FoTRRIS

Fostering a Transition towards Responsible Research and Innovation Systems

What is co-RRI?

Position paper on the conceptual framework underlying co-RRI

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About the FoTRRIS project

FoTRRIS develops and introduces new governance practices to foster Responsible Research and Innovation (RRI) policies and methods in Research and Innovation (R&I) systems.

FoTRRIS stresses that RRI is a collaborative activity from the very beginning. Therefore FoTRRIS adds the prefix 'co' to the acronym RRI. Important present-day challenges are of a global nature but manifest themselves in ways that are influenced by local conditions. Thus, FoTRRIS focuses on glocal challenges, i.e. local or regional manifestations of global challenges and on local opportunities for addressing them.

FoTRRIS performs a Transition Experiment, i.e. an experiment to support the transformation of present-day research and innovation strategies into co-RRI-strategies. It designs, tests and validates the organisation, operation and funding of co-RRI competence cells. A competence cell is conceived as a small organisational unit, which functions as a local one-stop innovation platform that encourages various knowledge actors from science, policy, industry and civil society to co-design, -perform, and –monitor co-RRI-projects that are attuned to local manifestations of global sustainability challenges.

Since research and innovation systems and practices in EU member states and within different research performing organisations vary, FoTRRIS experiments the implementation of new governance practices in five member states. These five experiments are evaluated, validated and constitute the basis for FoTRRIS policy recommendations towards EU and member states policy makers so as to enforce co-RRI into the national and EU R&I systems. Training is dispensed to various stakeholders, so as to form them to establish other co-RRI competence cells.

For more information see http://www.fotrris-h2020.eu

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Co-RRI : co-created responsible research and innovation

Political and societal support for research and innovation depend upon a silent contract between 'science' and 'society'. In line with dominating ideas on the role and responsibilities of research and innovation systems, a certain return is expected for public and private funding. So are research and innovation increasingly expected to contribute to the economy by improving countries' and regions' competitiveness in a global knowledge economy. In the Europe2020 strategy[2], for instance, research and innovation are seen as instruments to achieve the ultimate goal of growth and job creation. Science is also expected to enrich and legitimise policy processes through evidence-based policy advice. The scientific world is still perceived by many, including the scientific community itself, as being 'independent' and 'objective' and is, therefore, considered to be an essential source of reliable knowledge. Not only for policymakers, though, but also for a broader public, which presses for researchers' active role in public debates; and that science education and the communication of scientific results are increasingly used as tools to foster a broader culture of reason and reflexivity[3].

With sustainability gaining terrain and coming into the forefront of European objectives, this movement towards an understanding of research and innovation processes having multiple dimensions has been placed in yet another perspective during the past decades. Though knowledge economies have access to vast amounts of scientific knowledge and technological know-how, the sustainability performance of knowledge economies leaves much to be desired. We currently lack the necessary knowledge to create a thorough understanding at the level of individuals and institutions of the sustainability challenges we are globally facing, although these changes will be so vast, so pervasive, and so influential that they require immediate policy and management interventions. The research and innovation system is therefore asked to reflect upon its role and position in society and to re-examine their course and goals.

Currently, we record an emerging paradigm, in which a successful interaction of science, technology and society depends on the cross-fertilisation of values, norms, experiences and expertise among all actors engaged with ecologically sustainable and socially just societal change, and hence on the ability to transcend disciplines, established research cultures and practices, and categorisations such as public–private and academic–non-academic. This redefinition of the relationship between the research and innovation system and society is relying, amongst others, on an increase of the share of highly-educated citizens and the emergence of new 'spaces' for non-traditional knowledge actors to engage with science and technology. Examples of the latter are the growing number of activities that could fall under the term 'citizen science' or 'DIY science' (makerspaces, fablabs, etc.) and the opportunities created by social media for previously disparate groups of engaged individuals to connect. The long-term benefit would be that public dialogues are becoming part of the science

[2] EC (2010): EUROPE 2020. A strategy for smart, sustainable and inclusive growth. COM(2010) 2020, Communication from the Commission, Brussels, 3.3.2010. http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf

[3] Mejlgaard, N. (2018): Science's disparate responsibilities: Patterns across European countries, Public Understanding of Science, 27(3), pp.262-275.

governance landscape at different levels and that knowledge generation is increasingly seen as the result of co-creating practices.

