



## Pilot Territory-specific policy briefs

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A decorative graphic in the top-left corner consisting of various colorful letters and shapes in shades of yellow, green, purple, and red, arranged in a scattered, overlapping manner.

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## EXECUTIVE SUMMARY

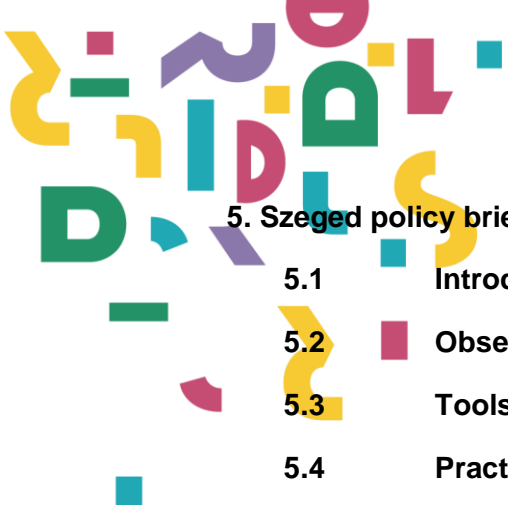
The aim of Project TetRRIS – Territorial Responsible Research and Innovation and Smart Specialization is to support four European territories (Tampere Region in Finland, Karlsruhe Technology Region in Germany, Cantabria in Spain, and Csongrád-Csanád County in Hungary) in integrating Responsible Research and Innovation (RRI) practices into their local/regional (“territorial”) innovation systems and development approaches; to promote mutual learning and interaction between the pilots (and, where possible, other European projects and regions); and to develop tools, good practices and policy recommendations that can be used to integrate RRI into regional development in other European territories.

This deliverable provides a suite of four policy briefs of the regions involved. It is setting out contextual barriers, challenges and drivers, tools for experimentation and RRI implementation, good practices to share and lessons learnt during the experiments and a set of policy recommendations tailored to each of the four regions.

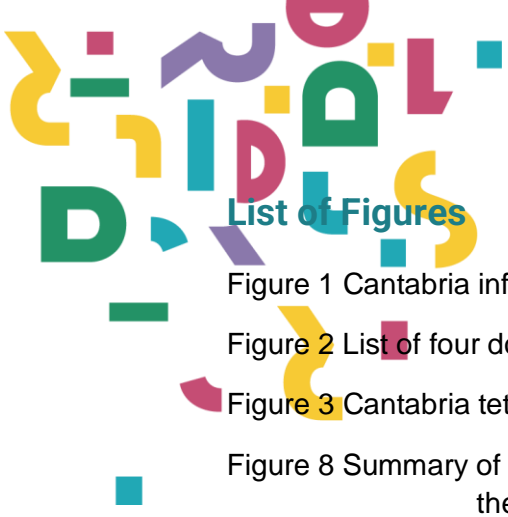
The policy recommendations are based on the empirical evidence gathered during the tetRRIS project lifespan and obtained through different approaches. Regional and scientific partners have worked together closely at different stages of the tetRRIS project on the four territories. The core components of the project also helped to provide a space for structured exchange among the regional partners and stakeholders, facilitating mutual learning and networking between regions and its associated stakeholders. This helped making visible common problems in RRI operationalization and paying attention to specific characters of each region.

The purpose of this deliverable is to address policymakers at regional, national, and EU levels, and RRI practitioners with an interest in the territorial implementation of the concept. These tailored recommendations are oriented to each of the territories, but they can be of help for conceptualizing strategies, plans and discourses around implementing RRI-oriented innovation policies based on empirical evidence in other territories.

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The aim of Project TetRRIS – Territorial Responsible Research and Innovation and Smart Specialization is to support four European territories (Tampere Region in Finland, Karlsruhe Technology Region in Germany, Cantabria in Spain, and Csongrád-Csanád County in Hungary) in integrating Responsible Research and Innovation (RRI) practices into their local/regional (“territorial”) innovation systems and development approaches; to promote mutual learning and interaction between the pilots (and, where possible, other European projects and regions); and to develop tools, good practices and policy recommendations that can be used to integrate RRI into regional development in other European territories.

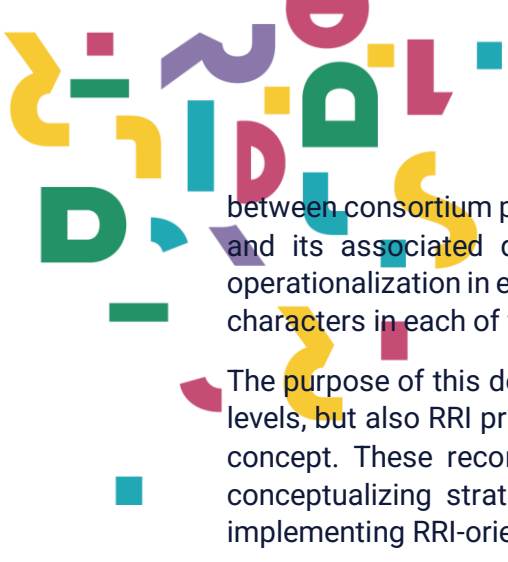
This deliverable is composed of four policy briefs that provide policy recommendations tailored to each of the regions involved in the tetRRIS project. These policy recommendations are based on the empirical evidence gathered via different methods and approaches and thanks to the experimentation enabled in the project between regions and its associated regional stakeholders, as well as between the four regions and consortium partners that took part in the project. This experimentation has allowed to diffuse, adopt and implement RRI through a variety of methods, approaches and means into the four regional innovation systems that the tetRRIS project covered.

In this deliverable the policy recommendations extracted from these experiences and tailored to each of their socio-ethical and geo-cultural contextual conditions are introduced in the following pages. Besides these policy recommendations the reader can also find different barriers, challenges, and drivers that each of the regions faced during the tetRRIS lifespan. These barriers, challenges and drivers reflect particular contextual conditions, which spanned prior stages of the project and each region’s different research and innovation attitudes and cultures.

Moreover, a detailed explanation of the different tools and instruments employed for overcoming the specific barriers, considering the challenges and using the drivers of each region is also provided. These were also of critical importance for diffusing, adopting, and implementing RRI in each of the four territories. In liaison with this, a subsection with practices and useful lessons extracted from each of the territories is also provided.

It is important also to mention that the recommendations, lessons, and practices that are brought together in this deliverable have been produced by using various methods and group dynamics. Regional and scientific partners have worked together closely at different stages of the tetRRIS project. These have included the diagnosis of the territorial ecosystem, the designing of the intervention and its operationalization. Of special importance was the setting up of the tetRRIS Policy Lab that allowed to the different regions and project partners to establish enriching synergies between the four regions involved. The lab also provided a space for structured exchange among the regional partners and stakeholders, facilitating mutual learning and networking between regions and its stakeholders.

This has proven to be critical for providing a common understanding at the consortium level of the region specific rationales of intervention and sharing tacit knowledge



between consortium partners which would have not been possible without the policy lab and its associated dynamics. This helped to visualize common problems in RRI operationalization in each of the four regions, but also to pay special attention to specific characters in each of them.

■ The purpose of this deliverable is to address policymakers at regional, national, and EU levels, but also RRI practitioners with an interest in the territorial implementation of the concept. These recommendations based on empirical evidence can be of help for conceptualizing strategies, plans and discourses around the need of adopting and implementing RRI-oriented innovation policies.

The deliverable provides a common structure for the presentation of each of the four regions (Cantabria, Karlsruhe, Tampere and Szged). All policy briefs start with a brief introduction of the territory. Following that, there is an explanation of the contextual barriers, challenges, and drivers in each of the territories. The third section of the briefs is dedicated to RRI tools employed during the project lifespan in each of the territories. Later, a subsection is provided for stressing practices and lessons learnt during the experimentation. Last, a set of policy recommendations is brought together for each of the four regions reflecting their particularities.



## 2- Cantabria Region policy brief

### 2.1 Introduction

As it has previously explained in other deliverables Cantabria is a particular region in the Spanish geography as it gathers less than 1% of total population and total territory of Spain. It is a predominantly rural region (Gil de Arriba, 1998) with significant mountains and a complicated orography that historically has diffculted communication between the mountains and the coast (the majority of population lives in coastal cities such as the capital, Santander) due to the lack of adequate infrastructures. Despite this shortcoming has been improved noteworthy, there are still challenges regarding transport infrastructures and network communications (Ribeiro & Dosil, 2018). However, and at the same time, the weight of the industry in the regional GDP is significant (above 25%), dedicated policies and strategies have been adopted recently for boosting research, innovation and entrepreneurship and the region offers significant prospects regarding research and innovation (R&I) in emerging sectors such as bioeconomy, health or renewable energies (Martin et al., 2021).

### Facts & figures

#### Demographics

- **582.357 inhabitants (1,23 % of the total population in Spain, 2020).**
- **Half of its population is congregated into the capital of the region (Santander)**
- **Population trend: declining. Challenges: rural depopulation, ageing**

#### Industrial / economic structure

- **Key industries: Automotive, metallurgy, chemical, agri-food**
- **Moderate Innovator (RIS, 2021)**
- **Domestic expenditure on R&D 0,83 of total GDP**
- **R&D expenditure by sector in 2018 was made up of (INE, 2020): Company and non-profit private institutions (PNPI): € 46.7m (0.6% of the total Spanish expenditure by this sector); Public administration: €19.3m (0.8% of the total Spanish expenditure by this sector); and Higher education: €49.2m (1.3% of the total Spanish expenditure by this sector).**

Figure 1 Cantabria information box

During the tetRRIS lifespan, special attention was paid to understand what kind of “RRI de facto” (Randles et al., 2016) features were at play in Cantabria. That is why a significant fieldwork was conducted for understanding the inner workings of the regional innovation system through a qualitative approach that focused on documentation analysis and semi-structured interviews (more information on D2.2). Thanks to this effort some RRI keys such as ethics and gender equality were commonly observed in several research organizations of the regional innovation ecosystem and institutionalized through particular policies at play and/or activities carried out in a regular basis. Moreover, other RRI aligned concepts such as sustainability and Corporate

Social Responsibility (CSR) seemed to be very popular in the regional landscape with specific programs and policies aimed to their promotion into the territory. Of special importance seemed to be the concept of social innovation in the territory which has a significant presence in policy documents such as in the Cantabria innovation strategy for the period 2016-2030 (Gobierno de Cantabria, 2016). It has also been the subject of particular funding support programs, especially in rural areas<sup>1</sup>. In this regard social innovation is understood in the territory as a broad concept in the region that has grown in importance during the last years, but still needs to be widely institutionalized. This can be perceived as a challenge for the uptake of RRI, but also as a driver.

