

What's in a name? Perceptions and promotion of responsible research and innovation practices across Europe

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Abstract

After a decade of efforts to mainstream Responsible Research and Innovation (RRI) across Europe, the policy momentum is now uncertain. We explore how 217 organisations perceive responsibility in relation to their work, what mechanisms they apply to promote responsible practices, and what hindrances to promoting RRI they observe. Most organisations are unfamiliar with RRI but employ diverse perceptions of responsibility and mechanisms to promote it nonetheless. Civil society organisations are primarily outward oriented; collaborating with others and hosting science events. Private companies are more internally focussed and more likely to formalise this effort in strategies and internal guidelines. Universities resemble private companies, while private and public funders use funding-specific tools to incentivise responsible practices. Our results suggest that RRI is still poorly institutionalised and that some areas lack attention among actors in the research and innovation systems. Future policy endeavours might benefit from addressing deficits and tapping into existing perceptions of responsibility.

Key words: responsible research and innovation; responsible practices; research performing and funding organizations; Europe; descriptive analysis

1. Introduction

*What's in a name? That which we
call a rose,
By any other word would smell as
sweet.*
Shakespeare, Romeo and Juliet

Building on approaches in technology assessment and evaluation of ethical, legal, and social aspects of scientific and technological development, the concept of Responsible Research and Innovation (RRI) emerged strongly in the European Commission's Seventh Framework Programme for Research and Technological

Development (Burget et al. 2016). The Commission has since promoted RRI as a set of guiding principles for governing research and innovation. Broad objectives of 'aligning research and innovation to the values, needs, and expectations of society' (von Schomberg 2011; Italian Presidency of the Council of the European Union 2014) have come together with operational key areas of public engagement, research ethics, gender equality, science education, and Open Access (European Union 2012) in a framework for improving governance of research and innovation.

During the past 15 years, EU-funded research has endeavoured to examine, conceptualise, and define RRI (e.g. Gianni 2016; Lindner et al. 2016), just as a growing academic literature has contributed to the development of the concept (Pellé and Reber 2013;

Stilgoe et al. 2013). Coordination and support actions have sought to implement change in research performing and funding organisations (e.g. Porcari et al. 2015; Gurzawska et al. 2017; Yaghmaei 2018) and to develop appropriate measures for evaluation and monitoring of RRI (e.g. Peter et al. 2018).

At the time of writing, the European framework programme to succeed Horizon 2020 is being negotiated. The future of RRI as a cross-cutting priority at the European level is challenged (Mejlgaard et al. 2018; Simone 2018). The ‘Science with and for Society’ programme line, which provided dedicated support for research and implementation activities concerning RRI, will not be part of the next framework programme, and it remains unclear whether and how funding schemes for RRI will be made available from 2021 onwards.¹ While the momentum initially raised by supranational commitment is decreasing, we are inclined to ask what the status of RRI is today after more than a decade long effort to mainstream it. Are companies, research funders, universities, and civil society organisations (CSOs) familiar with the concept? How do they perceive responsibility in relation to their work and the surrounding society? How do they promote responsible practices, and what hindrances do they see to this effort?

While significant attention has been devoted to conceptualising and defining the concept of RRI (for a recent summary, see Ribeiro et al. 2017), less effort has been given to the empirical investigation of how RRI is perceived and practised. Timmermans (2017) has explored which individuals, projects, and organisations are main contributors to the theoretical RRI discourse—mainly researchers—including how they frame and perceive the concept. A few studies look at the national level in cross-country comparisons either in clusters (Mejlgaard et al. 2019) or across twenty-eight European countries (Peter et al. 2018). Some case studies look into RRI in companies (Inzelt and Csonka 2017; Stahl et al. 2017; see Lubberink et al. 2017 for the synthesis of empirical papers addressing issues of responsibility in the business sector) and at universities (Nielsen et al. 2016). The RRI-Practice project carried out an analysis on how twenty-two research performing and funding organisations within and outside Europe define the RRI keys and implement RRI and what main drivers and barriers they see to this work (Damianova and Hajdinjak 2018; Hennen et al. 2018), yielding important knowledge to the field. However, no one has investigated these questions with a quantitative approach to a larger number of organisations to obtain a broader overview. In this article, we attempt to do just that.

We have looked into sixteen country reports produced by national correspondents as part of the Res-AGorA project (‘Responsible Research and Innovation in a Distributed Anticipatory Governance Frame – A Constructive Socio-Normative Approach’). The reports capture how research performing and funding organisations perceive responsibility in relation to their work and the surrounding society, how they promote responsible practices, and the hindrances they see to promoting RRI. In other words, the reports operate with an understanding of *de facto* RRI, that is, ‘how actors themselves *de facto* frame, and embed understandings of responsibility into the full scope of research and innovation contexts, situations, organisational settings and professional practice’ (Randles et al. 2016: 32). We argue that observed practices rather than terminology are important. Invoking Shakespeare, one might say that the quality of RRI is not in the name itself but in its practices.

Our approach is descriptive-analytical, and this study is distinct from earlier work by taking a quantitative approach that covers and compares five different types of organisations, specifically public

funding agencies, private research foundations, universities, private companies, and CSOs.

