

JUST2CE

A Just Transition to Circular Economy



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CHAPTER 12

Promoting a Just and Sustainable Circular Economy: The Role of Responsible Research and Innovation (RRI)

Chapter 12. Promoting a Just and Sustainable Circular Economy: The Role of Responsible Research and Innovation (RRI)

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Abstract

Despite differences in focus and means, both the CE and Responsible Research and Innovation (RRI) essentially attempt to address challenges connected to sustainable development via innovation. Regardless of the common understanding that RRI may provide an innovation governance framework to strengthen the CE framework (Inigo and Blok, 2019), there is a lack of clarity about whether and how the RRI guiding principles may be a key element of CE and be integrated in achieving a just CE transition (Pansera et al, 2019). In this section, I critically examine the literature on the CE and RRI in order to find out how the different focus of RRI may provide an innovation governance framework to strengthen the CE framework. More specifically, I critically examine the comprehensiveness, applicability, and adequateness of measurable indicators of RRI which are framed around the five keys (Strand and Spaapen, 2020), in reshaping the CE discourse to enable a fair and just transition and search for further potential indicators defined under the broader vision for RRI.

Keywords: Responsible Research and Innovation, Circular Economy, Anticipation, Inclusion, Reflexivity; Responsiveness.

How can RRI principles be effectively integrated within the CE framework to achieve a just and sustainable transition, and what are the challenges and opportunities of applying these core guidelines in the CE context?

12.1. Understanding Responsible Research and Innovation (RRI)

RRI is a concept that looks at how research and innovation can benefit society in a fair and sustainable way (references?). According to the European Commission, RRI is about thinking ahead and considering the potential

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effects of research and innovation on society. The goal is to design research and innovation that includes everyone and helps create a sustainable future. Under this definition, RRI is also defined by five important aspects: Ethics (doing things right), Gender (including everyone regardless of gender), Open Access (sharing knowledge freely), Science Education (promoting scientific understanding), and Societal/Public Engagement (involving the public in decision-making).

Beyond just following the rules, ethics in RRI is about understanding the broader impact of science on society. This means listening to different perspectives and making sure that science respects everyone's values. Science Education is not just about knowing science facts. RRI wants people to critically engage with science, ask questions, and participate in scientific discussions. Gender Equality is about making sure all genders have equal chances in research roles. But it goes deeper, recognizing that our understanding of 'gender' is complex and tied to other social factors like race, class, and more.

Open Access is based on the principle that if the public funds research, they should be able to see the results. This idea has grown though, and now there's a push to share not just the results, but also how the research was done. Governance is about setting goals, making plans, and checking if we're on the right track. Governance isn't just done by governments; other groups like universities and non-profits play a part too. Lastly, Public Engagement is all about involving everyone in science. Not just scientists and experts, but regular folks too. It's a two-way street: scientists share, the public gives feedback.

Different scholars have their own takes on RRI. One popular idea is called AIRR, which stands for Anticipation, Inclusion, Reflection, and Responsiveness. These are seen as important steps in the RRI process. In simple terms, RRI means that all the people involved in research and innovation need to work together and think about the consequences of their actions. It's not just about making money or advancing technology. It's about considering the bigger picture and making sure that research and innovation benefit society as a whole.

To do this, we need to look ahead and think about the impacts of new technologies, involve different perspectives, reflect on the ethical implications, and be responsive to the needs and concerns of society. It's about being responsible and thinking beyond just the short-term benefits or risks. So, RRI is a way of approaching research and innovation that puts people and the planet first. It encourages collaboration, foresight, and considering the wider impacts of our actions.

12.2 Monitoring and Advancements in RRI: The MoRRI and RRI Tools Projects

MoRRI¹³ was a project conducted from 2014 to 2018 that created a monitoring system for RRI within the European Research Area (Meijer and van de Klippe, 2020). It used a conceptual framework and more than 36 indicators based on the European Commission's definition of RRI with an objective to measure various aspects of RRI.