In contrast, other aspects of RRI seem to be downplayed in the region such as public engagement, open access and/or science education which seemed to not widely popular into regional stakeholders (despite some of the most important R&I organizations did have specific initiatives such as “open doors days” or “Researcher’s night”). Governance was also another of the RRI keys mostly missing and indicated by several regional stakeholders as a main deficit in the regional innovation system. Cantabria Government has tried to address this deficit through several policy plans (Gobierno de Cantabria, 2013, 2018), but it seems that there is still a way to go.

Aside from these “RRI de facto” features, another important issue that was considered during the fieldwork was the lack of a collaborative culture that was stressed by many stakeholders interviewed by the research team. Whilst there was no single reason for this, (some participants referred to the lack of an open innovation strategy in the territory while others commonly pointed to the fragmentation of the economic sectors, the size of the companies or the isolation of some areas) the majority of stakeholders agreed that policy efforts must be orchestrated in this direction as this is one of the main challenges that Cantabria faces.

After this mapping stage, efforts were allocated to set up four particular domains of opportunity for the diffusion and adoption of RRI concept in the territory (Nieminen et al., 2021). These four domains selected were:

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1 See [https://dgidtei.cantabria.es/ayudas/-/asset\\_publisher/zGYQ2fbdARZI/content/subvenciones-innovaci-c3-b3n-social?\\_com\\_liferay\\_asset\\_publisher\\_web\\_portlet\\_AssetPublisherPortlet\\_INSTANCE\\_zGYQ2fbdARZI\\_assetEntryId=11954950&\\_com\\_liferay\\_asset\\_publisher\\_web\\_portlet\\_AssetPublisherPortlet\\_INSTANCE\\_zGYQ2fbdARZI\\_redirect=https%3A%2F%2Fdgidtei.cantabria.es%2Fayudas%3Fp\\_id%3Dcom\\_liferay\\_asset\\_publisher\\_web\\_portlet\\_AssetPublisherPortlet\\_INSTANCE\\_zGYQ2fbdARZI%26p\\_p\\_lifecycle%3D0%26p\\_p\\_state%3Dnormal%26p\\_p\\_mode%3Dview%26\\_com\\_liferay\\_asset\\_publisher\\_web\\_portlet\\_AssetPublisherPortlet\\_INSTANCE\\_zGYQ2fbdARZI\\_cur%3D0%26p\\_r\\_p\\_resetCur%3Dfalse%26\\_com\\_liferay\\_asset\\_publisher\\_web\\_portlet\\_AssetPublisherPortlet\\_INSTANCE\\_zGYQ2fbdARZI\\_assetEntryId%3D11954950](https://dgidtei.cantabria.es/ayudas/-/asset_publisher/zGYQ2fbdARZI/content/subvenciones-innovaci-c3-b3n-social?_com_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_zGYQ2fbdARZI_assetEntryId=11954950&_com_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_zGYQ2fbdARZI_redirect=https%3A%2F%2Fdgidtei.cantabria.es%2Fayudas%3Fp_id%3Dcom_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_zGYQ2fbdARZI%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26_com_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_zGYQ2fbdARZI_cur%3D0%26p_r_p_resetCur%3Dfalse%26_com_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_zGYQ2fbdARZI_assetEntryId%3D11954950)

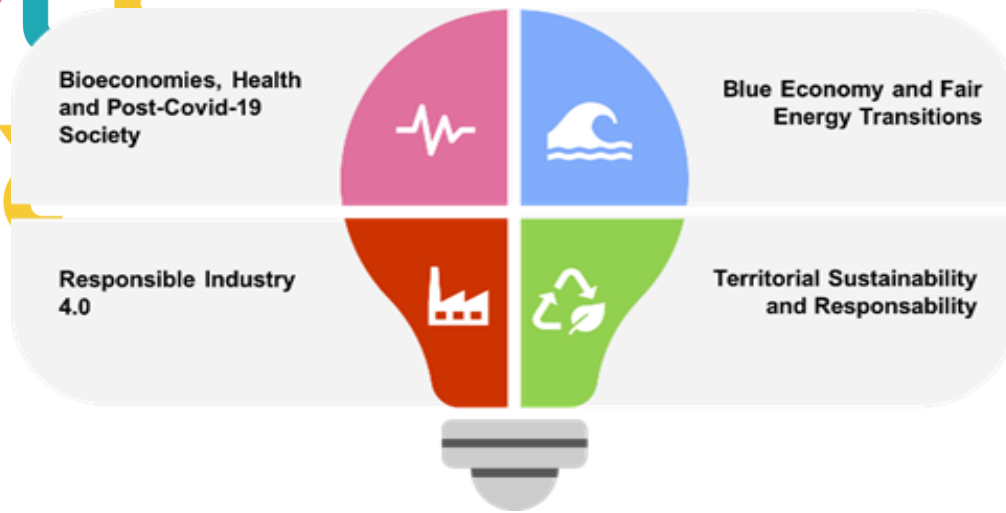


Figure 2 List of four domains of opportunity for RRI in Cantabria

These four domains of opportunity were aligned with the R&I strengths of the region, as well as they tried to gather different societal concerns, expectations and needs observed in Cantabria during the development of TetRRIS project. These domains of opportunity were also aimed to congregate different initiatives/projects/platforms/social movements in the territory that can be of interest for the development of pilot actions under these domains. These initiatives were presented to the participants in the first workshop for illustrating different domains of opportunity with the challenges, problems and opportunities associated for strengthening science-society interactions towards the diffusion and adoption of RRI in the regional innovation ecosystem of Cantabria (see D4.3 and D4.4).

The mobilization of stakeholders and the intervention in the regional innovation system was deployed by TECNALIA in close collaboration with SODERCAN through the social lab methodology (see Tools section for more details)

During this stage, four pilot actions were co-designed and co-created by regional stakeholders in close collaboration with SODERCAN. Dedicated work between regional stakeholders and SODERCAN to further developing them took place till the end of the experimentation stage in March 2023 (See D 4.3). These actions were situated in the four domains of opportunity for the diffusion and adoption of RRI in the territory. The pilot actions addressed different RRI keys and/or dimensions into different sectors and fields of expertise with the help of regional stakeholders that actively promoted their development during the co-creation sessions and afterwards. These pilot actions were:

- **Collaborative/Cooperative Health Forum**
- **Sustainable consumption model based on technological alternatives**
- **Digital Empowerment**
- **Sustainability Education**

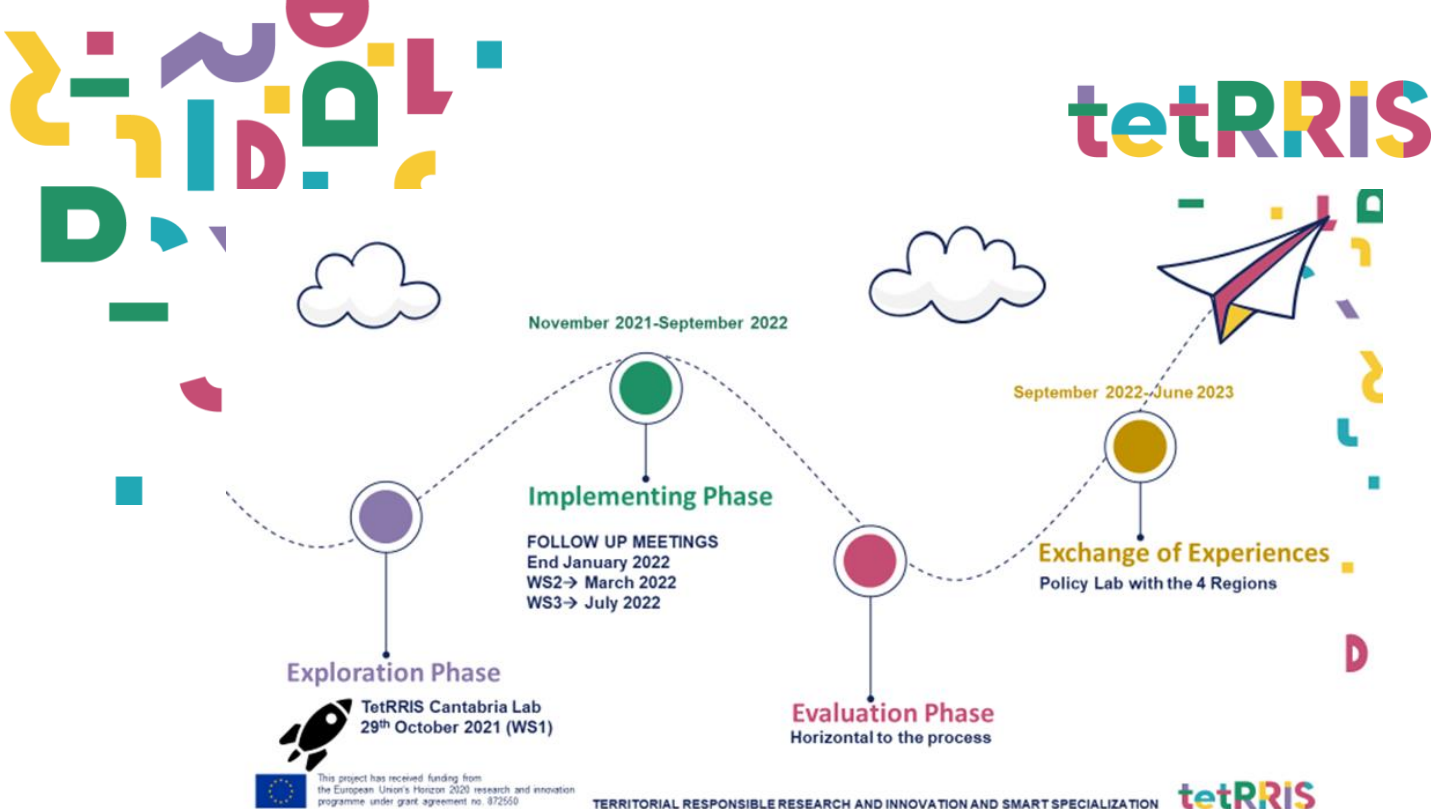


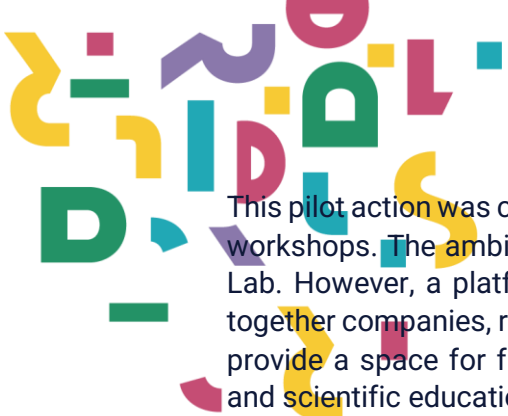
Figure 3 Cantabria tetRRIS social lab workflow

The pilot actions aimed to address various RRI dimensions such as stakeholder engagement, ethics, governance, inclusivity, responsibility, and reflexivity. While some pilot actions faced challenges and did not achieve their intended outcomes, they provided valuable insights and opportunities for learning and collaboration within the regional innovation system.

