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Integrating RRI into Smart Specialization Strategy: Taking Stock of Regional Initiatives

Lukasz Nazarko
Bialystok University of Technology, Poland

Rafael Popper
University of Manchester, UK
University of Turku, Finland
Technology Partners Foundation, Poland

Abstract

The study aims at revealing how the EU-funded efforts to integrate Responsible Research and Innovation (RRI) into regional Smart Specialization Strategies (RIS3) help to align regional ecosystems with the transformative innovation policy agenda. By analysing the quantitative and qualitative characteristics of 13 thematically relevant projects funded from Interreg, FP7 and H2020 we establish that the integration of RRI principles into RIS3 is helpful approach to ensuring that regional innovation strategies are aligned with the values and needs of local communities, and that the benefits of innovation are distributed more equitably. Finally, we propose ten policy agendas and ten actions points to promote the RRI-RIS3 integration.

Keywords: Regional innovation system, Smart specialization policy, Responsible Research and Innovation, Knowledge exploitation

Introduction

Responsible Research and Innovation (RRI) and Smart Specialization Strategies (RIS3) are two innovation-related, "made in Europe" concepts that have received increasing attention in recent years. RRI refers to a participatory and ethics-based approach to research and innovation that takes into account the intended and unintended social, economic, and environmental impact of scientific and technological developments. It aims to ensure that the development and deployment of new technologies align with the values, needs, and expectations of society. Smart Specialization Strategy (RIS3) is a policy framework aimed at boosting the competitiveness of regions based on their endogenous innovation capacity. It focuses on identifying and developing the unique strengths and potentials of each region, based on a bottom-up approach that involves multiple stakeholders, including the enterprises, academia, and civil society.

The departure point for this study is the assumption of the possibility (and the need) to integrate RRI and RIS3 in the European innovation policy. There are both tensions and complementarities of the two policy paradigms. There are two main aspects that make the RRI-RIS3 integration promising. The first one is the territorial aspect. RRI essentially omits geography, while RIS3 has a very clear place-based focus. The second aspect is the acceptance of the multitude of visions for a region's future. While RRI embodies the reflexive governance model, plurality of visions and aspirations, RIS3 is rather straightforward in the search for the one right economic development path. The EU policy-makers seem to have noticed the possible benefits of injecting RRI into the regional development discourse by providing funding for projects that would take the territorial aspect of RRI further.

Studied Projects

The research is based on the analysis of the characteristics, objectives and deliverables of the following EU-funded (Horizon 2020 and Interreg) projects thematically related to the topic of the study:

Category	Project Name
Sustainable Innovation and Responsible Research	**CHERRIES** – Constructing Healthcare Environments through Responsible Research Innovation and Entrepreneurship Strategies (H2020)
	CASI – Public Participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation" (7FP)
	DigiTeRRI – Responsible Research and Innovation Approach for Transitioning the Traditional Industry Regions Into Digitalised Industry Territories (H2020)
	RIPEET – Responsible research and Innovation Policy Experimentations for Energy Transition (H2020)
Territorial Governance and Regional Development	**MARIE** – MAinstreaming Responsible Innovation in European S3 (Interreg)
	RRI-LEADERS – Leveraging Leadership for Responsible Research and Innovation in Territories (H2020)
	RRI2SCALE – Responsible Research and Innovation Ecosystems at Regional Scale for Intelligent Cities, Transport and Energy (H2020)
	SeeRRI – Building Self-Sustaining Research and Innovation Ecosystems in Europe through Responsible Research and Innovation (H2020)
	TetRRIS – Territorial Responsible Research and Innovation and Smart Specialization (H2020)
	TRANSFORM – Territories as Responsive and Accountable Networks of S3 through new Forms of Open and Responsible Decision-Making (H2020)
Open Research and Innovation	**REINFORCING** – Responsible tErritories and Institutions eNable and Foster Open Research and inClusive Innovation for traNsitions Governance
	TeRRIFICA – Territorial RRI fostering Innovative Climate Action (H2020)
	TeRRItoria – Territorial Responsible Research and Innovation Through the involvement of local R&I Actors (H2020)