However, the indicators developed in MoRRI faced criticism for their reliability and coverage. Some argued that they focused too much on quantitative approaches and might not capture the transformative potential of RRI. Another project called Super MoRRI¹⁴ aimed to improve on these aspects and emphasized the need for more open evaluation activities.

¹³ <https://morri.netlify.app/>

¹⁴ https://super-morri.eu/from-morri-to-super_morri-monitoring-as-reflection-and-learning-not-representation-and-control/

The RRI Tools Project¹⁵, supported by the European Union from 2007 to 2013, aimed to compile best practices for RRI. It established an online platform with RRI-related tools to promote dialogue and education about the concept. The RRI Tools Project defined RRI based on several dimensions, including diversity and inclusion, anticipation and reflection, openness and transparency, and responsiveness and adaptive change. These dimensions aimed to promote stakeholder engagement, ethical considerations, and adaptability in research and innovation processes.

12.3 Challenges and Progress in RRI: Encouraging Business Engagement and Integrated Approaches

Even though many experts in RRI have emphasized the importance of collaborating with businesses and private companies to make sure that research and innovation benefit the environment and society, many private companies have been hesitant to actively engage in RRI (Silva et al., 2018). This reluctance can be attributed to several factors. Firstly, the lack of a clear and well-defined understanding of RRI, coupled with the presence of similar concepts like social innovation and sustainable innovation, has created confusion within the business sector. Secondly, RRI's emphasis on scientific and technological development has sometimes led to neglecting other critical aspects, such as the commercialization of innovations. Thirdly, RRI has predominantly been applied in publicly funded research settings, with limited efforts made to adapt its principles to suit the specific needs of businesses. Additionally, businesses have often perceived themselves as targets rather than collaborators in RRI initiatives.

Despite these challenges, RRI offers a distinct approach compared to traditional Corporate Social Responsibility (CSR) models. It promotes outward-looking engagement and places significant value on the early stages of product development and research and innovation processes. RRI addresses two fundamental challenges for businesses: staying competitive in innovation and maintaining public trust. It integrates business concerns into societal challenges and can help companies prevent problems and develop solutions that benefit society. Several projects and toolkits, such as the PRISMA¹⁶ project, aim to promote RRI in the industry by involving top management and creating a culture of responsibility throughout the organization.

In an attempt to investigate how RRI concepts may be incorporated into the innovation processes of start-ups that focus on sustainability, Responsible Management of Innovation (RMoI¹⁷) offers innovators a systematic means to recognize and take into account socio-ethical risks and possibilities. The RMoI tool incorporates a number of stages and draws on RI, technological philosophy, and design for usability ideas. Incorporating the Product Impact Tool (PIT)¹⁸, which draws on ideas from philosophy of technology and design for usability, the RMoI tool further develops and expands upon the principles of RRI (Long et al., 2020).

Fraaije and Flipse (2020) argue that incorporating RRI dimensions into real-world practices is challenging because people don't fully understand how these dimensions interact. They also emphasize the importance of integrated RRI, which means that while some RRI aspects can work together, others might conflict with each other. For example, more reflection might lead to more inclusiveness, but it could also create conflicts. Anticipation, even

¹⁵ <https://rri-tools.eu/>

¹⁶ <https://www.rri-prisma.eu/>

¹⁷ <https://www.tandfonline.com/doi/full/10.1080/23299460.2019.1608785>

¹⁸ <https://productimpacttool.org/en/portal-english/>

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though it might face opposition from scientists wanting autonomy, can encourage more engagement. To address this, they created a framework for implementing RRI based on a comprehensive review of factors that indicate the quality of responsible processes and products. They identified five process qualifiers (transparency, inclusion,

reflexivity, anticipation, and responsiveness) and three product qualifiers (societal relevance, market competitiveness, and scientific quality) for RRI. This framework helps guide the practice of RRI effectively.