**1. Collaborative/Cooperative Health Forum:** This pilot action aimed to establish a forum for cooperation in the health sector, bringing together various stakeholders including governments, universities, technology centres, companies, and patient associations. The forum aimed to foster collaboration, generate synergies, and address societal and regional challenges in the health sector. However, due to political barriers, the pilot action did not progress as planned. Lessons learned include the need for agile instruments and mechanisms to support bottom-up initiatives and the importance of stakeholder engagement and RRI institutionalization.

This pilot action faced challenges due to the lack of collaboration between regional public bodies. Despite the difficulties, relevant stakeholders, such as research institutes and companies, are actively involved in promoting public engagement, science education, gender equality, and ethics. SODERCAN will continue working with key stakeholders to develop a participatory health forum. Measures such as mentoring, training, funding, and compulsory cooperation for potential R&D projects are being considered.

**2. Sustainable consumption model based on technological alternatives:** This pilot action focused on changing consumption patterns towards more sustainable processes, particularly in the "Blue economy and fair energy transition" domain. The aim was to encourage organizations to adopt sustainable practices through the incorporation of technologies such as hydrogen and aquaculture. Although no significant progress was made in this pilot action, it led to the establishment of the "Blue Economy Cantabria" platform, which continues to address related issues.



This pilot action was challenging to develop and underwent significant changes between workshops. The ambitious scope went beyond the possibilities offered by the TetRRIS Lab. However, a platform called "Blue Economy Cantabria" was established, bringing together companies, research institutes, and public administrations. This platform could provide a space for future initiatives related to stakeholder engagement, governance, and scientific education in the blue economy sector.

■ **3. Digital Empowerment:** The third pilot action aimed to promote digital training programs and enhance digital competences at the regional level. It involved stakeholders from the ICT sector, companies, training centers, universities, trade unions, and government departments. The pilot action addressed RRI keys such as stakeholder engagement and ethics, and it created several benefits for the stakeholders involved. The experience highlighted the importance of collaboration between companies and clusters and the need for capacity building around RRI.

SODERCAN and the three clusters involved in this pilot action have a long-standing relationship. Digital skills are a common need in regional innovation systems, and ongoing initiatives in this area can be continued. The focus is on digitalization and its socio-ethical implications, particularly with disruptive technologies like AI. The development of training programs and initiatives for other sectors with similar needs is being explored.

**4. Sustainability Education:** The fourth pilot action focused on coordinating existing activities related to sustainability in the region and promoting education and training in sustainability. The aim was to increase the impact and engage citizens and the regional ecosystem in sustainability initiatives. Stakeholders such as the Chamber of Commerce, the University of Cantabria, and the regional business association participated in this pilot action. The pilot action provided a dedicated forum for discussing past and current interventions and helped establish synergies between different stakeholders. It also contributed to the development of a new environmental education strategy.

SODERCAN and the Chamber of Commerce of Cantabria have an established collaboration on sustainability issues. This pilot action will continue under their collaboration and involve other stakeholders interested in sustainability education. A workshop in a regional high school will be followed by further events to promote sustainability from both environmental and social perspectives. The goal is to institutionalize a comprehensive program involving public institutions, private companies, and civil society organizations at the regional level.

The project provided a meeting point for regional stakeholders, fostering cooperation and participatory forums. It influenced the development of the new Smart Specialization Strategy (S3) for the region, incorporating RRI concepts and values. The pilot actions helped identify priorities, challenges, and barriers for cooperation, leading to a better understanding of the region's needs. The project also served as preparation for future policy requirements related to sustainability, societal impact, and transformative innovation. Stakeholders positively received the RRI aspects and concepts introduced in the workshops, and there is a desire to establish a permanent space for discussion and cooperation among different actors in regional innovation. The commitment of the Regional Government's DG Innovation to include RRI as a key element in innovation policies is seen as a significant change in the region.

## 2.2 Observed Barriers, challenges and drivers

During the tetRRIS lifespan, several barriers, challenges and drivers have been spotted in the regional innovation system of Cantabria for the adoption of RRI. As we have indicated in the previous section, the lack of a cooperative culture regarding R&I has been one of the main difficulties that have been faced in the project and dedicated efforts were addressed to this regional deficit. The following table summarizes the main barriers, drivers and challenges faced during the regional experimentation held in the regional landscape. After the table a detailed explanation per each item is provided.



Cantabria	Barriers	Drivers	Challenges
	"Classical", "Technical" concept of innovation (not social)	Common presence of sustainability and responsibility notions in the regional innovation ecosystem.	Lack of an official open innovation strategy.
	Lack of knowledge of RRI concept	RRI awareness in some research actors closely related to RRI keys such as ethics or gender equality.	Modest Innovation culture and cooperation culture.
	Institutional Resistance	Emerging actions around CSR, social innovation, SDGs and social challenges.	Societal challenges in coming years related with rural depopulation, ageing, energy transition, post-industrialisation and/or mobility.
	Limited Resources	Political involvement and Conscious Politicians+ Social capital	Retention and attraction of talent.
Time Constraints and Short- Term Focus	tetRRRIs Lab: Communication and transmittion of RRI values to the general public	Policy Alignment & Change the old ways of doing things in regional organisation.	

Figure 4 Summary of main barriers, drivers and challenges addressed during the regional experimentation



## Barriers

### **Lack of knowledge of RRI concept**

One significant barrier faced during the project has been the general lack of awareness and understanding of RRI among policymakers, innovation practitioners, and stakeholders in Cantabria. RRI is a relatively new concept, and many individuals were not familiar with its principles, goals, and potential benefits. Organizing training programs, workshops, and seminars on RRI can enhance awareness and understanding among policymakers, innovation practitioners, and stakeholders. These initiatives should focus on the principles, methodologies, and practical implementation of RRI. Training can also include specific topics such as ethical considerations, public engagement techniques, and sustainability assessments. Developing guidelines and frameworks tailored to Cantabria's context can also provide practical guidance on incorporating RRI in local policy making and innovation work. These resources can outline step-by-step processes, methodologies, and best practices for integrating RRI principles into decision-making processes. Guidelines can address specific sectors or areas of focus to ensure relevance and applicability.

### **“Classical”, “Technical” concept of innovation (not social)**

In the classical or technical concept of innovation, the focus is primarily on the development and application of new technologies, products, or processes. It forms the basis for many innovation-driven industries and has contributed significantly to economic growth. On the other hand, contemporary perspectives on innovation, such as the social innovation paradigm, RRI concept or the quadruple helix model, take a more holistic approach that considers also social and environmental dimensions, as well as the active involvement of multiple stakeholders. These newer concepts recognize the importance of co-creation, collaboration, and user-centricity in driving meaningful and sustainable innovation. The transition from the classical concept of innovation to this new approach reflects a more holistic and dynamic understanding of innovation. This reorientation also seems to demand new tools for improving its regional governance, incorporating other kinds of non-technological innovations into regional configurations that can go beyond the classical conceptualizations of R&I, as well as enabling multi-stakeholder engagement processes that can facilitate public discussion and debates on different interests and visions. There is still some cultural constraints in Cantabria to shift towards a new approach to innovation that recognizes its complex and multidimensional nature.

### **Institutional Resistance**

Existing institutional structures and culture in Cantabria may resist changes associated with RRI. Incorporating RRI into regional policy making and innovation work often requires rethinking established practices, engaging in participatory processes, and promoting interdisciplinary collaboration. These changes encounter resistance from traditional hierarchical structures and resistance for altering established routines.

### **Limited Resources**

Integrating RRI practices can demand additional resources. Implementing participatory processes, conducting stakeholder engagement activities, and facilitating open



dialogues require dedicated funding and personnel with the necessary skills and expertise.

### Time Constraints and Short-Term Focus

As in other many European regions, policymaking and innovation processes often face time constraints and short-term perspectives. RRI emphasizes long-term considerations, social inclusion, and sustainability, which may conflict with immediate goals and political pressures.

## Drivers

### Common presence of sustainability and responsibility notions in the regional innovation ecosystem.

During the fieldwork it was common to observe a significant between stakeholders a common awareness about sustainability. A number of private and public initiatives related with sustainability were also regularly spotted. In addition, awareness and initiatives related with CSR were also observed. This can be considered a driver for the adoption of RRI at regional level with growing concerns about the environment and social impact, there is a greater emphasis on sustainable and responsible innovation. Organizations are integrating environmental and social considerations into their innovation processes. This includes developing environmentally friendly products, adopting circular economy principles, and addressing societal challenges through innovation.

### RRI awareness in some research actors closely related to RRI keys such as ethics or gender equality.

Some of the regional stakeholders engaged in the experimentation showed a significant level of RRI awareness and institutionalization. Despite in some cases, this was not framed in RRI terms, a considerable “RRI de facto” features were observed, especially among public stakeholders and around some specific RRI keys such as ethics and gender equality.