2. Data and methodology

The empirical basis for this article is sixteen country reports developed as part of the Res-AGorA project. Each report addresses the perception of responsibility, the use of mechanisms to promote responsible practices, and the perceived hindrances to this effort across major organisations in the national research and innovation system. Res-AGorA was funded by the European Commission and ran from 2013 to 2016. The project employed an extensive empirical research programme to investigate practices across Europe, used to inform the development of a ‘Responsibility Navigator’ with ten governance principles for making research and innovation more responsive, responsible, and sustainable (Lindner et al. 2016). As a component of the empirical programme, national reports were developed for Austria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, the Netherlands, Poland, Spain, and the UK. The selection was motivated by an ambition of capturing heterogeneity across Europe (Mejlgaard and Griessler 2016).

The country reports were produced by national experts, often researchers in science and technology policy, who were either member of the Res-AGorA consortium or recruited for the monitoring exercise. The country correspondents selected one prominent national public funding agency, one large private research foundation, ten universities, two larger research or innovation-driven private companies, and one CSO in their country. The correspondents then selected and analysed available strategic documents and interviewed one or two key representatives (e.g. an employee at the senior level working with corporate social responsibility (CSR) and a senior employee in the research and development unit of a private company) for each of the organisations. For the universities, however, the reports were based solely on document analysis. Data collection took place from 2014 to 2016 (Mejlgaard et al. 2016b). To allow for consistency across the country reports, and thus enable cross-country comparison, the country reports followed the same set of guidelines for data collection, the same semi-structured interview protocol, as well as a standardised template for the write-up of the report (for more information on methodology, see Mejlgaard et al. 2016a,b).

Despite standardised guidelines, the lengths of the reports vary between nineteen and fifty-two pages. For the purpose of this article, we translated these lengthy reports into a manageable number of binary variables in a collaborative coding process. First, the corresponding author carried out an initial segment-by-segment coding of three country reports, Denmark, Hungary, and the Netherlands, using the qualitative data analysis software NVivo (Charmaz 2006). Coding refers to ‘the process of sorting your data into various categories that organize it and render it meaningful from the vantage point of one or more frameworks or sets of ideas’ (Loftland 2006: 200). While this was informed by the main themes of the country reports and the RRI keys, which were expected *a priori*, the procedure remained open to capture the diverse perceptions of responsibility that organisations have in relation to their work and the surrounding society and the mechanisms they apply to promote responsible practices as they appeared in the data. The initial thematic coding was exploratory and resulted in no less than 156 codes. The initial codes were evaluated in a focussed coding; similar themes were grouped together, and less prevalent or unclear themes were omitted (Charmaz 2006; Miles et al. 2014; Bernard et al. 2017).

This approach resulted in thirteen different dimensions of responsibility and twenty-two different types of mechanisms to promote responsible practices, which were all assigned values as present (1) or absent (0) in each organisation. The use of the specific RRI term within organisations was also coded into a simple binary variable, that is, yes (1) or no (0). Secondly, based on the initial coding list, the corresponding author developed a codebook, which she pre-tested on the Austrian country report and refined based on the results. The revised codebook, coding guidelines, and a standardised coding template (Excel spreadsheet) were shared with the co-authors for thorough coding of the remaining country reports. To ensure sufficient reliability and consistency across our codes, we double-coded four of the country reports to identify uncertainties and inconsistencies. For instance, this could be similar variables that are hard to distinguish, such as 'unit' as a formal administrative body established to work with issues of responsibility inside an organisation and 'network' as a more informal and social group. We discussed such issues and wrote an extension to the coding guide to make sure we had the same understandings.

The country reports also contained paragraphs on the hindrances that organisations see to promote RRI in their organisations. These paragraphs were primarily based on the interviews with stakeholders and often highlighted broad concerns not exclusive to the organisation in question, such as lack of funding for research in general, lack of political support at the national level, or scepticism with the RRI concept itself. Also, these paragraphs tended to be less detailed than other sections of the reports. For these reasons, we could not attribute values on such variables to individual organisations but have instead summarised the findings from these paragraphs in Section 3.5.

The dataset includes information on twenty-two public funding organisations, sixteen private research foundations, 134 universities, thirty private companies, and fifteen CSOs; a total of 217 organisations across Europe.² It is a unique dataset offering a wide overview of how responsibility is understood and addressed across Europe and allows for a comparison of different types of organisations across the public and private sectors.³ However, it is important to note that there are limitations to the data. First, it is not a representative sample of organisations across Europe. The country reports focusing on large and well-established funding organisations as well as companies and CSOs that are already quite advanced in their work with responsibility-related activities (e.g. CSR). Likewise, there is a large share of universities in the sample, and since we do not have a strictly defined population and an accurate measure of the distribution between different types of organisation in the population, we cannot successfully weigh the data to represent it more accurately. Secondly, it should be recognised that the country reports are not exhaustive. They may not capture all perceptions of responsibility or all initiatives to promote responsible practices within the organisations in the sample. This is particularly true for the universities, which were examined using document analysis only and often treated collectively as a sector rather than individually in the country reports. This made them hard to code, and throughout the following sections of the article, we should stress the risk of underestimating the efforts of the universities.

3. Findings

3.1 Organisations work with multiple aspects of responsibility but are largely unfamiliar with RRI

The RRI concept is new to most of the analysed organisations; only thirteen of the 217 organisations explicitly use the term in their

strategic documents: four in the Netherlands, two in Denmark, France, and Spain, respectively, and one in Germany, Italy, and the UK, respectively. A few of the organisations are indeed aware of the RRI concept when asked about it in the interviews and intend to use it in their future strategic work. Others use comparable concepts such as Technology Assessment or CSR instead of RRI.

Despite the limited use of the RRI concept, most of the organisations express or work with key components of responsibility in their strategic documents or practices and have been for years without using the RRI term. In Table 1, we have summarised the most common aspects of responsibility that organisations focus on in their expressed values, goals, and strategies or in the work that they do; in other words, the manifestation of their perception of their responsibility in relation to their work or surrounding society.

