. In addition, because of “the fragmentation into the five keys” RRI does not “appear to provide a coherent anchor which might otherwise provide an effective policy instrument” (Randles 2017: 25).

Our analysis showed how the Pro RRI AC was divided into a low and high church based on different definitions of RRI. As a consequence, the AC was not united; high and low church struggled against one another (Timmermans and Blok 2018). The ongoing conceptual struggle within the AC created confusion inside and outside of the AC and made it hard to send a clear and unified message or talk with one voice to policy makers. No united and strong “policy broker” discourse emerged to promote the embedding of RRI in EC funding. The division on concept, implementation and measurement weakened the key AC vis-a-vis an opposing and indifferent AC and provided arguments to delegitimize RRI. In addition, the AC increasingly lost institutional, legal, financial resources because of resistance from the opposing AC as well as many indifferent or adversary groups advocating (mainly neoliberal, economic) agendas that were seen as incompatible with an RRI orientation. RRI faced a strong opposition from the AC of “RRI critics”. Their belief system is identical to the dominant innovation paradigm (Timmermans and Blok 2018) and contradicts almost everything that RRI stands for. This is the most powerful AC which holds top position in policy making, administration and industry and thus controls

institutional, legal, and financial resources. The communities of the “de-facto RRI” AC share elements of the belief system of the “Pro RRI” AC. However, it has its own agenda according to the subject matter and does not align with the Pro RRI AC.

Given this analysis, RRI advocates should, instead of primarily focusing on the right definition, develop a strong and unified policy message and “build networks and mobilize resources, within and across the boundaries between academia, policy and civil society” (Shanley 2020). They should find key policy brokers in and outside the EC and effectively connect RRI to current changes in socioeconomic conditions (sustainability, climate change, responsibility, mistrust in science, etc.). Further research as well as policy advocacy is required to find appropriate and effective ways, grounded in a theoretically sound STS tradition, how to achieve this.

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