### Emerging actions around CSR, social innovation, SDGs and social challenges

Frameworks such as Horizon 2020 and Horizon Europe emphasize the integration of societal aspects into research and innovation activities, creating incentives for regions to implement RRI. This is also an outlook for coming policy requirements, such as societal impact, societal engagement, directionality, transformative innovation, place-based sustainability, mission-driven innovation and other emerging ones. S3 strategies are being reoriented to embrace sustainability and inclusive growth into its DNA through initiatives such as the “Partnerships for Regional Innovation”<sup>2</sup>. This initiative is the biggest regional innovation policy lab in Europe. Cantabria is one of the selected pilot regions who have volunteered to co-develop and test the approach, centered on a selection of practical policy tools. This experience can bring a new strategic approach to the region through an innovation-driven territorial transformation, linking EU priorities

<sup>2</sup> [https://ec.europa.eu/regional\\_policy/en/newsroom/news/2022/05/17-05-2022-partnerships-for-regional-innovation-63-regions-seven-cities-and-four-member-states-selected-for-pilot-action](https://ec.europa.eu/regional_policy/en/newsroom/news/2022/05/17-05-2022-partnerships-for-regional-innovation-63-regions-seven-cities-and-four-member-states-selected-for-pilot-action)

with place-based opportunities and challenges. This will create new ideas for public policy, stimulating co-creation and innovation for pursuing public value.

### **Political involvement and Conscious Politicians+ Social capital**

One of the major drivers that the tetRRIS project has benefitted from has been the political involvement of the General Directorate for Innovation of the Cantabria Government. This political support to the project has been of paramount importance for developing the project activities and onboarding a significant number of regional stakeholders. It also has been critical for the policy up taking of the RRI concept in the new RIS3 strategy for the period 2021-2027.

### **tetRRIs Lab: Communication and transmission of RRI values to the general public**

Engaged regional stakeholders have emphasized how the social lab approach has been positively evaluated by the majority of participants in this process several times. The need for bottom-up participatory processes around research and innovation in the regional innovation system has been commonly argued as something that needs to be pushed forward in this territory.

## **Challenges**

### **Lack of an official open innovation strategy**

Embracing open innovation principles by the public administration in Cantabria seems to be a pending issue in the agenda. Collaboration with external partners, such as start-ups, research institutions, and customers, to co-create and share knowledge is critical for developing innovative assets and exploring opportunities for R&I. By tapping into a broader ecosystem, organizations can access diverse perspectives and expertise, accelerating the innovation process, and this must be facilitated by the public administration through specific forums, funding programmes, and diverse instruments.

### **Modest Innovation culture and cooperation culture.**

One of the main challenges spotted during the mapping of the ecosystem has been the modest innovation and cooperation culture that many stakeholders stressed. This was also observed during the literature review and the reasons for this were manifold. In this regard, a long-term challenge is to change that culture in the territory.

### **Societal challenges in coming years related with rural depopulation, ageing, energy transition, post-industrialisation and/or mobility.**

Cantabria region must face with several societal challenges such as ageing, rural depopulation, energy transition and post-industrialization, due to its socio-ethical and geo-cultural particularities. These challenges demand of a cooperative mindset and interdisciplinary linkages with different communities of experts, citizens, industry representatives and public administration. In this sense, there is a clear role of RRI in addressing these challenges through participatory processes.

### **Regulatory framework: Ensuring privacy, security, and compliance with data protection regulations.**

Cantabria needs to catch up with the latest regulatory advances regarding emerging technologies and preparing their regional stakeholders to deal with them.

### Retention and attraction of talent.

One of the most pressing problems that were identified during the mapping of the regional innovation ecosystem, and later on with the experimentation that was held in the territory has been the loss of talent around R&I that Cantabria suffers. Some measures were implemented during the lifespan of the project by the public administration to address this issue, but a more ambitious strategy will be needed for addressing this problem in coming years.

### Policy Alignment & Change the old ways of doing things in regional organization.

Ensuring alignment between RRI principles and existing policies can be a challenge. RRI seeks to integrate ethical, societal, and environmental considerations into decision-making processes. However, existing policies and regulations in Cantabria may not adequately address these concerns or may even conflict with them. Harmonizing RRI principles with local policies requires careful review, evaluation, and potentially revising the policy frameworks.

## 2.3 Tools for experimentation and RRI implementation

A variety of tools were employed at different stages of the tetRRIS project for dealing with the desired objectives to be achieved. In this regard, tools were employed upon the contextual needs that the research and the intervention in the region were revealed at each stage.

### Understanding the context through a qualitative approach

The first steps of the project were oriented to gather knowledge about the regional innovation system that the research team aimed to transform. In this sense tools oriented to obtain an understanding of the context from a qualitative approach were prioritized during the mapping stage. In this phase two main tools were employed by TECNALIA in collaboration with SODERCAN: a **document analysis** and **semi-structured interviews** with key informants.

Thanks to the use of **documentary analysis** a significant amount of literature related with the regional innovation system of Cantabria was reviewed. This state of the art involved academic papers, dedicated reports, public and private policy documentation as well as grey literature that was collected with the help of dedicated databases such as Google Scholar and Scopus. Key actors in the regional innovation system also helped TECNALIA for accessing to restricted documentation, cluster policy related documentation and important assessments of the regional innovation system conducted in the past by other actors.

For complementing this desk research, TECNALIA also in collaboration with SODERCAN carried out a significant fieldwork consisting in 12 **semi-structured interviews** involving 16 respondents and representing 19 different organizations. The interviewees involved public administration (regional government and public agencies), academia (universities and research centers) and business (companies, business associations and clusters). Some interviews were conducted collectively (several representatives of a policy administration, clusters and others), while others were carried out on an individual basis. This was due to the suitability of having several representatives from different

organizations regarding particular sectors of the economy in the region, such as the automotive, industry and chemical sectors. Some of the participants interviewed represented two or more organizations due to dual affiliations. Interviews commonly lasted from 40 minutes to one hour and were transcribed and compiled in predefined templates for subsequent analysis (See D2.2 for more information).

To conduct the interviews, a “mapping tool” was employed. This modular script was developed by the tetRRIS project consortium and consisted of a set of two different kinds of questionnaires: one dedicated to the regional policy actors and a second one for regional R&I actors (Martin et al. 2020). Both questionnaires comprised of a significant number of questions that were used to guide the interviews. The mapping tool paid attention to the socio-cultural particularities of innovation and the questions commonly alluded to factors such as sustainability, responsibility and risk governance in R&I activities, and how the interviewees anticipate or manage the impacts of these factors in their projects.

### Stakeholder mapping and engagement through participatory action-research methods

After this mapping stage, TECNALIA and SODERCAN worked closely in the definition of the intervention in the territory for the adoption and diffusion of RRI in the regional innovation system of Cantabria. To this aim, **a social lab** was designed and set up for mobilizing regional stakeholders, as well as for intervening into the configuration of the system, taking into account the particularities and findings observed in the mapping stage about the “RRI facto” features at play in Cantabria. This social lab was operationalized between October 2021 till March 2023 with the objective of promoting the uptake of RRI into the territory and policy making. Social labs are an instrument of participatory action-research that offer a safe space for collective experimentation between different agents and facilitate processes of change (Timmermans et al., 2020). Their theoretical underpinnings are diverse and varied, but traces of several pioneers of experiential learning can be found (Tabarés Gutiérrez & Bierwirth, 2019). The setting up of this social lab in Cantabria involved the celebration of different events such as participatory workshops, webinars, participation at different events, talks, dedicated meetings to follow up the development of pilot actions and trainings associated to these pilot actions mainly.

After the mapping stage and the identification of four domains of opportunity for RRI into the territory (“Bioeconomies, Health and post-Covid-19 society”, “Blue Economy and Fair Energy Transitions”, “Responsible Industry 4.0” and “Territorial Responsibility and Sustainability”), these were presented to the regional stakeholders in an online event (due to the pandemic) in May 2021. The official set up of the Cantabria social lab was carried out through a first participatory workshop celebrated in Santander in October 2021, engaging more than 40 participants representing different organizations of public administration, business associations, private companies, academia, research institutes and other kind of organizations.

The objective of this first workshop was to co-design between participants several pilot actions framed in the presented domains that can facilitate the uptake of RRI and sustainability into the regional innovation system. After screening the results of this first workshop and the conceptualized pilot actions, regional stakeholders were again engaged in a second workshop in Torrelavega in March 2022 to promote further work

on the definition and operationalization of these pilot actions. In these two events different tools were employed such as **brainstorming's, icebreakers, networking sessions, world cafés, idea clustering, creativity drawing, prototyping** and others.

### Prototyping, experimenting and operationalization

After these two workshops, it was agreed between TECNALIA and SODERCAN to move to a bidirectional mode between SODERCAN and the stakeholders that were moving forward the four pilot actions. TECNALIA also provided a backup to SODERCAN organizing **follow up meetings** with SODERCAN every 15 days for reporting about progresses made in each of the pilot actions, providing **feedback, guidance and coaching** SODERCAN members in their endeavours.

SODERCAN also hosted **dedicated meetings** with the stakeholders that took the lead in the four pilot actions, for discussing practicalities about how to continue the work initiated in the pilot actions and promoting different initiatives for the development of them. In this regard some of the pilot actions were not successful in their development, but others were able to conceptualize different **trainings** in relation to RRI. These trainings allowed to gather to a different set of regional stakeholders to promote **capacity building** into the four particular domains of opportunity identified for the adoption of RRI in Cantabria. At the same time, other pilot actions allowed to a set of regional stakeholders to be engaged in other initiatives dealing with **societal engagement** about R&I with high school students. These and other variety of tools employed during the experimentation were documented in prior deliverables (see D4.3 and D4.4 for more information). In addition to this, it is also important that TECNALIA and SODERCAN also took part in **participatory workshops associated to the development of the RIS3 strategy** for the period of 2021-27 also known as ICAN. These workshops were associated to the five main ecosystems identified in this strategy: Bioeconomy and Agrifood Sector, Blue Economy and Offshore Industry, Cultural Industries and Sustainable Tourism, Health and Welfare and Industry 4.0. These participatory workshops were conveyed to engage the main regional stakeholders in each of the ecosystems and also broadening these configurations with other social agents and associations.