The sheer volume and diversity of different dimensions of responsibility that organisations apply is a notable result. Clearly, these go well beyond the six keys of RRI.

In the initial qualitative thematic analysis of the data, education generally appeared as a dimension of an organisation's responsibility both internally and externally. It is hard to imagine universities without educational activities, but because of the properties of our data on universities, this may not be captured correctly in our dataset. We have thus coded a focus on education for all universities as a default. Because of the large number of universities in our sample, education comes out as the most prevalent dimension of responsibility, which 85 per cent of the organisations focus on. Following education, a large proportion of organisations (73 per cent) specifically address societal impact, which largely encompasses the general idea of RRI: a concern for local community, for creating solutions that serve or benefit citizens, and for solving societal challenges. This is closely followed by a focus on ethics (68 per cent), which includes specific principles for conducting research in an ethical manner, such as weighing benefits and harm, conducting medical trials in accordance with directions offered by ethical bodies, or abiding by specific principles in relation to animal testing.

Table 1 offers an impression of the breadth and diversity in the range of concerns that organisations perceive as their responsibility towards society or in relation to their work. We will not meticulously go through all the dimensions but instead, turn to the differences between types of organisations.

3.2 Only subtle differences in perceptions of responsibility between types of organisations

Figure 1 shows the share of organisations across the five types that focus on each dimension of responsibility. Overall, the differences are modest.

The funding organisations are very concerned with the aspects of ethics as well as transparency and Open Access. Overall, 94 per cent of the private research foundations focus on ethics in values, strategies, or the work that they do, which is also the case for 77 per cent of the public funding agencies. Similarly, 68 per cent of the public funding agencies focus on transparency in the research process and Open Access; this applies to half of the private research foundations. An interesting difference between the public funding agencies and the private research foundations is that half of the public agencies are concerned with the governance of research practices, whereas this only applies to 19 per cent of the private foundations. Another difference is that rather few (only 25 per cent) of the

Table 1. Share of organisations focusing on given dimensions of responsibility

Dimension of responsibility	Percent
1. Education Organisations focus on education and training of pupils, university students, researchers, or employees, for example, by valuing training, by teaching, contributing to curricula, or financially supporting educational activities.	85
2. Societal impact and challenges Organisations focus on their role in and impact on local community or society as a whole and seek to create solutions that serve the needs of people, benefit citizens, or solve grand societal challenges.	73
3. Ethics Organisations focus on research integrity and on cultivating ethically appropriate research and business practices, for example, by applying a Code of Conduct or complying with specific rules for animal testing and clinical trials.	68
4. Equality and diversity Organisations focus on equality, the inclusion of minorities, and diversity in their organisation or in the public debate, for example, by publicly expressing such values, setting goals for the number of women in management, or working actively to fight discrimination.	55
5. Sustainability Organisations focus on environmental impact and sustainability, for example, by raising awareness about such issues, engaging in environmental protection, or seeking to reduce the emission of greenhouse gases.	55
6. Governance of research practices Organisations focus on creating governance principles for research and innovation processes, for example, by making their own RRI-related principles to guide their work, contributing to national rules or guidelines, or voluntarily adhering to international standards.	53
7. Public engagement Organisations focus on raising awareness and interest in research, on science communication, science education, or engaging the non-academic public (or non-university students) in research discussions, decisions, and processes.	41
8. Transparency and Open Access Organisations focus on transparency in the research processes and results or on Open Access specifically, for example, by allowing the public to follow the research process and access trial results, by having an Open Access policy, or by hosting an Open Access platform.	39
9. Health and safety Organisations focus on health and safety internally or externally, for example, through procedures to secure a safe work environment, raising awareness about diseases, or promotion of health consciousness as well as financing or implementing health care initiatives.	35
10. Interdisciplinarity Organisations focus on interdisciplinarity, for example, valuing it as a tool to further RRI or actively facilitating interdisciplinary collaboration.	25
11. Stakeholder inclusion Organisations focus on including stakeholders, that is, people who hold a direct interest in the research process or its outcomes, such as employees, suppliers, customers, shareholders, or public authorities, in the research or innovation process.	24
12. Economy Organisations focus on contributing to economic growth, job creation, or welfare in their local community or country.	23
13. Culture Organisations focus on culture, cultural heritage, and cultural dissemination, for example, by supporting, participating in, or facilitating cultural projects such as art, films, and music.	17

private research foundations are concerned with responsibility in terms of contributing to the economy whereas 68 per cent of the public agencies explicitly seek to strengthen growth, job creation, or welfare in their country. Many of these organisations are probably established with this specific goal, as is the case with the Austrian Science Agency, which aims to contribute with ‘cultural development, to the advancement of our knowledge-based society, and thus to the creation of value and wealth in Austria’ (Griessler 2016: 1). The public funding agencies also stand out with a strong focus on interdisciplinarity compared to the other types of organisations.

While a high overall share of organisations focuses on equality and diversity, this only applies to a third of the CSOs.

Last, it is notable that universities stand out with a limited focus on health and safety, which was only identified among 21 per cent of the analysed universities. Similarly, only 7 per cent of universities focus on stakeholder inclusion. As already mentioned, we have to be very careful not to draw too strong conclusions regarding the universities in this dataset because of the nature of the data.

3.3 Organisations use many different tools to promote responsible practices

The 217 organisations covered by this study exhibit a very diverse range of perceptions of responsibility in the context of their research and innovation activities. We also find that organisations have developed and employ many different mechanisms and initiatives to promote RRI practices. In Table 2, we present these initiatives in order of frequency.

