

Responsible Research and Innovation

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Responsible Research and Innovation (RRI) describes a research, development or innovation process that takes into account effects and potential impacts on the environment and society. It can be defined as "a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products in order to allow a proper embedding of scientific and technological advances in our society."^[1] The approach is and has been part of several European Framework Programmes and has been developed in scientific and technological publications in journals and conferences, as well as in projects. By June 2014, there were at least a dozen international research projects, most of them funded or co-funded by the European Commission, that were involved in developing a Responsible Research and Innovation governance framework.^[2]

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Definitions

Apart from the well-known definition given in the first paragraph of this article, there are several other definitions of Responsible Research and Innovation (RRI).

It "refers to the comprehensive approach of proceeding in research and innovation in ways that allow all stakeholders that are involved in the processes of research and innovation at an early stage (A) to obtain relevant knowledge on the consequences of the outcomes of their actions and on the range of options open to them and (B) to effectively evaluate both outcomes and options in terms of societal needs and moral values and (C) to use these considerations (under A and B) as functional requirements for design and development of new research, products and services."^[3] The European Commission (EC) described RRI in an earlier publication as a framework that consisted of six key action points:^[4]

1. **Engagement:** It implies that societal challenges should be framed on the basis of widely representative social, economic and ethical concerns and common principles on the strength of joint participation of all societal actors - researchers, industry, policymakers and civil society.
2. **Gender Equality:** Addresses the underrepresentation of women, indicating that human resources management must be modernized and that the gender dimension should be integrated in the research and innovation content.
3. **Science Education:** Faces the challenge to better equip future researchers and other societal actors with the necessary knowledge and tools to fully participate and take responsibility in the research and innovation process.

4. **Open Access:** States that RRI must be both transparent and accessible. Free online access should be given to the results of publicly funded research (publications and data).
5. **Ethics:** Requires that research and innovation respects fundamental rights and the highest ethical standards in order to ensure increased societal relevance and acceptability of research and innovation outcomes.
6. **Governance:** Addresses the responsibility of policymakers to prevent harmful or unethical developments in research and innovation. The latter is a fundamental basis for the development of the rest of the dimensions.

According to Owen *et al.* (2012) there are three main features of RRI that overlap to a great extent with the EC Framework.^[5]

1. Democratic governance of the purposes of research and innovation and their orientation towards the "right impacts".
2. Responsiveness, emphasizing the integration and institutionalization of established approaches of anticipation, reflection and deliberation in and around research and innovation, influencing the direction of these and associated policy.
3. Framing of responsibility itself in the context of research and innovation as collective activities with uncertain and unpredictable consequences.

According to Stilgoe *et al.* (2013), RRI has four dimensions.^[6]

1. Anticipation
2. Reflexivity
3. Inclusion
4. Responsiveness

RRI is best understood as a higher level responsibility that aims to shape, develop, and align existing and future research and innovation-related processes.^[7] The concept is applied mainly for science and technology-based research and innovation, in particular in the area of emerging technologies—notably nanotechnologies, Information and communications technology (ICT), genomics, synthetic biology and geo-engineering. However, some authors state that RRI could also encompass financial instruments, public policy or community innovations, distribution, service or system innovations.^[8]

History

Responsible Research and Innovation is developed as an approach to governing research and innovation at the European Union level. It is "reflected in many high-level policy, strategy and programming documents, such as the objective of the Europe 2020 strategy to create smart growth or the Horizon 2020 programme that defines tackling societal challenges as one of the main priorities."^[1]

The term RRI was coined in Europe and the United States in the first decade of the 21st century. Among the first authors who developed this concept from 2003 on were Hellstrom, Guston, Owen, and others (see the References section below).

At the European level the concept originates from visions for collaborations between social, natural and physical scientists that address the wider dimensions of science and innovation early on. Examples can be found within the 5th and 6th EU Framework Programmes and their calls for socio-technical integration.^[9] More examples are calls for greater public engagement with science and technology.^[10] According to Owen *et al.* (2012),^[5] integrated approaches such as Technology assessment in its various forms, referring to publications from Schot and Rip (1996) and Guston and Sarewitz (2002), and anticipatory governance (see the paper by Karinen and Guston from 2010) are further roots of RRI. They claim that some of these features had been formalised within decision-making processes, such as the so-called "Danish model" for technology assessment based on public participation and deliberation, e.g. through consensus conferences (see ^[10]).

In the United States of America, many ideas that have shaped science policy emerged from the writings and influence of Vannevar Bush. Bush's "Science-The Endless Frontier" (1945) proposed a civilian-led body to support research in the interest of meeting national goals. Bush attempted to design a system that pursued fundamental theoretical work and successfully connected it to application and societal needs.^[11]

Application and Implementation

The European Commission stated in 2013 that because Responsible Research and Innovation was "a cross-cutting action that is implemented throughout Horizon 2020, 0.5% of the budgets for the 'Societal Challenges' and 'Industrial Leadership' pillars of Horizon 2020 [was] earmarked for RRI/Science with and for Society actions."^[12] Innovation and new technologies should meet the global challenges such as climate change and global warming, the efficient use of natural resources, demographic change, global health and development, social cohesion and the maintenance of economic prosperity.^[3]