Last, it is important to stress that above all tools, **the social lab was positively considered by a significant number of regional stakeholders** that stressed the need of developing these kinds of informal forums oriented to territorial challenges and organized around collective problem solving based on already based evidence needs.

## 2.4 Practices to share & Lessons learnt

Due to the experimentation enabled by the tetRRIS project in the Cantabria region, several practices were delivered during the lifespan of the project for promoting the adoption of RRI into the territory. Practices are different from tools in the sense that they do not have an instrumental character, but they are associated to ways of acting, behaving, and reflecting. They can be considered specifically to belong to the cultural dimension of a particular group of people into a specific territory.

### Engagement as a practice

The setting up of the tetRRIS Policy Lab helped to establish a space for engaging different participants representing the quadruple helix approach in the region (academia, business, public administration, and civil society organizations). This space also helped to promote collaborative, participatory and iterative bottom-up participatory processes oriented to develop novel ideas based on the contributions of participants. The lab also enabled a multidisciplinary and transdisciplinary approach for enhancing brainstorming, co-creation and experimentation stages to promote pilot actions.

This operationalization of the lab helped to highlight the importance of informal forums for collective problem-solving and addressing territorial challenges based on evidence-based needs. Something that was commonly stressed by participants at the forum and how Cantabria particularly demands this kind of approaches. The lab also facilitated collaboration, the sharing of visions, and interactions among different working groups with a format that was appealing and attractive for its participants, favouring the diffusion and adoption of the RRI paradigm. This was seen by many participants as a driver for spreading awareness of RRI and introducing the concept at the regional level. More important, it was argued that there was a need for continue with this initiative and promoting co-responsibility among the stakeholders in advancing RRI awareness in the region, as well as facilitating continuous learning and adapting RRI practices based on feedback, lessons learned, and evolving societal needs.

### The value of experimentation

It is important to highlight the role of experimentation between different actors in the regional innovation system as a value in itself. The operationalisation of the laboratory, in turn, has highlighted some of the existing problems in the regional innovation system, which are related to the need to develop instruments and mechanisms to favour inter-institutional collaboration, the establishment of more informal and less politicised forums for cooperation, and promoting an open, inclusive and ambitious innovation strategy at regional level. This can help to take advantage of the synergies that exist between different sectors, which due to their small size and lack of resources, cannot develop their full potential. This experimentation was absolutely necessary to facilitate the inclusion of the RRI concept in the region.

### Contextual RRI

Context matters when implementing RRI. R&I activities are always situated within specific social, cultural, economic, and environmental contexts. It must be emphasized the importance of considering the local and regional characteristics, needs, and priorities when conducting R&I. By considering the specificities of a particular place, RRI seeks to enhance the relevance, appropriateness, and effectiveness of R&I outcomes. The contextual analysis in the tetRRIS Lab at Cantabria has facilitated dialogue, collaboration, and co-creation, ensuring that the perspectives that have been considered were specific and applicable in a particular place.

### Stakeholder engagement diversity and inclusivity

Finding the right stakeholders is crucial for the success of any project. One of the major lessons learnt in the tetRRIS Lab in Cantabria has been that engaging with the appropriate actors is essential. In the mapping conducted in the first phase of the project

an effort was made to identify and analyse the regional innovation system. The purpose of this stakeholder mapping was to understand the perspectives, interests, influence, and potential impacts on the project. Together with the mapping of actors, an analysis of the different areas of the regional innovation system and “de facto RRI” features at place were delivered. This shed some light in the envisioned challenges that the implementation of RRI could create in the territory.

Collecting all this preliminary information was very useful, even more so in the case of Cantabria where there was no real mapping of the regional innovation system. This analysis allowed to identify the key stakeholders. Mapping was revealed also as an iterative process. In this sense, it is important to stress that the development of the pilot actions conceived were pushed forward by key stakeholders and these can act as “change agents” in the ecosystem pushing forward ideas or approaches in a bottom-up approach. Untapping this bottom-up potential for change and innovation into the regional innovation system should also offer good prospects for improving the governance of the whole system.

### **Domains of opportunity for RRI**

The concentration of stakeholders around particular domains of interest that can involve, science, technology, innovation, socio-ethical and geo-economic particularities created momentum for the development and strengthening of science-society interactions in the territorial landscape of the region. The four “domains of opportunity” proposed for the experimentation already identified different initiatives in the territory that could contribute to their development. To this extent, embedding RRI in the challenges that face the regional innovation system and beyond individual projects ensures that RRI can be perceived as a horizontal element of the entire ecosystem. This also helped to promote bottom-up approaches and activities aimed to address societal needs and contributing to regional development.

### **Demonstrate societal impact and purpose**

It is important to set up clear goals around RRI and highlighting how RRI contributes to addressing societal challenges. One way of emphasizing the positive impacts of RRI is to communicate success stories and examples of positive outcomes resulting from RRI practices. Demonstrating tangible benefits to society, as well as stakeholders can help to promote the value of RRI to R&I practitioners and taxpayers. In this regard, during the workshops held at Cantabria, RRI was presented through practical examples and specific good practices that stressed the socio-ethical implications that the development of these practices can have. This was accompanied by exercises and co-creation dynamics among participants to promote experiential learnings.

### **Capacity Building & Developing guidelines to provide practical guidance on incorporating RRI**

Generating resources have facilitated step-by-step processes, methodologies, and best practices for integrating RRI principles, methodologies, and practical implementation of RRI. In the course of the project, a catalogue of tools for the implementation of RRI (*Catálogo de Herramientas RRI*) was developed for regional stakeholders. This document contained practical resources, links to tools, methodologies, etc. covering each of the

RRI keys. This catalogue was presented in one of the workshops and distributed to participants for their personal use. It was positively assessed by regional stakeholders.

### **Trust building through honest communication**

When stakeholders trust that RRI processes are robust, transparent, and accountable, they are more likely to invest their time, resources, and support. Trust is also a critical factor in achieving social acceptance of scientific and technological advancements. The development of Cantabria tetRRIS Lab helped to promote an environment of mutual understanding, shared goals, and collective problem-solving for enabling effective collaboration.

### **Policy support and long-Term Thinking: Promote a shift from short-term perspectives to long-term thinking.**

It is important to stress that the actions and impacts provided by the project will be mostly and likely visible during the medium (3-5 years) and long term (5-10 years). Three years may not be sufficient to develop networks, build capacity, and shift organizational thinking. Overcoming time constraints and short-term focus in practices and policy making is very important for the development of effective and sustainable change and for this to be effective, there must be leadership and political commitment. The participation and commitment of the Directorate General for Innovation of the Government of Cantabria has been essential from the very beginning of the project. This involvement is considered a key factor for the project execution and has helped significantly as being the leading institution in order to coordinate the different fields of regional innovation. We can expect that the impact of the project at political level will manifest during the next decade in many different ways.

### **Exchange and co-learning with other regions**

Exchanging experiences can help to build networks between regions, which can facilitate collaboration and knowledge-sharing in the future. By sharing experiences, regions can learn about successful policies and programs that have been implemented in other regions and similarly, to learn from other mistakes. The tetRRIS Policy Lab was created as a space for structured exchange among the regional partners and stakeholders. This collaborative approach fostered mutual learning, provided platforms for dialogue, networking, and learning from diverse perspectives. In this process, different gaps and common issues were identified and potential solutions for addressing them were conceptualized during the different activities. Presenting case studies, research findings, and policy experiences facilitated cross-regional learning.

## **2.5 Policy Recommendations**

Last, and based on the experience, experimentation and cross-fertilization processes between different regional innovation stakeholders of Cantabria enabled by the tetRRIS EU funded project, we propose a set of policy recommendations for the up taking of RRI in the regional innovation policy making. These policy recommendations aim to facilitate the uptake of RRI by the regional innovation system of Cantabria as the first goal, but they also aim to strengthen the capabilities, practices and instruments that are currently in use. These are also oriented to improve the governance of the regional innovation system outlining several measures that need to be taken. Cantabria can foster a culture



of responsible research and innovation, ensuring that scientific and technological advancements align with societal needs, values, and aspirations. These policy recommendations for the regional innovation system of Cantabria are the following:

### **The value of experimentation itself**

To foster “the value of experimentation itself” in the regional innovation policy making for adopting a more informal approach to design and to develop new measures and instruments based on ecosystem needs and evidence towards the adoption of RRI.

### **Open innovation strategy**

To design and promote an ambitious regional open innovation strategy to enable cross-fertilization between different sectors and R&I stakeholders that can untapped the potential of the regional innovation system. To establish platforms for co-creation and sharing of values, fostering innovation culture and meaningful engagement.

### **Multistakeholder forums**

To establish “hybrid forums” where regional stakeholders can have informal exchanges with citizen associations and citizens about matters of concern in relation to the regional innovation system.

### **Regular consultation processes, participatory workshops, and public dialogues**

To enable public debates and discussions between regional stakeholders and Cantabrian society by different means and forms to promote a more societally aligned regional R&I and broadening the current configuration of the regional innovation system. To continue efforts to promote cooperation and collaboration mentality between actors through initiatives like the TetRRIs Lab.

### **Value-based innovation policy**

To promote a value-based innovation policy making in the region situating sustainability, responsibility, social justice or diversity at the core of regional innovation policies. To conduct regular policy reviews to identify gaps and barriers, and revise frameworks to align with RRI principles and goals.


### **RRI framework development**

To strengthen communication and transmission of RRI values that outlines the principles, objectives, and strategies for integrating RRI into R&I activities in Cantabria. This framework should consider the local context and involve relevant stakeholders in its development. To capitalize on the awareness of RRI in specific research actors, to drive RRI diffusion and adoption.

### **Funding and support mechanisms**

To shape funding mechanisms to include RRI criteria as a horizontal and complementary topic in funding calls. This will increase projects and initiatives that align with responsible and sustainable principles, ensuring a more comprehensive approach to funding allocation.

### **International collaboration**



To engage in international collaborations and knowledge-sharing initiatives on RRI. To participate in relevant EU and global networks, projects, and platforms to exchange experiences, best practices, and lessons learned.