12.4 Toward a Just Transition: RRI in the Circular Economy

The current concept of a CE seems to focus mainly on economic benefits, particularly for the environment, with limited attention to social aspects. Some experts, like Korhonen et al. (2018) and Kirchherr et al. (2017), highlight the need to include social goals in the CE, such as promoting the sharing economy, increasing employment, and involving people in decision-making. However, not everyone agrees on this point. The CE is criticized for not explicitly addressing social dimensions (Pansera et al., 2021). Nevertheless, there is a growing consensus that incorporating the social aspect into the CE is crucial for a responsible and fair transition. To achieve this, we need to consider a socio-technological transition paradigm, which involves significant changes in production, businesses, goods, and consumption behaviours. It's essential to assess the feasibility of these adjustments across various levels, from individuals to entire economies. Introducing RRI into the CE could be a promising way to ensure a just transition that includes diversity, inclusion, fair income distribution, employment, and working conditions.

In what follows, I thoroughly evaluate the CE paradigm within each of the AIRR dimensions, exploring how RRI can foster a fair and responsible approach to transitioning to a CE.

12.4.1. Anticipation

Looking ahead, research and innovation hold great power to shape our future. This requires us to think about the potential impacts of current research and innovation activities and to consider how they align with our principles and values. RRI involves considering the future consequences of our actions. This means asking "what if" questions and being open to different possibilities. In the context of CE, it's important to systematically think about potential futures while understanding the uncertain and complex nature of CE.

RRI aims to generate positive outcomes for stakeholders, so anticipating the external environment's interaction with CE is crucial. It involves anticipating challenges, striking a balance between precaution and innovation, and collaborating with other fields to comprehensively assess the broader societal implications of CE. For example, we need to understand how CE might impact social values like privacy and equality. This requires a thorough analysis, whether through modelling or data-based approaches, to grasp the broader implications of CE.

However, the complexities and interconnected parts of the CE make it hard to predict and understand how it will affect things. Simplistic engineering models that depict CE as a linear process overlook the complexities of various markets and competition between primary and secondary goods. Connecting waste streams to inputs doesn't automatically guarantee environmental improvements. Additionally, not all CE intentions prioritise the environment, as profit-driven companies may view it as an opportunity for arbitrage. Incorporating anticipatory

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measures in transition to CE through RRI can shed light on forthcoming difficulties and facilitate a sustainable transition.

Yet, caution is needed when linking RRI with CE, as assuming responsible transition automatically leads to broader societal benefits is misleading. Technology creators often discover unforeseen side effects, and precautionary measures may limit innovation. Balancing precaution and innovation is a challenge.

12.4.2. Inclusion

Building trust and understanding the needs of different stakeholders is crucial for a just CE transition. This includes involving policymakers, industry representatives, civil society groups, scientists, and non-profit organisations in the transition to a CE. By involving diverse groups and addressing their specific needs, collaboration and local leadership can drive positive change.

However, stakeholder engagement can be challenging for several reasons. Interactions are often limited in scope, which may overlook important issues of power dynamics and regulations. It's also difficult to ensure representation of all groups in society, as current tools for engagement often focus on those directly impacted. This raises questions about whose opinions are included and how conflicting values are addressed. Power imbalances and governance issues can further complicate stakeholder engagement.

In the context of CE, RRI can help create a public space where different actors can debate and shape the transition process. This approach helps identify key action points and promotes informed public participation. By including stakeholders and fostering openness and reflection, the transition to a just CE can raise awareness and minimise social costs generated by conflicts between different stakeholders.

12.4.3. Reflexivity

RRI can also support a just transition to a CE by promoting reflexivity, which involves reflecting on societal circumstances, reassessing practices, and adjusting initiatives. Reflexivity helps us evaluate our efforts, understand the consequences of our actions, and anticipate unexpected events.

