

Extended Abstract

Food systems exhibit increased complexity by lying at the intersection of a region's economic, societal and environmental structural conditions, struggling to balance economic development with increased needs for sustainability and social justice. Food-system transformations, characterized by industrialization and centralization, have often prioritized large-scale, profit-oriented production at the expense of ethical and social dimensions of innovation, enhancing regional inequalities and marginalizing small-scale enterprises and vulnerable communities. In this context, Responsible Research and Innovation (RRI) has been highlighted as a tool helping regions build legitimacy and ensure fair food system transformation across regional ecosystems. However, little attention has been paid to developing a place-based perspective of RRI towards integrating regional specificities during its operationalisation. The paper builds on the idea of developing a place-based RRI by exploring how it can be tailored to meet the needs of local food-system challenges identified through Smart Specialisation Strategies (S3) for five pilot regions. Our literature review focused on identifying best practices based on the existing MoRRI principles (governance, public engagement, science education, open access, gender equality, ethics, sustainability) that can be generally used for operationalizing RRI and evaluating the extent to which each principle has been embedded in the design of regional strategies. By combining qualitative analysis of S3 documents and stakeholder interviews for the five pilot regions, the study identifies tailored pathways of integrating RRI into context-specific regional priorities. The findings indicate that a place-based perspective on RRI is essential for addressing responsibility gaps in food-system transformation related to inclusivity, trust, coordination, and institutional capacity, as these dimensions are fundamentally shaped by how innovation is governed and accessed by different stakeholders within regional contexts. Although the same pool of best practices was used to map the RRI principles to the S3 challenges, these were tailored differently in response to distinct local conditions and varying levels of RRI readiness. The observed challenges were grouped into five cross-cutting categories (fragmented ecosystems, funding mechanisms, multi-level governance, technology adoption & skills development, energy efficiency & climate change) which are particularly relevant for understanding how regional food systems operate and change under internal and external pressures. The results suggest that localised forms of RRI can be developed through in-depth analysis of regional contexts, enabling fairer food-system transformation by structurally embedding region-specific constraints that would otherwise remain unaddressed within S3 policies alone. For example, ecosystem fragmentation across regions stems from uneven inclusion and weak coordination between actors, which RRI addresses through inclusive participation, open science promotion and quadruple-helix collaboration to bridge knowledge and sectoral gaps. On the other hand, our mapping shows that funding-related challenges are not purely financial, but procedural, as bureaucratic complexity and centralized decision-making hinder equitable access for SMEs and marginalized actors. This underscores the need for RRI to redesign the funding mechanisms through participatory governance, public engagement and vertical alignment of funding policies to meet the needs of local actors. Linking RRI to S3 governance challenges revealed rigid, top-down policymaking across authority levels. RRI responds to these barriers by enhancing transparent decision-making, open dialogue, peer-learning and adaptive governance that allows continuous learning and policy adjustment. Challenges related to technology adoption are shown to stem more from unequal access rather than technological availability, while skills development emerges as social rather than purely technical, meaning that people lack the conditions, support and pathways to align their skills with labour market needs. RRI counteracts these barriers by promoting inclusive skills development, science education and co-creation innovation pathways that link education to real jobs, stable incomes and careers that make the agri-food industry more inclusive and economically attractive. Finally, the analysis shows that S3 challenges related to energy efficiency and

climate change are often driven by top-down and reactive responses. RRI responds by embedding ethics, public engagement and foresight to support place-based, socially grounded innovation and forward-looking sustainability transitions that enhance resilience and build legitimacy. The observed regional disparities in innovation uptake and stakeholder inclusion suggest that what could be defined as the common good at the European or national level does not necessarily translate into beneficial outcomes at the regional or local level. In practice, research and innovation cannot be framed as 'responsible' when weaker or 'left behind' regions are forced to adopt technologies or comply with regulations that meet the needs of more powerful regions and stronger actors. This leads to the main takeaway of this study, that responsibility can only be meaningfully addressed in R&I when embedded into place-based challenges that actively involve local stakeholders, distinct governance structures and territorial realities.