### **Improving governance with a long-term view**

To promote a long-term perspective in governance structures and decision-making processes related to R&I. To emphasize sustainability, intergenerational justice and the wellbeing of future generations. To consider the potential long-term impacts of R&I activities on society, the environment, and human rights. To highlight the long-term benefits of RRI, emphasizing social inclusion and sustainability to counterbalance short-term perspectives

### **Rural-urban solidarity**

To foster cooperation, mutual understanding, and support between rural and urban areas, it must be recognized the interdependence and interconnectedness of both areas as well as the gaps and disparities that often exist. It is needed to develop policies and governance structures that consider the specific needs and challenges of both rural and urban areas. To encourage participatory approaches that involve residents from both regions in policy development, implementation, and monitoring. Promoting decentralized decision-making processes that empower local communities to address their issues that can enhance rural innovation, digitalisation, and development of new technologies.

### **Retention and attraction of talent**

To work together to design and implement talent retention and attraction policies, ensuring alignment with regional development goals. Promoting entrepreneurship support, networks of excellence and attracting talent that has emigrated outside of the territory due to the lack of opportunities.

### **Intergenerational divides**

To foster intergenerational solidarity for creating opportunities for collaboration and joint activities between different generations. To encourage mentorship programs, intergenerational community projects, and shared learning experiences to overcome the perceived or real differences, gaps, or conflicts that exist between different age groups in the territory.

### 3. Karlsruhe Technology Region policy brief

The overarching objective of TetRRIS and the Pilot Actions was to introduce (more) RRI thinking and practices into regional policymaking and innovation and development activities in the territory.

This policy brief should sum up the key lessons learnt about “how to do this”. Think of the imaginary reader we are writing this for as someone who wants to run a similar initiative (whether in project form or in some other format) in your territory, and is asking you for advice, on the basis of your experience in TetRRIS, on how to do this. This someone could be in local administration, or an academic or consultant of some kind, like us.

#### 3.1 Introduction

The Karlsruhe Technology Region (TRK region) is located in the upper Rhine valley, in the south-west of Germany and northern Alsace, and close to the major metropolitan areas of Stuttgart and Mannheim. With a total size of almost 6000 km<sup>2</sup> and about 1,7 million inhabitants, the region includes parts of the federal states of Baden-Württemberg and Rhineland-Palatinate in Germany as well as the region of Alsace in France. The Karlsruhe Technology Region is found to have a well-established and densely populated innovation system featuring an array of leading universities and extra-university research institutes, a strong industrial base made up of a mix of large multinational companies, SMEs and startups, and public administrations. Particular industrial and scientific strengths of the region lie in the fields of transport and mobility, energy, information and communications technology (ICT) and lately bioeconomy. Crucial governance and orchestration functions for the innovation system are provided by the structure of the Technology Region Karlsruhe GmbH (TRK GmbH). Organizationally a private company, the TRK GmbH is owned by many of the key actors in the local innovation system from public administration, the private and the university/research sectors, and serves as a platform, network and broker/intermediary, enabling actors to develop and orchestrate strategic development and innovation activities for the region.

In addition to TRK GmbH, there are several other intermediary actors in the region, which put emphasis on innovation and the forming of the regional innovation system and usually act at the interface between politics, business, and science. In the TRK region, these are the offices for economic development (in the different cities and municipalities of the region), the chamber of commerce and industry, the technology park, the "Innovation Alliance" and several clusters and branch initiatives (e.g. "Energy Forum Karlsruhe", the "CyberForum" or "K<sup>3</sup> - Cultural and Creative Industries Office Karlsruhe"). Regarding RRI, many of the core underlying ideas and concerns motivating RRI have disseminated widely into the culture and society of the Karlsruhe Technology Region (TRK region). Accordingly, quite high levels of de-facto RRI practiced by innovation actors, have already been observed at the beginning of tetRRIS. However, the RRI terminology was not widely known among the actors in the regional innovation system.

Within TetRRIS, the Karlsruhe Technology Region focused on two main pilot actions: the creation of a “Practitioner Network on Public and Stakeholder Participation”, and the

development of an inter-regional exchange with the Tampere region in Finland. In brief, the following outputs of the experimentation have been achieved:

- Regarding the Practitioner Network the participants benefitted from the opportunity to learn about public engagement, communication and participation from experts and experienced practitioners.
- Secondly, the network provided the participants an opportunity to critically reflect on their own usages and understanding of the potentials of public engagement, by confronting them with quite different understandings and usages.
- A third output was networking and a greater awareness of the range of supporting resources within and beyond the region; by placing practitioners into dialogue with each other, and giving them opportunities for informal networking, the Network helped change the previous limited awareness and visibility among practitioners.
- A more indirect output was the Network offering the region support for the realisation of multiple Sustainable Development Goals (SDGs), particularly related to SDGs 7 (Affordable and Clean Energy), 8 (Decent Work and Growth), 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities), and 13 (Climate Action);
- Regarding the second pilot action, the Karlsruhe-Tampere exchange, the main output was the two regional partners, TRK GmbH and Council of Tampere, as well as a selected group of actors to get to know each other better and develop a deeper understanding of each other's innovation and development-related activities, interests and priorities and policy strategies.
- The key benefit of the exchange is to have laid the basis for such future cooperation, to have identified some possible opportunities for this, and to have begun acting on them, for instance regarding possible cooperation in the fields of designing inter-regional innovation and development projects, applying for funding together and possibly joint workshops or presentations at conferences.

### 3.2 Observed Barriers, challenges and drivers

At the start and during the implementation of tetRRIS in the regional innovation system of the TRK region, various barriers and challenge, but also drivers could be observed. Both areas are crucial to achieve a significant effect in the later stages. As will be shown further down below, barriers could be observed on the different levels of the regional innovation system, mainly on the level of institutions (firms), the intermediary sector (not to be mixed up with TRK GmbH) and the system level as such. On the other hand - and in line with the main characteristics of the innovation system - several drivers in the region supported tetRRIS and the implementation of RRI.

What were the main barriers and challenges to getting more RRI thinking & practice into local policy making and innovation work in the territory? The main challenges we observed in the TRK region include:



## **No common understanding of the RRI concept and need to "translate" it into practical terms**

One of the barriers at the start of tetRRIS was the lack of knowledge of the RRI concept and a more or less unfamiliarity with the objectives, possible instruments and value added for the different stakeholder groups. A key lesson at that point was the finding that RRI or specific elements were already used in the region, although not on a systematic and integrated level. Insofar, the development of a common language proved to be a challenge, but we benefited from pre-existing experience among important local actors which were the drivers in the later phases.

## **No existing strategy or guiding document to get local actors to be interested in RRI**

In line with the first the challenge highlighted above there was no regional strategy available when tetRRIS was started which could be used as a guiding document and based on a joint communication and exchange process. In the regional innovation strategy, which had been elaborated a couple of years prior to tetRRIS, besides the core technology fields and their further development the soft elements like quality of life, attractiveness for business professionals and the self-image were also considered. Although these soft elements imply some RRI-aspects, the RRI was not explicitly addressed.

## **Lack of a systematic identification of need and interests related to RRI across the diverse group of actors**

Part of the regional innovation strategy was the identification of specific needs and interests as well as measures to match these. With regard to RRI no such investigation was at hand when launching tetRRIS. As the RRI concept was not familiar to most of the actors, the challenge was to operationalise needs and interests based on the more general information available and discuss these with a core group of stakeholders. As a result, the approach was taken on how the available information on needs and information could be addressed with RRI. One example are the R&D&I projects on autonomous driving and mobility undertaken at efuCampus Buchsal where a systematic stakeholder process was initiated to guarantee acceptance among societal groups.

## **Limited availability of budgets and exchange formats through which stakeholders in the region could be involved**

The need to find and develop formats through which stakeholders could be involved, also in contexts where a budget is not available to cover the costs, proved to be a barrier resulting in a comprehensive effort to convince different institutions and people in charge to participate in the implementation process. Therefore, it is not enough to identify stakeholder needs which could be addressed with RRI, but also innovative formats are needed in which stakeholders can be connected with RRI or educate them about it. Our approach integrated both views: the development of new formats of knowledge exchange, like for instance, dedicated stand-alone workshops, but also ideas on how to "piggy-back" onto larger existing structures (e.g. conferences and initiatives organised by others, for other purposes, where we get a slot), but also discussions on how a sustainable financing structure can be set-up.

## To find ways to get stakeholders to engage with RRI and practice it beyond a single initiative or project

Another challenge was to identify or find ways to engage stakeholders with RRI and practice it beyond a single initiative or ongoing project. The mapping exercise pursued the goal to not only identify the ongoing activities and projects related to RRI, but also stakeholders who were open and willing to participate in the tetRRIS project. As the majority of R&D&I activities in the region are mainly technology oriented with most of the individual actors unfamiliar with RRI, we had to find innovative ways to approach and convince them to participate. To translate the concept into more practical terms was one element at the start (see above), followed by several interviews during which we could explain the approach a bit more detailed. Another element was the network competence of TRK GmbH having close relationships with regional companies and research institutes and current R&D&I projects. Regarding societal groups, we didn't involve them directly rather than reflecting experience with the engagement of heterogeneous (societal) groups on the level of specific projects. This was done primarily in the frame of the practitioner's workshop series supported by a team of coaches with expertise in the area of moderating conflicts and stakeholder processes.

As regards the main drivers for getting RRI into the regional/local policy making and innovation and development practice the following should be mentioned:

### **Single RRI practices have already been (implicitly) incorporated among a small group of networks partners within TRK region**

An important driver for RR implementation within the TRK region was the pre-existing use of "de facto" RRI practices. When starting tetRRIS in the TRK region, particularly in the mapping phase it became obvious that a small group of firms, institutions, intermediaries and individuals were already using instruments like stakeholder and participation processes, science communication, risk assessments and diversity in their current R&D&I projects. This experience and core group of network partners formed the basis for the next steps and proved to be extremely valuable for tetRRIS and the region as such.