'Responsible research and innovation' (RRI) was introduced as a new way to conceptualise this science-society relationship. According to the European Commission RRI means that *'societal actors work together during the whole research and innovation process in order to better align both the process and its outcomes, with the values, needs and expectations of European society.'*[4] In a broader sense, RRI is *'taking care of the future through collective stewardship of science and innovation in the present.'*[5]

RRI provides principles to facilitate the transformation of research and innovation systems. According to the European Commission, inclusive engagement, commitment to gender equality, more science education, ethics defined as shared values reflecting fundamental rights, open access to data and developing new models of governance open up and democratise the current research and innovation establishments.[6] Related scientific arguments stress the importance of anticipation, reflexivity, inclusion and responsiveness as most fundamental RRI principles.[7]

These definitions and principles, however, leave room for various interpretations and practical implementations; ranging from views and practices that strive for the radical transformation of the current R&I systems to views and practices that hardly challenge current structures. While RRI is a normative concept, with values such as ecological sustainability and social inclusion in its core, its normative anchor points are blurred. This again leads to a diversity of RRI approaches concerning their ethical and political positions, their understanding of responsibility and their transformative potential.

Therefore, FoTRRIS introduces **co-created responsible research and innovation (co-RRI)**. This is a concept that does not substitute former definitions and principles of RRI. It attempts to supplement them in order to clarify our normative position and our understanding of RRI principles. Co-RRI is characterised by its normative assumptions, content, its approach and its process.

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[4] EC (2012): Responsible Research and Innovation. Europe's Ability to Respond to Societal Challenges. European Commission, Brussels.

[5] Stilgoe, J.; Owen, R. & Macnaghten, P. (2013): Developing a framework for responsible innovation, Research Policy, 42, pp.1568-1580.

[6] EC (2012): Responsible Research and Innovation. Europe's Ability to Respond to Societal Challenges. European Commission, Brussels.

[7] Owen, R.; Macnaghten, P. & Stilgoe, J. (2012): Responsible research and innovation: From science in society to science for society, with society. Science and Public Policy, 39, pp. 751-760.

Schomberg, von R. (2013): A vision of responsible research and innovation. In Owen, R. - Bessant, J. - Heintz, M. (ed): Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society. John Wiley & Sons, pp. 51-75.

Stilgoe, J.; Owen, R. & Macnaghten, P. (2013): Developing a framework for responsible innovation, Research Policy, 42, pp.1568-1580.

1. Normative assumptions

FoTRRIS acknowledges that research and innovation processes are embedded in societal and political discourses and institutional structures. In the current context, the overarching political framework regarding sustainable development is provided by the United Nations' Sustainable Development Goals (SDGs). However, the political context may change over time. Yet, the basic values of co-RRI will still press for our **joint responsibility in creating knowledge and taking actions for solving grand environmental and social challenges while respecting planetary boundaries**.

The **underlying values** co-RRI is committed to, therefore, are: **ecological sustainability**, **acknowledgement of different forms of knowing** and **social inclusion**.

Given the role of the research and innovation system to create, collect, structure and distribute new knowledge, and its tradition in exploring less-known paths and discovering new horizons, we consider traditional knowledge actors to be appropriate partners to initiate and to sustain the search for answers to global challenges. They are well placed to organise and actively contribute to actions contributing to long-term transformative change, such as raising awareness, creating niches to experiment and collaborate, broadening and connecting networks of frontrunners, and creating tools to deal with the uncertainty surrounding policy and management actions for transformative change. We believe that a lack of complete scientific understanding never justifies a lack of action. Researchers and other knowledge actors should, therefore, in our opinion, follow in this respect the precautionary principle, which we understand as a call for taking action and being pro-active.

Moreover, we believe that problem-solving, in the spirit of the precautionary principle, cannot be based on the exclusivity of scientific knowledge production. The entanglement of the research and innovation community with industry and government easily runs counter to researchers' critical distance from dominant beliefs and practices.[8] Besides, each scientific discipline and paradigm is characterized by its boundaries, hence limiting researchers in their understanding of multifaceted societal problems. The necessary knowledge to understand the complex societal problems of today, therefore, lies scattered among a diversity of stakeholders and various forms of local knowledge. This makes that transdisciplinarity is a key characteristic of co-RRI.