RIS3 vs RRI: Conceptual Divergencies and Complementarities

Aspect	RRI	RIS3
Time of introduction to the EU policy	**2012** Not clearly defined but may be assigned to the *Commissioner Geoghegan-Quinn Keynote Speech at the "Science in Dialogue" Conference, Odense, 23-25 April 2012*	**2010** *Europe 2020. A European strategy for smart, sustainable and inclusive growth*
Emergence mode of the policy concept	**Top-down** European Commission officers, EU-level science policy makers and funding agencies.	**Top-down** European Commission's adoption and implementation of a theoretical, academic concept coined by D. Foray.
Universality of the concept (beyond EU)	**Made in EU** but with global ambitions. Attempts have been made by scholars to popularise it beyond EU.	**Made in EU** but started inspiring several countries and regions around the world (EU neighbourhood countries, Africa, Latin America, Asia-Pacific, Arctic)
Institutional origin within the European Commission structure	Directorate-General for Research (**DG Research**)	Directorate-General for Regional and Urban Policy (**DG Regio**)
Attention to spatial dimension of innovation processes	**No** Omitting the fact of the spatial embeddedness of innovation processes, knowledge acquisition and learning	**Yes** Place-based policy, focus on regions, counting on the knowledge spill-overs among co-located agents
Advocating for stakeholder involvement in the innovation governance	**Yes** Special attention to groups potentially affected by the effects of innovation (co-creation, multi-stakeholder dialogue)	**Yes** Special attention to actors that create the endogenous regional innovation potential and are agents of entrepreneurial discovery
Emphasis on innovation solving grand societal challenges	**Strongly yes** However, it is not specified *what* society should benefit from innovation (regional, national, global – notions of 'responsible' or 'socially desirable' are heavily context-dependent)	**Yes** Focus on solving regional challenges. Tendency to prioritise economic growth and employment opportunities over sustainability and inclusiveness.
Level of institutionalization	**Low, "patchy"** Varying degrees of RRI adoption in relevant institutions, no generally adopted guidelines/roadmaps for different actors	**High** Became a key element of the EU cohesion policy. Translated into official regional innovation strategies of practically all EU regions
Fostering interdisciplinarity	**Yes** Integrating social sciences (STS, ethics, philosophy, sociology, management) with natural sciences and engineering	**Yes** Looking for innovation at the intersection of different fields of knowledge
Relationship to other regions (especially neighbouring ones)	Asserting moral and functional responsibilities and interdependencies with other communities/regions.	Relationship of competition, rare attempts of elaborating cross-regional or transnational smart specialisation areas.
Influence on the development trajectories of science and technology	**Yes** Well-informed deliberative co-creation process by the diverse stakeholders shaping the direction of research and innovation towards what is ethically acceptable and societally desirable at the European scale	**Yes** Entrepreneurial discovery of opportunities for gaining economic competitiveness and growth involving dominant knowledge actors at the regional scale

RRI-RIS3 Most Active Actors

Analysed project consortia include partners from most European countries, however heavy concentration in several countries may be observed. Actors from Spain, Italy and Belgium alone make up one third of all listed partners.

Project Objectives and Deliverables

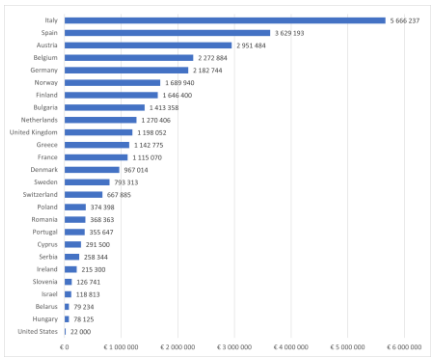
The analysis of the project objectives has led to the formulation of 10 meta-objectives.

Common Objectives	CASI	CHERRIES	DigiTeRRI	MARIE	REINFORCING	RIPEET	RRI-LEADERS	RRI2SCALE	SeeRRI	TeRRIFICA	TeRRItoria	TetRRIS	TRANSFORM
Develop a methodological framework for assessing sustainable innovation and managing multi-disciplinary solutions through public engagement in the RTDI system.	■			■			■				■		■
Define a working definition of sustainable innovation and build a common understanding of best practices in sustainable innovation management.	■	■		■				■				■	
Include general public concerns in assessing the social impact of sustainable innovations on society.	■			■			■				■		■
Provide specific policy recommendations on improving innovation management and incorporating sustainability considerations.	■	■				■		■		■		■	
Develop a framework for the assessment and management of sustainable innovations.	■		■	■	■							■	
Foster responsible research and innovation (RRI) in healthcare innovation and regional environments.		■		■			■		■		■		
Transition traditional industry regions into digitalized industry territories through responsible research and innovation.			■	■	■			■	■				
Support policy experimentations for energy transition and socio-technical transformations.				■	■	■	■				■		
Investigate the application and sustainability of responsible research and innovation (RRI) within territorial innovation systems.	■						■	■	■			■	
Promote responsible research and innovation (RRI) on the EU territorial level.				■	■		■			■		■	■

Project outcomes may be grouped into five broad categories 1) Good practices, 2) Territorial and Ecosystem Mapping and Audits, 3) RRI Toolboxes, Training resources, Guidebooks, 4) Action plans, Roadmaps, Trajectories, Agendas, 5) Pilot projects and activities. What has not been observed in the analysed projects is the direct translation of project results into updating regional innovation strategy documents, despite the presence of a regional authorities in some project consortia.