Including principles of responsibility in strategies, policies, and goals is the most common way to promote RRI practices. More than half of the organisations do this (56 per cent). This includes, for instance, aims related to the environment, such as minimising the use of electricity or water, which may reflect a more general trend of an increased focus on sustainability over the past two decades (Linnenluecke and Griffiths 2010; Benn et al. 2014). Coming in second, internal guidelines are widely used among the analysed organisations (43 per cent). These are primarily codes of conduct and ethical guidelines, which are present in far most of the private companies and at almost half of the universities. Roughly a third (35 per cent) of the analysed organisations focus on cooperation to promote

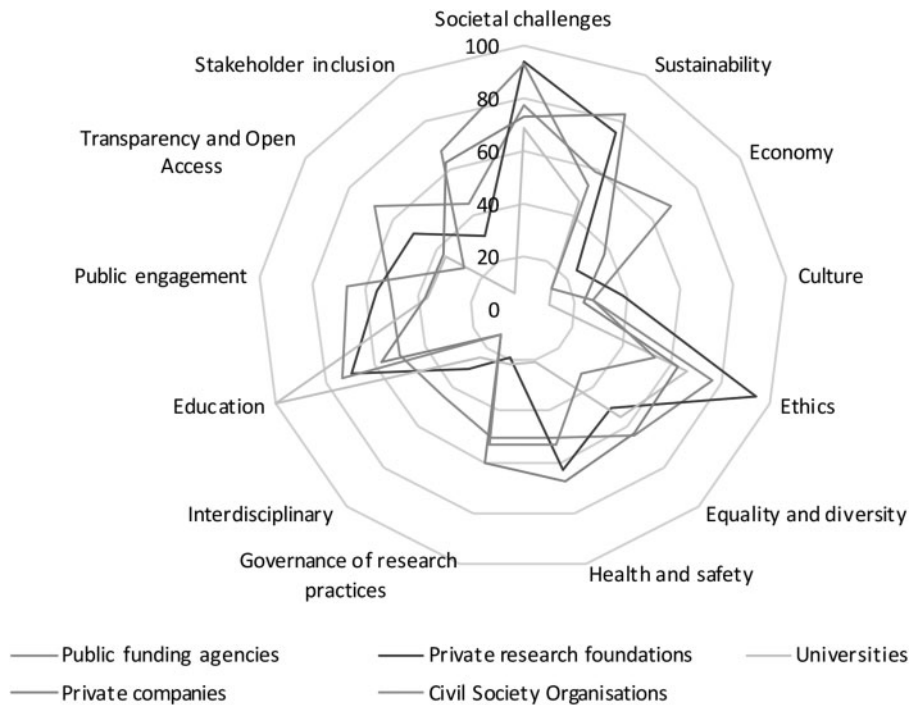


Figure 1. Percentage of organisations across types focussing on a given dimension of responsibility.

responsible practises, that is, collaborations with external partners or between distinct parts of their own organisation.

3.4 Different types of organisations have different approaches to promote responsible practices

In Fig. 2, we illustrate the share of organisations across the five different types that apply a given mechanism to promote RRI practices. It is evident that there are more pronounced differences between the organisations in these matters of implementation than was the case regarding the perceptions of responsibility.

The CSOs are outward oriented in their efforts to promote responsible practices. Overall, 80 per cent of them engage in cooperation with other organisations to discuss or act on questions of responsibility. Moreover, 80 per cent also lobby their ideas and interests to policymakers and administration. Among the other types of organisations, this mechanism is rarely used. A large proportion of CSOs also facilitate discussions about science and research priorities, contribute to or host science events, and implement public campaigns. Moreover, a large share of CSOs also implement or support RRI-related training activities, host online platforms for dissemination of science, create informal groups or networks, and support or implement citizen science initiatives. It is interesting to note that the CSOs largely implement these initiatives without formalising them in official strategies, policies, or goals. Only 27 per cent of the analysed CSOs include principles of responsibility in their strategies, which is substantially less than the other organisations. Similarly, only 13 per cent have established specific units within their organisation to discuss or implement this work.

The private companies have an almost opposite profile than the CSOs. They are more likely to formalise their work to promote responsible practices than other organisations. About 73 per cent of the private companies incorporate principles of responsibility into strategic goals and policies, 70 per cent of them implement and

enforce internal guidelines for their work, and half of the private companies have adopted voluntary standards. Similarly, little more than a third of them have established units within their organisations to discuss or act on responsibility issues. Forty per cent of the companies also engage in RRI-related training activities, which are primarily training of their own employees in areas such as courses and workshops on ethical codes or specific rules and procedures in research. Most of these tools are oriented inwards at making the research and innovation process, the production, or the staff more responsible. However, 60 per cent of the companies also cooperate with other actors or facilitate cooperation among distinct parts of their own organisation to promote responsible practices.

The private research foundations primarily use tools that are related to their role as funders to promote RRI practices. Overall, 69 per cent of the private research foundations set responsibility-related requirements for applicants to achieve funding, provide financial support specifically for research in research integrity, RRI, gender equality, ethics, or the like, and offer funding for particular responsibility-related purposes, such as Open Access publishing or public engagement events. They are also slightly more likely to financially support educational activities and impose rules on others to enhance responsibility. The public funding agencies generally follow the trend of their private counterparts. The mechanisms employed are rather specific to the funding organisations as they are primarily based on creating financial incentives to incorporate ideas of responsibility in research projects.