However, there are challenges in achieving reflexivity during the transition to a CE. The business environment that shapes the CE transition is influenced by unequal power relations, particularly through Global Supply Chains controlled by wealthy nations and multinational corporations. These entities may prioritise their own interests and make it difficult for other stakeholders to participate fully in the transition. Additionally, evaluating which firms or projects to support in the transition is challenging, and there is a risk of exacerbating power dependencies, widening the gap between high-income and low-income nations, and neglecting actions for strong sustainability. Another risk is stakeholders becoming too focused on technical aspects of CE and losing sight of larger goals and societal implications. RRI suggests using socio-technical scenarios to encourage stakeholders to consider the consequences of their CE-related decisions. These scenarios broaden perspectives, promote reflection and learning, and foster co-evolution between technology and society.

Current CE strategies often neglect trade inequality concerns. There is a growing concern that CE is being used as a protectionist approach to gain economic advantage over other nations, rather than prioritising sustainable

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development. The transition to a CE can impact trade flows and resource extraction in low-income nations. While reducing resource demand can improve environmental sustainability, it may negatively affect countries relying on

industries like mining, fast-moving consumer goods, textiles, and agriculture. These nations may require tailored aid programs from the international community to cope with the transition.

To achieve a just CE, international collaboration is crucial to develop equitable governance institutions and coordinate policies at different levels. Multilateral technical assistance programs should be established, especially to support low- and middle-income nations.

12.4.4. Responsiveness

Responsiveness is about institutions being open and adaptable to new knowledge, perspectives, and ideas. It means they can reflect on these and respond accordingly. In the context of RRI, it's believed that societal challenges can actually be opportunities for positive change. By discussing and defining the right impacts and processes, we can use innovation to bring about social and economic benefits.

When it comes to the CE, responsiveness involves being adaptable to changing factors and immediate impacts. It also means considering the larger systems at play and being mindful of potential misconceptions and challenges. By being responsive, we can navigate the complexities of the CE and work towards positive social and economic change.

Yet, there's a debate about how to make CE more responsive. The question is whether the transition process can be flexible enough to consider changing factors and immediate impacts. While anticipating different scenarios and having open discussions through RRI is important, there's a concern that these discussions may only serve to justify decisions that have already been made, rather than genuinely considering changing the project's objectives or outcomes.

Another aspect of responsiveness is considering the larger socio-technical systems that can influence the development and spread of the CE. Understanding these systems helps us gauge how adaptable the CE can be at different stages of its development. RRI can support a fair transition to the CE by encouraging partners to be responsive and mindful of the social, economic, and environmental effects and misconceptions that may arise. Simply highlighting the benefits of CE initiatives to others may not be enough, as stakeholders may have misconceptions or even react negatively. By being exposed to possible misunderstandings and challenges, stakeholders can better understand the complexities of achieving the desired societal impacts through innovation.

12.5 RRI's Role in Addressing Inequalities in CE

In the journey towards a CE, addressing inequalities is paramount. RRI offers a framework to ensure that the transition to CE is equitable, considering environmental, labor, and gender inequalities.

12.5.1. Environmental Inequality

When we think about the Circular Economy (CE), we need to make sure it's fair for everyone, everywhere, aligning with the AIRR dimensions of RRI. Right now, the way we make and use things often leads to environmental problems, like pollution, that affect some people more than others. This isn't fair, and it happens a lot in poorer countries where a lot of the world's waste ends up.

Researchers have found that if we keep making and using things in huge amounts, even if we recycle, we're still not going to fix this problem. To really make things better, the CE needs to focus not just on recycling, but also on using less stuff and energy in the first place. This is called a 'degrowth' approach, which is part of the Anticipation dimension of RRI, foreseeing and planning for the long-term impacts of our consumption patterns.

Sometimes, the rules we make for CE can end up being unfair, just like in the old way of doing things. They can create problems both inside countries and between different countries. For example, rich countries might recycle, but they send their waste to poorer countries, causing pollution there. This isn't right, and it's a new way of being unfair. Here, the Inclusion dimension of RRI calls for involving diverse stakeholders from all countries in the decision-making process, ensuring that the voices of those affected by these policies are heard and considered.