It has been suggested that "Grand Challenges"—tightening supplies of energy, water and food; pandemics; ageing societies; global warming; public health and security^[13]—could be useful as a guiding force for RRI, in particular with regards to the criterion of societal desirability.^[1] Another possible foundation for societal desirability with democratic legitimacy could be constitutional values.^[14] Constitutional values of the European Union are "respect for human dignity, liberty, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. Moreover, the societies of the Member States are characterised by pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men."^[15] Other values that play an important role in this context are the UN Global Compact's ten principles in the areas of human rights, labour, the environment and anti-corruption.^[16] Some member states of the European Union have the ambition to establish their own framework for RRI, so that national criteria and approaches are being developed and implemented. Here are some examples of these national initiatives and their funding in 2008:^[8]

- The Netherlands Responsible Innovation Program (MVI) 2008 is funded by six Dutch government ministries and undertaken by the various departments of the Netherlands Organisation for Scientific Research (NWO), WOTRO Science for Global Development, the Technology Foundation STW, and the Netherlands organisation for health research and development (ZonMw). Among its distinctive features is that the projects it funds must all be interdisciplinary, involving collaboration between researchers in such diverse fields as ethics, social science, law, economics, applied science, natural science and engineering; projects have to be innovative, design-oriented and relevant to policy goals; and social and ethical issues are considered as part of the research and design process. What is also noteworthy about the program is that end user engagement is built into the application process through a valorization panel, which co-develops the proposal.
- The German NanoKommission sought in 2008 to create a structured dialogue between stakeholders, i.e. representatives of environmental and consumer organisations, unions, the science sector, industry and the government, to understand and evaluate the issues associated with the use of nanotechnologies in various sectors.
- In 2008 the UK's Engineering and Physical Sciences Research Council (EPSRC) initiated a 'grand challenge' to provide a focus for UK nanotechnology research by considering its potential contribution to healthcare. Grand challenges are defined through a scoping exercise to focus the topic onto practical contributions and for the first time the EPSRC involved the general public in this scoping exercise. EPSRC has established a Framework for Responsible Innovation (see the section #External links below).

Related terms

Technology Assessment

Even though Responsible Research and Innovation draws on the body of knowledge and experience provided by the history of Technology assessment over decades and on the methodological toolbox, it extends the scope of consideration to ethical issues of responsibility and to broader governance and science, technology and society (STS) issues.^[17]

Corporate Social Responsibility

The main difference between Corporate social responsibility (CSR) and RRI is that the CSR approach tends to be industry-driven or rather "an expression of corporate strategy, corporate identity, market power".^[18] CSR decisions are driven by the values of stakeholders by asking "What do stakeholders care about?". In contrast to that RRI establishes procedures to better integrate societal needs in the process of research and innovation and its methodology is centered on the equal roles and responsibility of societal actors and innovators.

Furthermore, CSR is mostly concerned with ethical acceptability (or legal responsibilities of human rights instruments) and sustainability (e.g. reducing pollution), not with societal desirability. This is illustrated by the United Nations Global Compact, a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles, which are concerning human rights, labour standards, the environment and anti-corruption.^[19]

Creating Shared Value

The principle of Creating Shared Value (CSV) starts where the UN Global Compact stops, namely how businesses can pursue social goals as part of their licence to operate. As such there is an overlap with RRI and its focus on societal desirability. However, the goal of CSV is to improve the competitiveness and economic profit of a company by addressing societal issues, whereas RRI ensures that science and innovation are ethically acceptable, sustainable and focused on societal benefits for society as a whole.

Corporate Sustainability

The term Corporate sustainability (also "sustainability" and "sustainable development") communicates a company's ambition to align its actions with the major social, environmental and economic changes that face society at large—and to prepare itself for the society of the future. However, it is about business in general and not specifically about Research and Innovation, has unidirectional top-down character and is not associated with collective responsibility, and civil society's engagement.

See also

- Accountability
- Beneficiation
- Business in the Community
- Business ethics
- Civil society
- Conscious business
- Corporate behaviour
- Corporate governance
- Corporate social entrepreneurship
- Corporate sustainability
- Customer engagement
- Ethical banking
- Ethical job
- Evolution of corporate social responsibility in India
- Green economy
- Green job
- Inclusive business
- Integrity Management
- Interest of the company
- ISO 26000
- Matching gift
- Principles for Responsible Investment (PRI)
- Public Eye Awards
- Responsible mining
- Shareholder primacy
- Socially responsible marketing
- Sustainability
- Technology assessment
- Voluntary compliance

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External links

European projects on RRI

- GREAT (<http://www.great-project.eu/>)
- NERRI (<http://nerri.eu/>)
- PIER (http://cordis.europa.eu/projects/rcn/111478_en.html)
- ProGReSS (<http://www.progressproject.eu/>)
- Res-AGorA (<http://www.res-agera.eu/>)
- RESPONSIBILITY (<http://responsibility-rri.eu/>)
- Responsible-Industry (<http://www.responsible-industry.eu/>)
- RRI Tools (<http://www.rri-tools.eu/>)
- Synenergene (<http://www.synenergene.eu/>)

Other resources

- EPSRC's Framework for Responsible Innovation (<http://www.epsrc.ac.uk/research/framework/>)
- Observatory for responsible innovation in ICT (<http://www.responsible-innovation.org.uk/>)
- Monitoring Responsible Research and Innovation (<https://morri.res-agera.eu/>)

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Categories: Social responsibility

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