A noteworthy difference between the public and private funders is that 27 per cent of the public funding agencies implement responsibility-related training activities. This only applies to one of the private funders. One might argue that there is a risk that requirements become mere ‘tick-boxing’ in research proposals if they are not backed by training on why this is important, how such requirements can be fulfilled, and how to implement them into daily work.

Table 2. Share of organisations using given mechanisms to promote responsible practices

Mechanisms to promote responsibility	Per cent
1. Strategy Principles related to responsibility dimensions are included in the strategies, goals, or policies of the organisations, for example, specific plans to reduce carbon emissions by 20% in 2020 or implementation of a strategy to employ more women in management.	56
2. Guiding Organisations have internal rules guiding the work of researchers, students, and/or employees to be more responsible, for example, an ethical code, code of conduct, rules for clinical tests, and testing on animals as well as mechanisms to enforce such rules, such as a hotline for violations.	43
3. Cooperation Organisations collaborate (locally, nationally, or internationally) with local authorities, NGOs, universities, or businesses in order to discuss or act on questions of responsibility, for example, universities joining forces to make research more relevant to society.	35
4. Adhering to voluntary standards Organisations adhere to or support non-mandatory local, national, or international standards or principles regarding responsible behaviour, for example, the United Nations' principles for responsible management education or the Berlin Declaration on Open Access to scientific knowledge.	28
5. Unit Organisations have a formal administrative body, staff unit, or an officer to discuss and/or act on issues related to responsible practices with a degree of decision-making power, for example, a council, committee, or chair on gender equality or ethics.	26
6. Event Organisations host or support activities aiming to communicate science, research, or innovation and make people interested and engaged in these topics, for example, educational events for children and youngsters, science fairs, festivals, researchers' nights, science cafes, open house events, and so on.	26
7. Supporting RRI-related research Organisations as a whole prioritise or financially support research into specific responsibility-related issues, for example, by promoting research in gender equality or running a research centre that focuses on RRI research.	26
8. Discussion Organisations host or support activities (internal and external) that bring people, for example, stakeholders, together to facilitate discussion or dialogue about science and research priorities. These are face-to-face meetings, such as conferences, discussion groups, seminars, and round tables.	23
9. Training Organisations conduct or support teaching, training, or education activities directly related to principles of responsibility, for example, training researchers in communicating their work broadly, teaching employees ethics, or educating students in sustainability.	23
10. Funding Organisations offer or contribute to grants specifically for RRI or related purposes (e.g. for Open Access publishing) or otherwise offer funding based on responsibility considerations (e.g. grants for women to enhance equality in research).	21
11. Setting requirement Organisations require that researchers meet certain demands related to responsibility or discuss these when applying for funding. This could, for example, be requiring that half of the research team are women or that researchers consider potential societal harms and benefits of their project.	13
12. Competitions, prizes, or awards Organisations host or support competitions, awards, or prizes related to responsibility principles, for example, research competitions among pupils or high school students to make them interested and involved in science or awards to excellent research by female scientists.	13
13. Campaign Organisations host or support public information campaigns or other activities to disseminate research results or facilitate public discussion about responsible science and technology. This is, for example, media activities, public appearances, writing for newspapers, or press releases.	12
14. Imposing rules Organisations impose rules or principles of responsibility on others, for example, by requiring sustainable production, workers' rights for health and safety, anti-discrimination, or ethical guidelines by suppliers or partners.	12
15. Affecting policy Organisations work to affect policy, legislation, or public authorities on a local, national, or international level in a responsible direction. This can be lobbying or by representing certain interests in government bodies.	12
16. Citizen science Organisations host or support citizen science initiatives where the general (non-scientifically trained) members of the public conduct science, for example, by collecting data.	10
17. Platform Organisations host or support an online platform for creating, communicating, or discussing research, for example, an online Open Access platform, research blog, or open-source forum.	10
18. Financially supporting education Organisations financially support educational activities.	10
19. Network Organisations facilitate informal groups or networks to enhance organisation, support, or social ties in certain groups or host events for these groups, for example, women or minorities.	10