But, if people who care about fairness and the environment get involved, they can use CE to help fix these problems. It can be a way to make things better for both people and the planet. This approach reflects the Reflexivity dimension, encouraging us to continually assess and adjust our actions in CE to ensure they are just and sustainable.

We also need to think about how our actions in the past have hurt other countries, especially poorer ones. The CE should help fix this by being fair to these countries. This means listening to the people there and understanding how they use and recycle things in their own ways. Responsiveness, another RRI dimension, requires us to adapt our strategies in CE based on the feedback and needs of these communities.

In the CE, everyone who works, whether they get paid or not, should have a say, especially those in poorer countries. Their knowledge and ways of doing things, like recycling and reusing, are important for a fair CE. Inclusion, again, emphasizes the importance of diverse perspectives in shaping CE policies and practices.

Making CE fair means looking at who must pay the costs of changing to this new way of doing things. We shouldn't make some people or countries pay more than their fair share. This consideration falls under the Reflexivity and Responsiveness dimensions, where we must be alert to the consequences of our actions and ready to make necessary changes.

It's also about making sure everyone has a say in how we do CE. This means that people who are often left out or ignored, like those in poorer countries, should be part of making decisions. They should be able to share their ideas and have them taken seriously, aligning with the Inclusion principle of RRI.

The way people see CE can be different depending on who they are. For some, like environmental groups, it's about making life better for local communities and protecting the environment. For others, like some governments and companies, it might be more about making money and growing the economy. Recognizing these different perspectives and finding a balance is a key aspect of Reflexivity in RRI.

An important part of CE, especially in poorer countries, is people who collect and recycle waste. They do important work, but often don't get the respect or pay they deserve. A fair CE needs to really think about these people, understand their work, and make sure their needs and ideas are part of the plan. This is where the Responsiveness

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dimension plays a crucial role, ensuring that the CE adapts to acknowledge and integrate the contributions of these vital yet often overlooked workers.

12.5.2. Labor Inequality

The shift towards CE can significantly impact the job market. While it may create new opportunities in green industries, it can also lead to job losses in traditional sectors. RRI in the context of CE should advocate for policies

that support workers during this transition. This includes retraining and education programs to help workers from declining industries adapt to new roles in the CE.

In thinking about labour and jobs in the CE, we often miss some important points. Most of the time, when people talk about jobs in CE, they only talk about how many jobs there are, not whether these jobs are good or bad. They don't talk much about things like how much these jobs pay, how long people must work, if the work is safe, or if workers have protections like unions.

Also, we don't hear much about the workers themselves, especially their own choices and power, how CE changes affect unpaid work often done at home, or the role of workers who come from other countries. Plus, issues like fairness for all genders, racism, and how some countries control others are usually left out.

Job quality in the new CE industries is crucial. The aim should be to create decent, safe, and fulfilling jobs. For example, if new recycling methods are introduced, they should be designed to be safe for workers, reducing health risks and ensuring fair wages and working conditions.

It's also important to realize that moving to CE doesn't change every job the same way. Some jobs might involve lots of physical work or machines and these don't all create the same number or kind of new jobs. For example, some jobs might be short-term or not pay very well, while others might be better in these ways.

Labor inequality also has a global dimension. CE can influence global supply chains, affecting labour markets in different countries differently. Developed countries might move towards high-tech recycling industries, while developing countries might become centres for labour-intensive recycling work.

To ensure fairness for workers in the CE, it's crucial to consider various factors, aligning with the AIRR approach. We need to anticipate how jobs will evolve, focusing not only on the number of jobs but also on their quality, including aspects like wages and working conditions. Inclusion in decision-making is key; every worker should have a voice in these changes, especially those engaged in unpaid work, workers from other countries, and individuals facing issues like racism. It's also essential to practice reflexivity by continually assessing whether our expectations about jobs in CE match the reality and being prepared to adjust our strategies accordingly. Finally, responsiveness is vital; if we find that the changes in CE are not benefiting everyone equally, we must be proactive in improving the situation, keeping in mind the global workforce's needs and challenges. This approach ensures that workers in all countries are treated equitably: anticipating the impacts of supply chain decisions on labour practices worldwide, including diverse stakeholder perspectives in these decisions, being reflexive about the consequences of these practices, and being responsive to the need for adjustments to ensure fair and equitable treatment of workers globally.