Budgets of the Analysed Projects

The total EU funding earmarked for the analysed projects amounts to ca. 31 million EUR. Three countries with the highest funding (Italy, Spain, and Austria) attracted nearly 40% of the funds.



Towards a Responsible and Regionally Embedded Innovation Policy

Transformative innovation policy framework proposed by Haddad et al. (2022) includes the following aspects: 1) Grand challenges and inclusive growth, 2) Directionality, 3) Multi-faceted policy intervention, 4) Multiple actors and global networks, 5) Multi-level governance. Informed by those aspect and the results of the CASI project (Popper et al. 2017) we propose 10 responsible innovation policy agendas. They have been formulated on the basis of sustainable innovation mapping and represent the priorities and ambitions of European innovators. They are, as such, manifestations of the entrepreneurial discovery taking place in regional ecosystems.

Promoting Foresight for Sustainability Governance and Intelligence by conducting comprehensive research to explore alternative governance models for sustainability; embracing innovative governance models that prioritize citizen engagement and policy integration; harnessing the potential of information and communication technologies (ICT) and datafication; fostering stakeholder engagement and participation in governance processes; and learning from existing Sustainable Innovation (SI) cases to develop more efficient resource utilization and sustainable development goals.

Deploying Responsible Environmental and Resource-Efficiency Strategies by implementing governance innovations, regulations, and public information platforms to promote sustainable practices; encouraging product innovations that focus on upstream emissions control and environmentally-friendly practices; developing service innovations that address comprehensive systems and promote sustainability; implementing innovative models for effective water resource management; and adopting systemic solutions for urban air and noise issues and promote sustainable consumption.

Creating Sustainable Biofuel and Renewable Energy Solutions by exploring specific technologies such as biogas or anaerobic digestion to enhance energy supply; supporting community energy initiatives and eco-schools to drive energy efficiency improvements; promoting energy system transformation towards zero-carbon supplies; adopting concepts like industrial ecology to optimize energy use and promote energy efficiency; and fostering partnerships among researchers, industry stakeholders, policymakers, and communities to develop comprehensive solutions.

Advancing Recycling and Circular Use of Waste and Raw Materials by encouraging businesses and organizations to view waste as an opportunity for re-use and recycling; Learn from social enterprises and national schemes for industrial symbiosis; addressing challenges and prioritize research and innovation on circular business models; promoting collaboration among stakeholders to exchange knowledge and best practices in waste management; and advocating for supportive policies and regulations that incentivize the transition to a circular economy.

Embedding Sustainability in Cultural and Holistic Education Models by prioritising sustainability education in schools and universities; encouraging active involvement of citizens, workers, and policymakers in sustainability initiatives; challenging conventional notions of education and promote innovative approaches; embracing emerging trends and tools in education to enhance sustainability education; and identifying and address barriers that hinder the integration of sustainability into education systems.

Strengthening Eco-Community Empathy and Crowd-Funded Development by fostering stakeholder engagement in sustainable, crowd-funded businesses to drive local economic prosperity and resilience; embracing governance innovations that promote multi-stakeholder engagement and long-term sustainable development; prioritising the ecological dimension through policies, programs, and partnerships that safeguard natural resources; emphasising the importance of empathy as a catalyst for behavioural change and the establishment of sustainable institutions; and driving industry transformation towards sustainability by encouraging businesses to embrace sustainable practices.

Developing Sustainable Urban and Rural Infrastructures for the Bioeconomy by investing in eco-friendly infrastructure and circular bioeconomy-oriented urban and rural infrastructures; aligning business strategies with the European bioeconomy strategy to promote renewable resources and reduce dependence on fossil fuels; adopting a comprehensive approach to sustainable innovation, including supportive policy frameworks and behavioural shifts; fostering cultural transformations within organizations and society to embrace sustainability principles; prioritising research and innovation efforts that integrate sustainable innovation with the bioeconomy strategy.

Fostering Eco-Local-Agriculture and Bio-Resources Efficiency by encouraging the development of local food networks that prioritize circularity and sustainability; investing in transformational innovations and support ideas directly from citizens; exploring alternative cultivation techniques to promote sustainable and resource-efficient food production; considering the scalability of micro-innovations and influence global food systems for sustainability; and recognising the cultural and psychological aspects of food and promote comprehensive approaches.