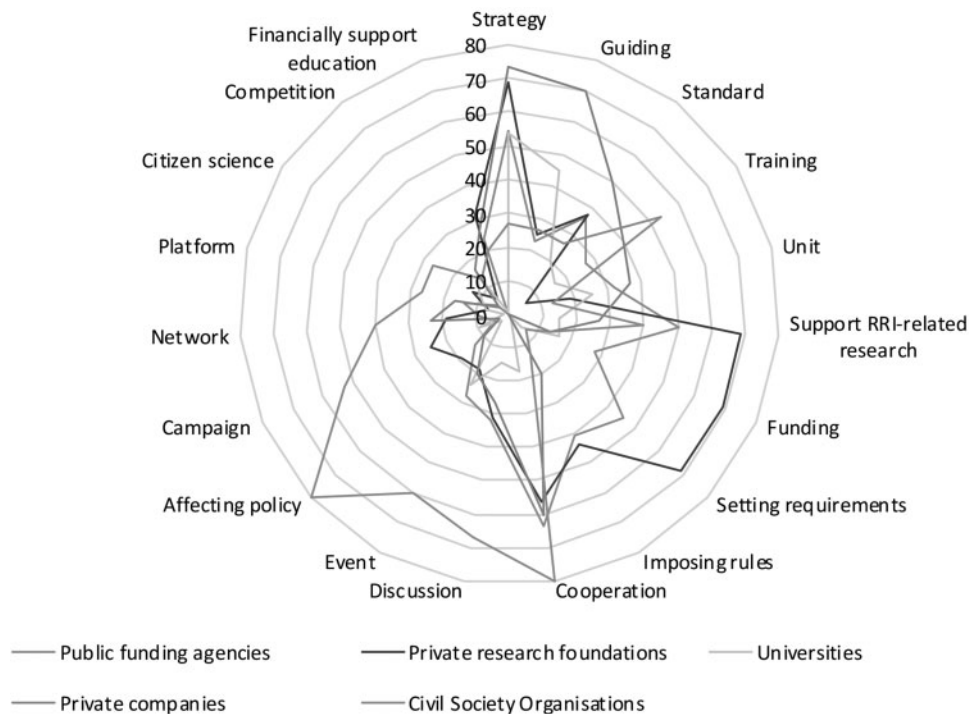


Figure 2. Percentages of organisations across types using given mechanisms to promote responsible practices.

With the current data, we cannot say if this is the case but only encourage future research to look more into this question.

Similar to private companies, the universities seem to be internally oriented and rather formalised in their effort to promote RRI practices. About half of the universities have incorporated principles of responsibility in their strategies and policies. Likewise, 45 per cent have implemented responsibility-related internal guidelines, and 25 per cent work with these issues in internal units. However, almost one in four universities also host or support science events to communicate science. Overall, the universities seem to be less active in promoting responsible practices compared to the other organisations in our sample. This may indicate a trend, but because of data issues regarding the universities, this may not present a fair and accurate image but, indeed, underestimate the efforts of the universities.

In Table 3, we have summarised the differences between the organisations in an attempt to characterise their distinct features.⁴

3.5 Several hindrances to promote RRI

The above analysis demonstrates that many initiatives have been set in place across Europe to strengthen responsible practices. In the interviews with key actors in each analysed organisation (except the universities), the country correspondents also asked about hindrances to promote RRI specifically. We summarise these in Table 4. These are general reflections, concerns, and perceptions of a few individual interviewees across the organisations, and we present them in these general terms and not at the organisational level, as in the previous analysis.

The main obstacle to implementing initiatives to promote RRI is a lack of financial resources. A low degree of political support or will to allocate money to the area or direct cutbacks in public funding for research and innovation have left especially universities, funding agencies, and CSOs struggling to find funds for RRI

activities, such as science shops and online platforms for science dissemination. Similarly, there are no operational financial incentives for researchers to engage with RRI. The deep economic crises in some countries (e.g. Greece and Iceland) have exacerbated these tendencies, forcing decision-makers to limit research activities to a minimum and thus leaving ad hoc projects without funding. The primary aims of research activities in these countries are economic stability and growth, and collaborations between industry and academia are thus rewarded because of their expected ability to create patents and jobs. This does not necessarily leave much room for RRI initiatives, as it was, for instance, uncovered in the country report on Iceland: ‘Moving towards an RRI mentality and tackling societal challenges when the basics of the research and innovation system are not fully functional is a bit like running before you learn how to walk’ (Jonsdottir and Thorkelsdottir 2016: 6).

In countries that have experienced economic crises and cutbacks in public funding for research, public funding organisations have primarily focused on absorbing resources and maintaining their existing work, which is the case in Greece. This is also an issue in Lithuania, where CSOs are fighting for ‘economic survival’, not leaving resources to prioritise RRI initiatives.

A related issue is a way the funding system works. Temporary project funding for limited, specified activities makes it hard to plan, develop, and sustain RRI projects over a longer period of time and creates instability. This is typical for most non-governmental organisations but also for organisations (e.g. universities) that rely heavily on private funding (e.g. from industry).

The financial issues do not just apply to universities, funding agencies, and CSOs. Private companies are also affected by a lack of funding. Ensuring an ethical supply chain, investing in cleaner technology, training employees, upholding outreach programmes, and so on are all subject to financial investments. In times of economic downturn or low prices, companies may carefully scrutinise the

Table 3. Overview of differences between organisation types

Funding organisations	Universities	Private companies	CSOs
Concerned with ethics and transparency/Open Access, although public funding agencies are also concerned with contributing to the economy. Primarily use funding-specific tools to incentivise responsible research practices: setting requirements for funding, funding specific responsibility-related initiatives, and funding research in RRI or related areas.	Education appeared in our data as a dimension of responsibility, which is one of the primary tasks of universities. Primarily internally oriented in their efforts to enhance responsible research practices: incorporating aspects of responsibility in strategies and establishing internal guidelines and units to work with such issues. Comparatively lower priority given to this effort.	Focussed on sustainability (in production), health and safety (of employees), and governance of practices. Their effort to promote RRI practices is formalised and internally focussed with strategies, internal guiding and standards, units and training (of employees) as core mechanisms.	Concerned with public engagement and stakeholder inclusion. Characterised by an external focus in their efforts to promote RRI practices by hosting events, discussions, campaigns, and so on. They are comparatively the most engaged organisations in this area, although the work is not formalised in strategies and designated units.

