Chapter 1
Introduction

Vincent Blok and Lucien von Schomberg

After a period in which Responsible Research and Innovation (RRI) stood as a cross-cutting issue under the Eigth European Union Framework Programme for Research and Innovation (R & I), Horizon 2020, its further development and implementation has reached a crossroad. It turned out that there is a lack of consistent integration of RRI in Europe's R & I practices (Novitzky et al. 2020), and dedicated funding for RRI is almost entirely absent in the Ninth European Union Framework Programme for R & I, Horizon Europe. At the same time, global challenges like climate change become increasingly more urgent and thus continue to call for collective efforts of scientific research and industry, policy makers and civil society. Further, the emergence of disruptive technologies like synthetic biology, artificial intelligence and robotics raises several new societal concerns. Finally, the growing disbelief in science, as shown during the Corona pandemic, demonstrates the importance of aligning R & I policy and societal values all the more. For reasons as these, the disinvestment in a dedicated *Science With and For Society* programme line for RRI in Horizon Europe did not result in decreased academic attention for embedding science in society. On the contrary, a dedicated research community emerged that engages in the academic discourse of RRI and tries to contribute to projects on topics such as *responsible* data governance, *responsible* AI, and *responsible* agroecology within the Horizon Europe framework programme, sometimes even without the use of the frame RRI.

If RRI is to have a future in the European Commission's Open Science Agenda and Horizon Europe Programme, it is important to focus on the *implementation*, *institutionalization* and *management* of responsibility in R & I practices. One of the

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weaknesses of the current academic discourse of RRI is its focus on conceptual and theoretical analysis. A variety of theories and approaches emerged under the heading of RRI, ranging from Value Sensitive Design to the six keys of RRI, all having their own ideals and barriers to reaching those ideals (Timmermans and Blok 2018). This makes the implementation and management of RRI an enormous challenge, leaving a discrepancy between the promoted ambitions of RRI and their realization in practice (Novitzky et al. 2020). This is also the case at the broader policy level, where RRI faces structural tensions with other policy goals, such as scientific excellence and economic value (Rodríguez 2019). Another weakness is that to this day the academic discourse of RRI is primary focused on the RRI research community itself, rather than on, for instance, the engineers and scientists who are actually working in the area of disruptive technologies . A final weakness is that the RRI research community mainly focusses on public research practices, while a significant amount of innovation practices take place in the private sector facing its own challenges and opportunities (Blok and Lemmens 2015). As long as the private sector context of R & I is not taken into account, the implementation and management of RRI will be difficult to align with the three goals for European R & I policy - Open science, open innovation, open to the world – to increase responsiveness of science to society (DGRI 2016).

The aim of this volume is to build on the great work that is already done by the RRI research community, and to engage professionals, practitioners and policy-makers working outside the RRI research community to implement, institutionalize and manage responsibility in their R & I practices. We were able to engage this wider audience, including people working in science and industry, because the authors of this volume were involved in a large European Coordination and Support Action project that aimed to engage the European R & I community in the promotion and acceptance of RRI in all programme lines of Horizon 2020; Excellence in Science and Innovation for Europe by adopting the concept of Responsible Research and Innovation (NewHoRRIzon). After a diagnosis of the uptake of RRI in the various programme line of Horizon 2020 (Novitzky et al. 2020), the project worked out the conceptual and operational basis to fully integrate RRI into European and national (R & I) practice and funding. In order to accomplish this goal, the project established 18 Social Labs as inclusive methodology to implement and study RRI in all programme lines of H2020 (Timmermans et al. 2020). Together with a wide-ranging group of R & I stakeholders, these Social Labs co-created tailor-made pilot actions that stimulate an increase in the use and acceptance of RRI across H2020 and each of its programme lines. These pilot actions address a variety of R & I actors such as academia, business, non-university research institutes, research funding organisations, policy-makers on European, Member State and global level, civil society organisations (CSOs) and the general and specific public(s) as they arise from technological controversies. Using the social lab methodology, the authors contributing to this volume were able to benefit from the practical experience of this wider audience as a basis for further conceptual development and effective implementation of RRI in European and global R & I practices. Such a broad overview of evidence-based practices and experiences has not been employed in connection

with RRI yet. The book highlights the potential of and opportunity in R & I to conduct R & I in a societally responsible way.