### **Policy concerns that resonate with RRI (e.g. sustainability, inclusion, participation, diversity)**

Most of the policy makers in the TRK region, especially the shareholders of TRK GmbH (the mayors of the cities and municipalities in the region) were relatively open to the RRI concept and policy concerns resonate with RRI, for instance regarding issues like sustainability, inclusion, participation or diversity. Thus, like several firms and institutions in the region, policy makers were quite "ready" to adapt the idea of RRI and actively use the concept as a part of the political programmes. Political support and communication in the region were surely an important driver as current political goals can, or need be linked with RRI.

### **Legal structures or requirements from project funders that mandate "de facto RRI" or "RRI-like" practices in certain contexts**

On the level of specific funding programmes and measures from the federal state of Baden-Wuerttemberg and the national level, RRI-like practices are mandatory to (successfully) participate in the competitive programme calls. These RRI related

practices concern for instance public consultations over infrastructure projects, participation and communication, public understanding of science, open data, diversity requirements, etc.). The elaboration of the Regional Innovation Strategy for Baden-Wuerttemberg for instance is a typical example of a mandatory requirement in the form of actively involving innovation partners into the "entrepreneurial discovery process". Another example is the RegioWIN competition initiated by the government of Baden-Wuerttemberg, co-financed by the European Fund for Regional Development pursuing the goal to develop new concepts to deal with future technological, ecological and demographic challenges in the sub-regions, cities and municipalities of Baden-Wuerttemberg. The link to RRI is in the area of stakeholder involvement (applicants need to demonstrate how such a process will be implemented), target group-oriented communication of the project goals and possible risks, and diversity and inclusion management.

### **RRI understanding among leading academic institutions in the region**

The leading academic institutions in the region, like Fraunhofer and the Karlsruhe Institute of Technology (KIT) are constantly involved in R&D consortia with a socio-technical focus, in which elements of RRI are applied. The regional networks between the different R&D institutions are comparatively dense which results in quite stable relationships and typically combine different disciplines or technological and social sciences. Apart from this, the leading academic institutions have RRI expertise at its disposal. As these institutions are often drivers in the elaboration of funding proposals, RRI elements can be incorporated accordingly. In the course of tetRRIS the availability of competencies in RRI - complementary to Fraunhofer ISI - resulted in a various exchange with the colleagues and their active involvement in the pilot actions.

### **3.3 Tools for experimentation and RRI implementation**

For the conceptual foundation and subsequent implementation of RRI in the TRK region different methodologies or tools were used, which are not per se new, but adapted to the specific issue and the regional context. Most of the instruments were qualitative approaches and commonly used within the empirical social research. The tools were used in line with the different topic or work packages and chosen to according to the specific objectives. Qualitative methods were implemented due to the novelty of the RRI concept mostly un-known to regional stakeholders and to achieve a common understanding and acceptance at the beginning of tetRRIS. The idea was to involve as many representatives as possible of the innovation system and have commitments from a core group supporting tetRRIS all the way through. In the following, the tools used in the project are introduced: structured background interviews with different stakeholders in the TRK region based on semi-standardised interview guidelines, a series of practitioner's workshops as the core of the pilot projects and a survey carried out in the region on perceived benefits and shortcomings.

Interviews with regional stakeholders on the basis of specific guidelines have been conducted in the first phase of tetRRIS implementation in the TRK region with the aim to better understand how and to what extent different elements of RRI were already practiced in the TRK region without necessarily utilising the term RRI. We began with the examination of a series of innovation projects related to urban and suburban mobility - as one of the main (technology) priorities (besides energy and digitalisation) of the TRK

GmbH - to get an overview of both the main players and the relevant experts. For this, we undertook desk re-search on individual projects and conducted ten structured background inter-views with project officers, researchers, and local-government officials. The focus on mobility/transport was justified due to the importance this field assumes in the region's development strategy and the number of actors and initiatives involved. It was also justified on account of the potential this field to offer for further deepening RRI activity, as identified during scoping talks in the proposal and initiation phases of TetRRIS.

A series of practitioner's workshop was one of the two pilot actions in TRK region. The idea and concept was introduced as it became clear, that at the time when the pilot action was initiated, only a few structures existed in the region to facilitate dedicated dialogue and exchange among practitioner about participation, communication and engagement issues. The gap in terms of initiating a "safe space" to discuss specific needs and experiences in the process of implementing RRI became obvious during the initial investigations in the course of the "mapping" phase. To facilitate the exchanges among the regional stakeholders and to develop an appropriate structure, the TetRRIS project team in Karlsruhe therefore sought to build a "practitioner network on citizen and stakeholder participation". The network evolved into a small core who attended a series of workshops plus additional networks members who participated ad-hoc depending on interest in the particular topic and time availability. The group of networks members consisted of over 30 people, including stakeholders from business, academia, politics, associations and intermediary organisations, and civil society. Insofar, a broad range of perspectives and expertise was represented in the network. As a tool for RRI implementation, the work-shop series proved to be extremely valuable as a core group of experienced actors can trigger a dynamic process, push the topic and mobilise additional players. Furthermore, the network results in a team spirit and supports identity (with the region and the specific topic of RRI). The workshop series constitutes a structure for a regular exchange in both a formal and informal setting. Summing up, the workshop format developed for the TRK region was the most important vehicle to exchange practical knowledge and to discuss specific topics on a regular basis.

The implementation of a survey proved to be a good instrument to systematically collect monitoring data on work progress, the pilot's perceived value, and remaining shortcomings. Such data and its findings are a good basis to help regional partners in RRI related project to further improve the instruments and measures as well as to develop a long-term regional strategy. The survey can be implemented after the initial interviews to assess the regional pre-conditions and/or on annual basis to collect monitoring data. The main advantage is addressing more actors than is possible in the frame of interviews. In the case of the TRK region, one of the practitioner's workshops was used to fill the survey.

### 3.4 Practices to share & Lessons Learnt

#### Guarantee a common understanding of the RRI concept and its operationalisation in the region

For those regions and actors being unfamiliar with the RRI concept, its objectives and instruments, a common understanding needs to be elaborated at the beginning. A part of these working sessions should be a discussion on how RRI and single instruments



can be operationalised in order to maximise acceptance and output. As RRI is a generic concept, a common founding according to regional features is basically beneficial. A practice to share is therefore to initiate a conception phase with the involvement of different stakeholders which formulate their demands and expectations. The definition should be concrete enough to avoid arbitrariness but not too narrow resulting in a dominance of individual interests.

### **Existing structures and institutions are the key to implement the concept**

The deployment of the concept, particularly with regards to the pilot actions in the TRK region has shown that being sensitive to the existing institutional structures in the territory and local actors' interests and shaping own activities to fit with these is one of the main success factors. Here, the existing innovation culture in the region in general and with regard to several high-tech companies helps to implement the concept. Apart from the micro level of firms, the intermediary actors, especially TRK GmbH as the networking platform and agency were crucial because of the ability to assess the basic possibilities, interests and barriers within the regional network. Therefore, an important lesson learnt is a capable platform or agency acting close to policy makers, administration and the companies. However, as territories or regions are very diverse, including the intermediary structure, it cannot be guaranteed that what works in one may also work in others. An important goal at the outset of tetRRIS was to understand these in some detail.

### **Establishment of an exchange-platform for RRI in the region**

The establishment of a platform for a regular and targeted exchange of ideas related to RRI in terms of the use of the concepts and experiences is a useful tool to support the actors and stakeholders in learning from each other. The platform serves as an easy format to include current issues, like achieved milestones, critical factors for the implementation of RRI or finding opportunities to be shared with other actors looking for similar information.

### **Technology oriented and innovative firms matter and need to be included right from the start of RRI**

Although the TRK region did not start from scratch in terms of RRI elements, but the main drivers were only a few companies or consortiums having included single RRI instruments in their projects. These are typically companies engaging in new technology fields be it in urban mobility, autonomous driving, smart cities, or artificial intelligence. Most of those companies are quite sensitive on issues like public awareness, technology acceptance, communication, the involvement of societal groups and therefore are often forerunners in operationalising these concepts. Based on this observation, a lesson learnt from the implementation of RRI in the TRK region is to take into consideration the crucial role of single companies and make use of their experience from a very early point.

### **Reflecting the role we as external scientific actor (Fraunhofer ISI) are playing and wherein our additionality lies**

We as external scientific support actor within the tetRRIS pilot TRK region had to be very flexible in the process of initiating the pilots in order to guarantee the matching of the regional needs and the assessment wherein our additionality lies. So reflecting regularly on what role we as external actors, who are trying to reshape aspects of the policy

making and innovation practices in the territory, and our project is in fact playing a quite important role. In the Karlsruhe case, a key role was laid in systematising and making explicit the already ongoing de facto RRI activities and concerns - giving local actors a language and concepts to understand what they were already doing (or trying to do), and thus helping them make it better. The combination of the practical work carried out by TRK GmbH, the consideration of the specific interests of TRK GmbH's shareholders and stakeholders and the conceptual input coming from us constitutes a favourable frame to achieve the overall goals. With a view to sustainable effects of tetRRIS and more general to other regions trying to adopt RRI a good process therefore lies in the establishment of a network and management structure which guarantees a flexible and creative approach and a certain freedom to possibly adjust the original ideas.

### **Ensuring sufficient diversity and representation across relevant metrics**

In the specific context of the practitioners' network, the corresponding workshop series, but also vis a vis a view to project events, we ensured a sufficient diversity of the group and the representation across relevant metrics. The reasons were on the one hand to not only integrate the relevant actors from the regional innovation system (structure) and on the other hand - as the main reason - to ensure a multitude of perspectives across the different groups (gender, business, civil society, ethnicity). Within this process, the different views on the concept and how to implement it were included, for instance as regards the communication strategy, the solution of conflicts, different targets, the balance between individual and regional interests etc. Especially in regions with a quite international composition it seems to be essential to actively include a diverse set of ideas and notions and adapt the RRI concept and instruments to the different societal groups.

### **Exchange of experience and policy learning with Tampere region and other regions to reflect own status with "reference" regions**

Inter-regional policy learning and a continuous exchange with other regions are extremely inspiring for regions starting to implement RRI. Even though RRI elements have already been implicitly implemented, TRK region tremendously benefited from the exchange with the Tampere region. Therefore, regions just starting with RRI should think about possible "reference regions" and initiating a systematic exchange on critical issues like stakeholder involvement, governance structure, funding, etc.