We recognise, however, that not all stakeholders invited to participate in this kind of transdisciplinary learning processes can start on an equal footing. While co-RRI invites stakeholders to engage in a joint (consensus-oriented) problem-solving process, it acknowledges that opportunities for participating, influencing the outcomes or taking steps in the real world vary among stakeholders. The implementation of co-RRI inevitably involves controversies, conflicts, and power issues. As a result, co-RRI is inextricably linked with **making choices with ethical and political implications**, such as giving a voice to marginalised and silent social groups. Beyond being aware of the ethical and political nature of co-RRI, responsibility therefore asks for being reflexive upon the choices made, as well as their implications.

[8] Deblonde, M. (2015): Responsible research and innovation: building knowledge arenas for glocal sustainability research, Journal of Responsible Innovation, 2(1), pp.20-38.

2. Content

Co-RRI addresses local manifestations of grand societal challenges (**glocal challenges**). As each locality is characterised by its own specific combination of cultural, social, infrastructural, geographical, economic and environmental elements, the actual problems, as well as the answers, are contextualised and unique. A precondition for research and innovation systems to become more responsible therefore is that local needs, values and opportunities are taken as a starting point to consider which combinations of traditional and non-traditional (local) knowledge are appropriate to effectively respond to the glocal problems they want to tackle. A next step is then to check whether their normative content complies with global ethical principles on strong sustainability. This implies that co-RRI frames economic growth as a means to realize social justice, prosperity and ecological sustainability as long as planetary boundaries are respected.

Local communities, however, never develop in solitude, but are attuned to changes in their environment in a co-evolutionary way. Co-RRI trajectories will therefore inevitably involve processes of critical reflection on their own functioning, also about this environment. We believe that this kind of **reflexive monitoring** should be structurally embedded in research and innovation processes and that it should be used to better align co-creation processes at the local level with broader societal developments. Accordingly, co-RRI trajectories touch upon a variety of possible options for addressing glocal challenges and should be understood as long-term processes involving lasting relationships between traditional and non-traditional knowledge actors and engagements transcending project-based knowledge creation.

3. Approach

Addressing grand societal challenges and, currently, pursuing SDGs implies complex and non-linear processes. SDGs and, in general, grand societal challenges cannot be solved in isolation, but they have to be looked at in interaction with each other, and as parts of one global agenda. The SDGs are dealing with **wicked problems**, which are deeply entrenched in contemporary societal, political, and economic structures and characterised by a hardly reducible structural uncertainty. These kinds of problems are very difficult to manage, given the variety of interests involved and the difficulties to interpret and structure them. Wicked problems are pointing out systemic failures that have gradually become part of our societal systems. Contrary to market failures, they cannot be corrected by conventional policies, but call for a transformation of our societal systems.[9]

Therefore, co-RRI adopts a **complex systems** perspective. This means that we conceptualize societal systems as complex systems that can be described in the following, non-exhaustive way. First of all, complex systems are constantly evolving, open systems that contain a multitude of elements interacting with each other and with elements in the system's environment. These interactions are

[9] Rotmans, J. & Loorbach, D. (2010): Towards a better understanding of transitions and their governance: A systemic and reflexive approach. In Grin, J. – Rotmans, J. – Schot, J. (ed): Transitions to sustainable development: New directions in the study of long-term transformative change. Routledge, pp. 105-113.

often unpredictable, in the sense that they are non-linear and determined by feedback loops. A small stimulus may, therefore, cause a larger effect than expected, or no effect at all, and vice versa. Secondly, complex societal systems are nested systems, which means that different organisational levels can be discerned in this kind of systems. Higher level structures emerge out of the interactions between elements at lower levels. So can co-RRI be placed in line with a Polanyian way of thinking in which the economic system is seen as nested within the social system which, on its turn, is nested within the ecological system. This implies that the institutionalised logic of economic activities is supposed to serve the social and, subsequently, the ecological system, and not the other way around. Moreover, the history of complex systems is believed to affect their present state, which in turn influences future states. This creates a certain degree of path dependency and makes that, in retrospect, there can always be found characteristics connecting distinct developmental states of a societal system. Furthermore, it questions 'one-size-fits-all solutions' for glocal problems, as this kind of solutions often lack connections with past states and are therefore less effective.