Implementing Sustainable Transport and Smart Mobility Innovations by investing in research and innovation to explore smart cities and mobile technology for sustainable mobility; supporting social innovations that prioritize inclusivity and collaboration in transport solutions; addressing barriers hindering the deployment of emerging vehicle technologies; enhancing urban design practices to prioritize pedestrian zones and accessibility planning; and incorporating considerations of social equity and local communities when designing transportation initiatives.

Dealing with Climate Issues and Managing Greenhouse Gas Emissions by fostering comprehensive research and collaboration to address climate change uncertainties; combating skepticism and promote understanding of climate change impacts; embracing a range of approaches for tackling climate change and transforming economies; cultivating empathy and responsibility within communities to drive sustainable actions; and shifting the narrative to view climate change as an opportunity for multi-level solutions.

Based on the observed model of *pioneer-mirror* regions practiced in several analysed projects, we offer 10 action points that may further exploit this model using available EU instruments:

1. Exploit European Coordination and Support Actions (CSA) such as Twinning, as a key instrument to enhance networking (mirroring) activities between research institutions in both Old and New Europe.
2. Encourage the exchange of best RRI practices and knowledge transfer between stakeholders in Western and Eastern Europe to promote excellence and innovation.
3. Facilitate the formulation of joint research and innovation projects in specific areas to boost trans-national and cross-regional smart specialisation processes.
4. Create strategic networking platforms and opportunities for research institutions in both Old and New Europe to collaborate with internationally leading counterparts at the European Union level, with the aim of tackling grand societal challenges more effectively.
5. Maximize investments in research and development to bridge the research and innovation gap within the European Union and support economic growth, as a part of asserting responsibilities to — and interdependencies with — other communities and regions.
6. Facilitate increased mobility of regional innovation ecosystem stakeholders, encouraging inward and outward exchanges between regions and institutions in Western and Eastern Europe.
7. Arrange short-term staff exchanges between institutions in Old and New Europe to foster collaboration and exchange of expertise.
8. Facilitate expert visits and short-term on-site or virtual training programs to promote skill development and responsible enhance research management and administrative capabilities.
9. Promote the organisation of joint workshops, conferences, and summer school activities to facilitate collaboration, knowledge sharing, and dissemination of research findings.
10. Focus on strengthening responsible research management and administration skills within institutions from Eastern Europe, including setting up or upgrading dedicated research management and administration units.

Conclusions

The relationship between RRI and RIS3 is the one of complementarity. The integration of RRI principles into RIS3 can help to ensure that regional innovation strategies are aligned with the values and needs of local communities, and that the benefits of innovation are distributed more equitably. It is too ambitious to say that the combination of RIS3 and RRI provides a complete conceptual and methodological package that effectively promotes responsible and sustainable regional innovation. However, these two concepts compensate for a number of each other's weaknesses and offer a novel intellectual and practical perspective on regional development policy. This study has contributed to the development of the RRI-RIS3 relationship by analysing the landscape of relevant EU-sponsored initiatives and by putting forward policy agendas and action points that are aligned with the RRI-RIS3 ambitions.

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Łukasz Nazarko received his Ph.D. degree in economics from the University of Economics, Katowice, Poland. He is an Assistant Professor with the Faculty of Engineering Management, Bialystok University of Technology, Bialystok, Poland. He has participated in many national and international research projects. He has been a visiting research fellow with the University of Tokyo, Tokyo, Japan, and with Vilnius Gediminas Technical University, Vilnius, Lithuania. He serves as a Deputy Editor-in-Chief of *Engineering Management in Production and Services* and is a Board Member of the Polish Association for Technology Assessment. He has authored or co-authored more than 70 scientific papers in the area of his research. His current research interests include foresight, technology assessment, innovation policy, and responsible research and innovation.

E-mail: **l.nazarko@pb.edu.pl**

Rafael Popper is External Director, Chief Scientific Advisor, and Founder of Futures Diamond Ltd. (UK), Director of Executive Education in Foresight at the Manchester Institute of Innovation Research (MIOIR) of the University of Manchester (UK), and Adjunct Professor in Futures Studies, Foresight and Innovation Management at the Finland Futures Research Centre of the University of Turku (Finland). Dr. Popper is also Co-Founder and Director of the Centre for Foresight and Internationalisation (CFI) at Technology Partners in Poland. He has over 20 years of experience working as foresight and sustainable innovation policy analyst and consultant for several international organizations including the European Commission, United Nations agencies, and numerous public and private organisations in Europe, Latin America, Africa, Asia, Australia and the Middle East.

E-mail: **rafael.popper@manchester.ac.uk**

Bialystok University of Technology | Faculty of Engineering Management | Bialystok University of Technology | Manchester 1824 The University of Manchester | University of Turku | Futures Diamond | Technology Partners