1.1 Synopsis and Overview of the Chapters

The book consists of three parts. The first part – Chaps. 2, 3, 4, 5, and 6 – focusses on RRI as European policy concept, and how we can derive policy recommendations based on its current implementation, both at the EU level and the institutional level. The second part – Chaps. 7, 8, 9, and 10 – focusses on public engagement practices for RRI and pays particular attention to its operationalization in the social lab methodology. The third part – Chaps. 11, 12, and 13 – focusses on the governance of RRI, also in the setting of industrial research and innovation.

In Chap. 2, Erich Griessler, Robert Braun, Magdalena Wicher, and Merve Yorulmaz kick off with a general reflection on the ups and downs of the implementation of RRI in the EU. The chapter addresses the question of why RRI was facing problems in the European Commission to succeed as a policy concept for R & I, despite the Commission's 20 years history of addressing science and society relations within its Framework Programmes. They highlight four interrelated elements that contribute to the instability of RRI as policy concept, namely conceptual, legal, financial, and institutional fragility. Based on Sabatier's advocacy coalition approach, they explain how these elements of fragility developed and how the ups and downs of RRI as policy concept played out. They identify three advocacy coalitions with regard to RRI and analyse their belief systems and resources.

In Chap. 3, Stephanie Daimer, Hendrik Berghäuser, and Ralf Lindner zoom in on the failure of mainstreaming RRI in EU policies for funding R & I. In order to better understand the reasons for the limited success of mainstreaming RRI, they draw on the concept of Deep Institutionalisation (DI) and adapt it to analyse institutionalisation processes related to policy practice and implementation. They analyse recent findings from RRI research with the help of an adapted DI concept. The results suggest that key preconditions for the successful institutionalisation of RRI policies were not fulfilled. Specifically, broader policy debates reaching beyond the confines of a small policy arena within the European Commission, a lack of experimental embedding allowing for adjustment to different contexts, and the development of ownership were not achieved. Building on the cornerstones of the DI concept, the authors conclude that attempts to mainstream RRI in H2020 have been premature.

In the Chap. 4 of part I, Joshua Cohen and Robert Gianni take the limited implementation of RRI in EU R & I practices as a basis to reflect on the normative potential of RRI. In their chapter, RRI is approached as a matter of collective democratic experimentation. They propose a pragmatist conceptualization inspired by John Dewey and show how his interest in social inquiring publics provide a particularly apt foothold from which to operationalize collective democratic experimentation with RRI. The utility of this approach is subsequently illustrated with the social labs methodology to experiment with RRI. Chapter 4 provides a conceptual argument

and heuristic as to how the current RRI implementation deadlock can be overcome. The reconceptualization of RRI in this chapter paves the way for the empirical chapters in the second part of the book.

After the first two chapters that focus on RRI as EU policy concept in general and the reconceptualization of RRI in Chap. 4, the next two chapters zoom in on two particular aspects. Chapter 5 concerns the involvement of new member states in Framework Programmes for R & I, and with this, their involvement in RRI projects. Chapter 6 concerns the institutionalization of RRI in national R & I funding agencies.

In Chap. 5, Raúl Tabarés Gutiérrez and Antonia Bierwirth consider the inclusion policies of new member states in R & I policies. They analyse the "innovation divide" between member states with high and with low participation rates in the European R & I Framework Programmes. This problem exists since the origins of the European Union but is especially pressing for the group of countries that entered the Union after 2004. Several initiatives have been implemented by the EU to encourage the participation of these countries in Framework Programmes for R & I, trying to maximize and extend the benefits of a knowledge economy across the EU. The authors explore how these instruments have been deployed in the Horizon 2020 Work Programme and focus on the origins of "Spreading Excellence and Widening Participation". They identify specific weaknesses and pitfalls and argue that the innovation divide is not only a matter of adequate funding and provide recommendations for future implementation strategies.

In Chap. 6, Ulrich Schoisswohl, Ulrike Wunderle, Luboš Studený, Lieke Michiels van Kessenich, and Pia Weinlinger provide three case studies of two funding and one innovation agencies involved in RRI: the Netherlands Enterprise Agency (RVO), the Austrian Promotion Agency (FFG), and the Technology Agency of the Czech Republic (TA CR). As part of the author team is working at these agencies, they are able to provide an in depth inside perspective on the matter of RRI implementation. They analyse how these funding and innovation agencies are already responding to the grand challenge-oriented R & I approach, how their activities can be linked to RRI and what additional insights could be gained from introducing RRI to agency practitioners. Their contribution provides insights in *de facto RRI* and the role of experimenting with RRI in funding agencies. Based on their findings, recommendations are provided on how the potential benefits of RRI at the EU level can be extended to the national funding and innovation agencies and their specific national R & I landscape.