Table 4. Main hindrances to promote RRI

1. Lack of funding General economic pressure in research and development and a lack of funding specifically for initiatives to promote RRI hinder implementation. This cuts across all types of organisations.
2. Priority Private companies seek economic growth, researchers seek to publish articles in high-impact journals, and CSOs and funding agencies seek funding to uphold their activities. Often, these pressures and priorities hinder the use of resources on implementing initiatives to strengthen responsible practices.
3. Scepticism Lack of recognition of RRI and its potential benefits among key players in industry, scientific communities, or the public is a hindrance. Some informants expressed direct organisational resistance to its implementation.
4. The RRI concept The RRI concept is unknown to many organisations, it is unclear how it differs from other ideas of responsibility and hard to define and operationalise, and there is a lack of criteria and tools for RRI evaluation, which makes organisations unlikely to implement it.
5. Lack of political support No or a low degree of political vision and will to further RRI from national policymakers, public funding agencies, or university administrators. This leads to a lack of funding and an absence of national regulation or requirements.
6. Difficulties in assigning responsibility Assigning responsibility for the implementation of RRI activities and control procedures can be problematic. Some funding agencies, universities, and companies have difficulties defining their own role and, hence, pass the responsibility to promote change to others.
7. Lack of knowledge and skills There is a general lack of information about RRI and its implications. This deficit can be detected both on the side of academics and on the side of the broader public.

activities not considered ‘core business’, and thus, RRI initiatives may not be their main concern. This, of course, has a lot to do with priority, the second major hindrance to RRI. Not surprisingly, companies are driven by an aim for economic growth, and although this does not contrast with responsible practices or, for instance, CSR, they might face trade-offs when they opt for economically advantageous decisions at the expense of, for instance, sustainability. In several countries, company interviewees highlighted that sales, marketing, or growth-based models can hinder RRI. Companies only invest in projects if they can expect an economic return, and this concern sometimes overrules the principles of RRI.

Not only the private companies, do not highly prioritise RRI. There is a dominant conception across European universities that research excellence can be measured in terms of quantitative publication output and researchers’ abilities to publish in high-impact journals. Moreover, researchers are expected to secure funds for their work and institutions. Their careers depend on their ability to meet these demands, which does not leave much room for RRI initiatives. Some researchers may even find that RRI can interfere with

their careers and are reluctant to, for instance, engage in participatory or multidisciplinary approaches as they lack dedicated journals. Similarly, seeking to publish in high-impact journals does not always align with the RRI principle of Open Access.

While there might be difficulties related to implementing RRI principles and activities because of lack of funding or because organisations have different priorities, there are also signs of more profound scepticism or direct resistance when it comes to the RRI concept. Some key players in the industry and especially in the academic communities in Europe do not see the benefits of science communication and public engagement. The main reservation exists in the scientific communities where academic freedom and autonomy of researchers are very strong values. Here, the dominant belief is that only scientists should make decisions regarding science; a serious hindrance to promoting public engagement at these universities. Some interviewees also claim that a similar scepticism exists among those in the broader public who are unwilling or uninterested in engaging in science and voice their demands on these issues.

In several countries, there is no or only a low degree of political interest, will, or vision to develop plans for RRI, either because the current political power structure does not favour more direct democracy or because policy is highly influenced by other concerns. In some cases, no one really takes responsibility for stimulating RRI initiatives or develop responsibility aspects of existing programmes. This may very well be a result of a lack of political determination, which again results in a lack of legislation or requirements more generally. In Austria, for instance, most of the initiatives on RRI concerns gender equality, where legislation does exist, indicating that political priority and measures implemented top-down do matter. A few informants mention the distinction between soft and hard governance and highlight that setting formal requirements, and not just informal encouragements, will be vital to promoting RRI.

Another substantial hindrance to strengthening responsibility in research and innovation is the RRI concept itself. Key actors in CSOs, public research agencies, and private research foundations find the concept weak; it lacks support from well-founded literature, its definition remains unclear, and it is hard to operationalise and thus difficult to transfer into practice. This complicates cooperation between national and international partners who have a hard time finding common grounds on the understanding of RRI. Similarly, it is difficult to identify criteria or tools for RRI evaluations. Several organisations also raise a concern about the actual need for the concept and, to some degree, find it redundant, either because they are already working with keys of RRI without knowing the concept or because they rely on more established concepts, such as research ethics, which have a long tradition. It is hard for funding agencies to explain to researchers why this new concept is important, and there is a risk that the introduction of a new concept will be perceived as implying that former practices were not responsible—even if this is not the case.

The last of the hindrances that cut across some countries and organisation types are lack of information, expertise, and experience. Interviewees reported a lack of capabilities both among members of the public and within the scientific community when it comes to developing shared understandings and development of a common language around engagement and co-creation of research and innovation.

4. Discussion of findings

In this article, we have offered an overview of the status of RRI in 217 research performing and funding organisations across Europe. We have investigated how they perceive responsibility in relation to their work and surrounding society, which tools they apply to promote responsible practices, and what they see as hindrances to promote RRI. In this section, we present and discuss the primary findings and potential policy implications.

Only thirteen out of the 217 organisations in our sample use the RRI concept, despite the effort of the European Commission to mainstream it throughout the research and innovation communities of Europe in recent years (Owen et al. 2012; Zwart et al. 2014). Nevertheless, most of the organisations examined in this study employ a broad and diverse perception of responsibility in relation to their work, also beyond the six keys of RRI. Most frequently, this includes a focus on education, societal impact, and ethics.

There are only subtle differences between the perceptions of responsibility between public and private research funders, companies, universities, and CSOs. However, their implementation approaches

to promote responsible practices are quite different. The CSOs are outward oriented and host or support discussions, events, and campaigns. They collaborate with other organisations to discuss or address issues of responsibility, and they work to influence policy. They do not tend to formalise this work in strategies, internal guidelines, and in dedicated units within their organisations. The private companies are the opposite. They primarily use such tools and are internally focussed around product development, production, and staff in their effort to be more responsible. The private research foundations and public funding agencies primarily use funding-specific tools, such as setting requirements to receive funding, offering to fund for specific RRI-related purposes, or funding particular research areas to incentivise responsible practices. The universities are harder to characterise. Similarly to the private companies, they are quite formalised and internally focussed in their effort to promote responsible research, but a large proportion of them also host or support open science events.