As a consequence, the complexity of societal systems emerges from the interactions between its composing elements. One of the elements can therefore never contain the whole or, said otherwise, one person, or even a group of people, can never have a complete view on the functioning of a whole societal system, such as the energy system, food system or health care system. Co-RRI, therefore, shares the opinion of those who say that when we understand that the world we live in is complex, we also have to acknowledge that there are limitations to our understanding of this world. An important consequence in this respect is the fact that it is difficult to describe the functioning of a societal system. Any description will be limited by the observer's needs, knowledge, interests and possibilities, which makes that there will be as many different ways to decompose and describe a societal system as there are observers.

In practical terms, this means that co-RRI follows the point of view that the knowledge gained through any description should always be placed relative to the perspective from which the description was made.[10] It necessitates, in our perspective, the involvement of a diverse array of actors to come to a broad understanding of the causes of glocal problems, as well as a broad range of thinking about possible alternative solutions. Co-RRI can therefore never be understood as just an add-on to 'research and innovation as usual.' Citizen and stakeholder engagement for RRI requires the **co-creation of relevant knowledge and solutions for complex problems**, and not just involving citizens and stakeholders in the final phases of an R&I project with the aim of 'educating' them into acceptance of the outcomes (the 'box-ticking' exercise). Co-RRI is a much more solid, thorough, and systemic concept for tackling complex problems in non-linear contexts. "RRI is not about first promoting new solutions and then implementing them into society afterwards, but about first deciding what the real values and needs in society are. Once we have a clear picture of those, we have to look for a good combination of experiential, scientific and technological knowledge to respond to those values and needs."[11] As a result, co-RRI invites actors from at least four societal subgroups representing the four

[10] Cilliers, P. (2005): Complexity, deconstruction and relativism, Theory, Culture & Society, 22, pp.255-267.
[11] Mariann Deblonde https://www.youtube.com/watch?v=arXQf7uQpeY

sectors of the quadruple helix of innovation, that is science, policy, business and civil society. The co-RRI process, in a **trans-disciplinary** spirit, provides space for dialogue among diverse types of knowledge-holders, and it creates room for guided reflections on the inherent values and norms of the research and innovation (R&I) system.

4. Process

Co-RRI processes go along with **transparency,** which grants access to information about the process as well as the (intermediary) results of ongoing activities, and therefore goes hand in hand with the **accessibility** of data and other information. On the one hand, this openness will allow stakeholders and other community members to reflect on the outcomes and to form their own opinions about the societal relevance of co-RRI trajectories. On the other hand, transparency and accessibility of data break down barriers and facilitate capacity building among actors engaged to participate in co-RRI processes.

Transparency, hence, enables another process characteristic of co-RRI, that is **reflexivity**. It concerns an iterative action during which the participants of a co-RRI process take account of the (intermediary) results relative to the choices that have been made as well as external changes. Reflexivity therefore creates awareness about the fact that making choices with ethical and political implications is inevitable – which addresses again the normative character of co-RRI processes mentioned previously. Furthermore, the reflexive character of co-RRI builds in a certain responsiveness to the emerging needs of the actors engaged to the process. It allows for research and innovation processes that unfold as ongoing, open and long-term processes carried by a continuously developing network of actors that channel in new problems on a regular basis.

Yet, this openness appears to have its limits. While for some co-RRI activities it is essential to implement a fully open and inclusive way of actor engagement, in other cases it makes sense to build upon invited participation. Particularly in highly contested fields, it is difficult to reconcile diverging interests. Thus, the way co-RRI processes deal with **inclusiveness** and actor selection are to be carefully chosen depending on the particular context in which they take place so that a productive and constructive working atmosphere can be fostered.

Deblonde, M. (2015): Responsible research and innovation: building knowledge arenas for glocal sustainability research, Journal of Responsible Innovation, 2 (1), pp. 20-38.