Part II of this volume presents empirical evidence regarding the social lab methodology that is used to engage a wider audience of stakeholders in RRI. The chapters of part two move from more general accounts of stakeholder engagement and the social lab methodology to specific contributions on sectors like health and industry.

In Chap. 7, Philine Warnke, Tanja Bratan, and Ulrike Wunderle analyse public engagement in the tradition of participatory approaches. They investigate how the public engagement dimension of RRI could benefit from different research and practice traditions on participation in research and innovation that do not directly

frame themselves as RRI. Based on an analysis of the participation literature, they identify four areas of theory and practice with major linkages to public engagement in RRI: Co-design, user-led innovation, participatory research, and systemic R & I policy instruments. They confront the specific contributions of these traditions with cases of RRI requirements in two specific fields: healthcare and environment. In this way, they explore barriers and challenges to public engagement and promising practices. This analysis is continued in Chap. 8. In this chapter, Ilse Marschalek, Lisa Marie Seebacher, Elisabeth Unterfrauner, Katharina Handler, and Margit Hofer explore the social lab methodology to operationalise public engagement for RRI and to mitigate some of the pitfalls of traditional public engagement formats. By using practical case studies, the authors show how social labs provide a fertile ground for the circular nature of public engagement within the context of RRI.

In Chap. 9, Merve Yorulmaz, and Susanne Bührer zoom in on the particular notion of diversity in the social lab methodology for RRI. They investigate the relationship between participants' diversity and the manifold outcomes produced in a social lab. Drawing on social network and critical mass theory, they show that social labs with greater diversity face more friction but produce more original, novel and innovative outcomes than more homogeneous groups. Based on quantitative data about the characteristics of social lab participants and outcomes, as well as qualitative information about group dynamics to describe the links between group diversity, their dynamics and outcomes, the authors show that the level of diversity does influence group behavior and the type of outcome that is to be expected. They also show that diversity requires conscious and deliberate management.

In Chap. 11, Elisabeth Frankus and Helmut Hönigmayer explore how the social lab methodology can substantiate stakeholder engagement for RRI. They explore a single case study in the EURATOM research area to answer the question how the social lab methodology helps to integrate RRI and stakeholder engagement into the European R & I process.

Part III of this volume presents findings regarding the governance of RRI. In Chap. 11, Anne Loeber, Michael Bernstein and Mika Nieminen use another aspect of the social lab methodology. They concentrate on the use of pilot actions as social experiments with the implementation of RRI, reflect on how RRI was put into practice, and draw lessons about policy implementation in such complex governance settings. Social lab participants were invited to deliberate on the RRI policy goals, and to design and execute pilot actions to implement the policy in their context and related research (funding) practices. They consider these findings in light of the policy implementation literature and show how the policy goal of RRI, and its attendant normative orientation, exists in tension with the substantive focus (science governance) and administrative setting (the science funding system) of European Commission's R & I. Finally, they reflect on alternative normative orientations and decentralized efforts to implement RRI.

In Chap. 12, Robert Braun and Johannes Starkbaum consider public engagement for RRI in light of recent developments in stakeholder theory in the strategic business context. It reflects on political Corporate Social Responsibility (pCSR) as conceptualization of responsible governance and develops a model for stakeholder

engagement in RRI on the basis of this material. The potential of the model is explored in two cases of co-creation exercises in which several stakeholders are involved. They draw conclusions regarding the operationalization of the normative ideals and social legitimation in R & I practices. With this perspective, the chapter also provides a bridge to Chap. 12 in which the industrial perspective on RRI is focused on.

Chapter 13 completely focuses on the industrial context of RRI. Thomas Long and Vincent Blok take the limited effect of EU R & I policies to implement RRI as point of departure to ask how responsible innovation can be pursed within industry settings. They explore how start-up firms manage the dual responsibilities of 'doing good' and 'avoiding harm'. To this end, they collected data within the context of smart farming innovations that seek to tackle agri-food system challenges and identify several mechanisms to manage firm's dual responsibilities.

In the final chapter, we draw conclusion by addressing the question what Social Labs can contribute to the implementation of RRI at a micro-, meso- and macro-level, and by reflecting on the role of RRI, and by reflecting on the progressive contribution RRI can make in contemporary debates on mission oriented research and innovation.

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