As mentioned above, it is important to note that the sample of this study is not representative of the population. The sample of organisations is purposively drawn, and there is an overweight of universities. We should be careful to draw conclusions from this sample to a general population but rather see it for what it is, an attempt to get an overview of different perceptions of responsibility and different mechanisms used to promote responsible practices across different kinds of organisations. Even though the study captures a considerable number of individual organisations, it does not inform us about the prevalence of such dimensions and mechanisms in general.

We cannot, with the data at our disposal, provide any detailed explanations of the differences we have found between types of organisations; neither can we investigate in greater depth the relationships between dimensions of responsibility and mechanisms used to further them.

Standing at the threshold to the next European framework programme for research and innovation, Horizon Europe, it seems obvious to raise the question of whether RRI is adequately mainstreamed to withstand declining attention at the supranational level. The immediate answer is ‘no, probably not’. As our results suggest, the concept is still quite unknown, poorly institutionalized, considered unclear, and hard to operationalise and evaluate, and its unique contribution in comparison with related concepts of, for instance, research ethics is not convincing to all informants in our study. So, what might be the implications of withdrawing support?

On the one hand, RRI is potentially a controversial issue, which requires a lot of deliberative consideration, debate, and practical changes within implementing organisations before it is accepted (van Oudheusden 2014). Meanwhile, it is still an evolving concept and social innovation, and dissemination and adoption are expected to take a long time (Rip 2014). One might argue that more time is simply needed to negotiate and implement the concept. Likewise, the lack of funding is seen as the primary obstacle to implementing RRI, and in that context, withdrawing funding is problematic.

Our results also suggest a more general challenge in the implementation of RRI through soft, multi-level governance. Soft governance is a decentralised process of governing relying on complex collaborative networks (for policy-making and implementation) that are not directly steered by a centralised authority such as the state (Rhodes 2007). Typical to these arrangements is also that steering takes place in the form of various informal guidelines, meetings, information dissemination, and so on, instead of binding regulation (Brandson et al. 2006). The absence of regulation and non-

ambiguous incentive structures may add to the slow adoption of RRI across Europe, suggesting that other tools might be beneficial.

On the other hand, even if the RRI concept has had a modest impact, there is a multitude of responsibility-related issues considered salient across core actors in the ecosystems of research and innovation. Several initiatives are already set in place to promote RRI practices, implying that the RRI concept itself is of less importance.

Liberating the responsibility agenda in the transition from Horizon 2020 to Horizon Europe might indeed involve useful opportunities for adjusting the policy approach. Rather than imposing a particular concept of responsibility in research and innovation top-down, it might be helpful to refocus policy efforts towards established and prevailing perceptions of responsibility, tapping into the language that core actors in the research and innovation landscape already use, and to pursue schemes that create motivation around practices that are already familiar. The mapping of perceptions and activities, as in this study, could be used to inform a more context-sensitive and flexible policy approach. Sensitivity towards the perceived barriers to responsibility detected in this study might also be exploited in novel policy approaches.

Likewise, the mapping may help to identify areas that are underdeveloped or lacking attention among certain actors in the research and innovation systems. For instance, only 24 per cent of the organisations covered in this study focus on stakeholder inclusion, an observation that is arguably at odds with aspirations for ‘opening up’ research and innovation processes to broader participation and co-creation (Stirling 2008; European Commission 2016). Another observation is that public funding agencies seem to lag behind their private counterparts when it comes to incentivising responsible practices, which might point to a ‘responsibility deficit’ that could be addressed through targeted policies. Overall, exploring patterns across organisations, including perceived obstacles to responsibility, might be conducive to the making of new policies in this area.

Our hope is that the mapping effort can raise questions, stimulate further research, and contribute to a policy discussion about the need for and approaches to enhancing responsibility across the European research area. The future of the RRI agenda is uncertain, but we find it noteworthy and encouraging that while the RRI concept is largely unknown to the research performing and funding organisations in our sample, they still work to promote responsible practices. After all, the sweet smell of the rose is not due to its name. It is important to acknowledge the efforts devoted to fostering responsibility across European research and innovation organisations, whether these efforts are coined as RRI or not.

Supplementary data

Supplementary data is available at *Science and Public Policy* online.

Conflict of interest statement. None declared.

Notes

1. See ‘Pathways Declaration’ at http://pathways2019.eu/wp-content/uploads/2019/07/RRI_Declaration.pdf.
2. See the full list of organisations in [Online Appendix A](#).
3. Mapping the average number of responsibility-related dimensions and mechanisms used to promote responsible practices in different countries did not reveal geographical patterns. We attempted an agglomerative, average linkage, hierarchical cluster analysis using the simple matching coefficient to explore national or regional patterns (Anderbjerg 1973; Everitt et al. 2001; Ekström 2011). We found no such patterns in the data.
4. We collected data on the number of employees in each organisation using Google searches, the organisations’ websites, and the ETER Database (www.eter-project.com) to see if the differences found are merely a product of organisational size. We categorised organisations as ‘small or medium sized’ if they had less than 150 employees, ‘large’ if they had between 150 and 999 employees, and ‘very large’ if they had 1,000 or more employees. We ran the above descriptive analysis again but did not find significant differences in the mechanisms used to promote responsible research and innovation practices in organisations of different sizes.

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