12.5.3 Gender Inequality

When we talk about gender in CE, it's not just about women. Gender means all the roles and expectations that society has for people, and these can affect jobs and how much we value different kinds of work. Women, who

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come from all sorts of backgrounds and have different experiences, often end up in jobs that are less valued or not paid at all, especially in work related to taking care of others or the environment. This happens in CE too.

Gender issues are connected to how we think about what's valuable. Usually, making and selling things is seen as important, while taking care of people and our surroundings is not given much importance. This is a big problem when we talk about fairness for all genders.

Experts in FEE tell us that our economy's growth is based on a lot of important but undervalued work, like taking care of others. They say we should think about wealth differently - not just as making more things, but as taking care of each other and our planet (Martinez Alvarez and Barca, 2023).

In CE, we often don't think about how different genders might be affected differently, both in making things and in using them. To make CE fair for everyone, we need to change how we think about what's valuable. We should value both paid work and the unpaid work, like taking care of family or the community.

To make CE fair for all genders, we shouldn't just try to get more women into jobs that are all about making money. Instead, we should make CE about caring - linking together the work that makes money with the work that's about taking care of things and people.

This idea aligns well with the AIRR approach in RRI. Firstly, it involves looking ahead (Anticipation) by considering how the CE will impact men and women differently, ensuring fairness in its outcomes. Secondly, it requires including everyone (Inclusion) to ensure that people of all genders are involved in decision-making processes within CE. Thirdly, there's a need for constantly thinking about our actions (Reflexivity) – this means regularly assessing whether our actions in CE are equitable for all genders and being willing to make necessary changes. Lastly, being ready to change (Responsiveness) is crucial; if we identify aspects of CE that aren't fair for all genders, we must be prepared to adjust our strategies to foster greater fairness and inclusivity.

12.6 Conclusion

In the journey towards a CE that truly benefits society and the environment, RRI plays a pivotal role by embodying the principles of anticipation, inclusion, reflection, and responsiveness. It goes beyond simply following rules; it's about embracing ethics, promoting gender equality, sharing knowledge openly, encouraging scientific understanding, and involving the public in decision-making. RRI is about putting people and the planet first, fostering collaboration, foresight, and a holistic perspective.

In the context of the CE, RRI introduces a socio-technological transition paradigm. This paradigm acknowledges the need for significant changes in production, business practices, goods, and consumption behaviours. By incorporating RRI into the CE, we can ensure a just transition, promoting diversity, inclusion, fair income distribution, employment, and working conditions. Each dimension of the CE—Anticipation, Inclusion, Reflexivity, and Responsiveness—offers a unique lens through which RRI can foster a fair and responsible transition. Anticipation encourages us to think about the potential impacts, understand uncertainties, and anticipate challenges. Inclusion calls for diverse stakeholder engagement, addressing power dynamics and conflicts, while Reflexivity prompts us to reassess practices and consider unforeseen consequences. Responsiveness is about adaptability and using innovation to address societal challenges. It involves navigating complexities, considering changing factors, and avoiding misconceptions. By encouraging partners to be responsive and mindful, RRI can help stakeholders better grasp the complexities of achieving desired societal impacts through innovation.

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In summary, a just transition to a CE is the process of moving to an economic system that is fair and sustainable and takes into account the needs and rights of all stakeholders. RRI principles can help make a just transition to a CE by making sure that the transition is socially responsible, inclusive, anticipatory, reflexive, and takes into account the needs and values of all stakeholders by promoting reflexivity, addressing power imbalances, considering societal implications, and fostering international collaboration. By addressing these challenges, we can strive for a CE that is equitable, sustainable, and beneficial for all.

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