### **Make use of innovative organisational concepts to experiment with new technologies**

Based on the experience in the TRK region, highlight projects with a focus on experimenting and testing new technologies under real conditions supported the implementation process of RRI. One example is the so-called efeuCampus Bruchsal GmbH which intends to establish the eco-friendly experimental urban logistics campus within the TRK region. The concept is part of the RegioWin research project "Innovation Centre for Autonomous Urban Freight Logistics" funded by the state of Baden-Württemberg and European Regional Development Fund (ERDF). This lighthouse project is intended to become a permanent stimulus for the development of solutions for freight logistics on the last mile and autonomous vehicle technology for the business location of Bruchsal. In this reference quarter, which is unique in Europe, goods of all kinds will be moved with new types of vehicles in an emission-free, generation-friendly and

driverless manner. By sustainably reducing motorised delivery traffic on the so-called last mile, energy consumption and CO2 emissions are to be reduced and the quality of life in the neighbourhood decisively improved. Due to the ambition of the project and the regional impact, a systematic stakeholder and communication process had to be carried out prior to project launch. tetRRIS benefited from efeuCampus as valuable knowledge on what works in terms of stakeholder integration and favouring framework conditions was generated and could be built upon. So, regions which think about integrating RRI into their innovation and technology support strategy are well advised to identify and analyse already ongoing de facto RRI measures to be taken into account.

### **Regional innovation support programmes may support RRI implementation**

With a view to support RRI in the region in a sustainable way, the example of TRK region shows that additional regional innovation support programmes can be useful to link the original idea with a concrete funding architecture. In the case of Baden-Wuerttemberg, the Ministry of Economy, Labour and Tourism, in cooperation with the Ministry of Science, Research and the Arts and the Ministry of Food, Rural Areas and Consumer Protection, has launched the competition "Regional Competitiveness through Innovation and Sustainability - Re-gioWIN 2030" for the 2021-2027 funding phase of the European Regional Development Fund (ERDF) of the European Union in order to make optimal use of regional on-site expertise as part of a bottom-up process. "RegioWIN 2030" aims to improve competitiveness in the regions through innovation and sustainability and thus contribute to sustainable regional development. The RegioWIN 2030 competition is intended to create an incentive for the regions of the state to systematically pursue a strategy-based and targeted regional and innovation policy in the functional areas of the state as an ongoing structural and regional policy task. The focus of the competition is on innovation and sustainability orientation in the conceptual set-up. Lighthouse projects can be in the area's innovation capacities, specific demonstration projects and regional innovation centres linked to public universities of applied sciences. For TRK region, the integration of RRI elements into the regional development concept and the requested lighthouse projects was quite beneficial as the experience from tetRRIS could be used to create a unique signature of both the regional concept and the lighthouse projects.

### **Independent scientific support from innovation research can increase acceptance**

In the TRK region the tetRRIS consortium consists of the intermediary TRK GmbH and Fraunhofer-Institute of Systems and Innovation Research ISI. With a view to the process of the conceptual foundation, the definition of the pilot cases and the subsequent realisation within the practitioners' workshop series and the exchange with the Tampere region, it became apparent that the combination of the two types of institutions was extremely valuable to meet the original objectives. Against the background of the perception of RRI as a theoretical concept, the efforts to communicate the objectives, intentions and practical use were important to achieve acceptance among the different actors in the region. Especially the role of ISI as an independent institution supported acceptance and the scientific solidity of the RRI concept. It became clear that due to the novelty of RRI significant translation and communication efforts had to be undertaken.

### 3.5 Policy Recommendations

The preparation and implementation of the pilot actions and experimentation with different instruments in the TRK region have shown a potential for the RRI concept accepted and further used on the different levels of the regional innovation system. As highlighted above, the pre-conditions are advantageous as both the current actors, the structural organisation in the shape of an intermediary organisation (TRK GmbH) and an innovation culture sensitive for the importance of RRI and respective elements. But how can the impacts be resulting out of tetRRIS perpetuated over the coming years? How can the regional potential at the interface of technology, innovation and complementary RRI elements further activated? Is there room for a further improvement and adaptation of the instruments developed within tetRRIS? How to transfer the learnings to other regions within the federal states and beyond? These are the most important question that have to be answered in order to make tetRRIS a lasting success for the Karlsruhe Technology Region.

The following recommendations are derived on the basis of both, the drivers related to RRI and the challenges. Within this logic, the already existing strengths vis-a-vis RRI will be addressed as well as the weaknesses. Due to the facts that the TRK region - as is the case of nearly all the regions in Europe - is neither autonomous, nor sovereigns, recommendations are not only formulated for the TRK GmbH as the intermediary organisation implementing RRI in the future, rather than also for the federal states as the superior administrative policy level.

#### **Guarantee the continuation of the initiated pilot projects as the core of RRI within the TRK region and the federal states.**

The two pilot projects initiated in the TRK region have shown that a specific group of actors is ready and open for RRI within their project work and R&D&I activities as such. The experience gained are a good basis for a further dialogue and concrete actions. The exchange with the Tampere region is also a starting point for policy and practical exchange of ideas coming from different regional settings and R&D activities. Informal declarations of intention to continue the exchange have already been given. In detail, the following recommendations can be named:

- regarding the practitioners' workshops, continue the series with a least two annual meetings in different issues arising from the community.
- try to further develop the instruments regarding network building, exchange formats and for the workshops themselves; if necessary, include external knowledge and experience from other regions (in Baden-Wuerttemberg).
- regularly evaluate the dialogue with the core actors in the network to meet the demand and generate new ideas to be discussed.
- as for the regional exchange with Tampere, continue the dialogue with at least one annual meeting to a common agreed agenda; in a medium-term think about including other regions and circulate between the hosts.
- think about the allocation of a specific RRI related budget for supporting/administrative staff at TRK GmbH to guarantee the follow-up activities (see also further below regarding the establishment of a specific fund).

**Use the existing experience from tetRRIS and particular the pilot cases to demonstrate the positive effects of RRI related stakeholder integration and communication**

The current status of the implementation of RRI in the TRK region, incl. the different milestones have been regularly communicated via social media, the TRK website and in the form of newsletter notes. The interest and feedback to the RRI pilot actions was significant and showed a huge interest among the TRK region community, the TRK GmbH shareholders, stakeholders and also external actors. Therefore, it is recommended that the further RRI activities and particularly the positive effects or success stories should be regularly demonstrated and communicated in order to sensitise and motivate the actors within the regional innovation ecosystem. More specifically, the following options should be considered:

- use the experience of the two-year pilot phase to assess the communication strategy and adapt it when necessary; try to be innovative in terms of highlighting success stories and the positive effects; try to address the different stakeholder groups with a targeted communication strategy; the objective should be to institutionalize the issue and sensitise the community.
- try to take integrate RRI elements into strategic planning activities to guarantee a comprehensive approach and consideration.
- think about initiating a series of regular workshops or focus groups with the broader society to inform about technologies developed in the TRK region, to demonstrate the (positive) effects of RRI and to further integrate societal groups.
- use these elements and think about other instruments to improve the socio-technical mindset in the region regarding (risky) technologies and innovations as such.
- continue the dialogue with the scientific institutions in the TRK region, incl. KIT to take into consideration RRI specific activities in this particular group.

**Systematically enlarge the group of firms and other (scientific) institutions, which are not using RRI elements in their RTDI activities (broaden RRI elements in the region)**

At the end of the initiated pilot projects in the TRK region, the number of actors involved in RRI is still limited. These actors are the regional forerunners when it comes to RRI and the complementary use of socio-technical instruments. Consequently, de facto elements of RRI have already been implemented prior to tetRRIS. However, the objective for the coming years should be the broadening of the concept of RRI in the region (and beyond) - based on the pilots which have been launched within tetRRIS - and guarantee a more systematic mobilisation of actors. In detail, we recommend:

- taking into consideration the broader portfolio of current R&D&I projects, which were not directly affected by tetRRIS, as the basis for RRI in the coming years.
- to motivate additional players to engage in R&D activities in general and to recognize the importance of RRI instruments (see also above regarding communication measures).
- to be creative in the formation of project consortia for proposals or sensitise established project consortia to consider RRI when appropriate and specific R&D measures contain RRI elements.
- to continuously enlarge the core group of current RRI partners within the region and make use of the practitioners' workshop series;

- improving the interaction, exchange of experience and learnings across the different groups of firms (and scientific institutions) to guarantee transparency.

#### **Further strengthening the cross-regional or inter-regional exchange of experience and policy learning**

Apart from the international exchange with Tampere region, the integration into other existing format is important to learn from other regional and institutional contexts. Specific issues relevant for a mutual benefit are those that have practical relevance for instance regarding the management of RRI instruments and their integration into on-going or new R&D&I projects, funding opportunities, relevance of specific features of the respective innovation systems, integration into innovation strategies and regional planning activities, mobilisation of different stakeholder groups, role of engagement processes, interfaces with on-going technology acceptance approaches, etc. Regarding the federal states of Baden-Wuerttemberg and Rhineland-Palatinate in which TRK region is located, a systematic transfer of experience is recommended as the TRK region is the de facto role model in terms of RRI for both federal states. To be specific, the following options should be considered:

- to engage in ongoing or new regional exchange format, for instance regarding the platform "RRI Tools" or specific working groups within the Smart Specialisation Platform.
- to connect with other similar regions in Germany to continuously exchange ideas and new instruments regarding RRI.
- to establish a network of interesting regions for a mutual and regular exchange.
- in the case of already established exchange formats try to include RRI topics on the agendas.

#### **TRK GmbH should make use of the existing discussion and exchange formats with all administrative levels, especially with the superior policy level to integrate RRI in ongoing or new innovation support instruments**

In order to include the issue of RRI into the existing innovation strategies and funding measures, TRK GmbH should be creative to make use of the existing exchange formats on all political (and administrative) levels. As TRK GmbH as an organisation is dependent upon the superior policy levels in terms of R&D funding, the objective of RRI can only be achieved when relevant innovation and technology support measures are geared towards this goal. Specifically, RRI needs to be stimulated both top-down and bottom-up. The more the different policy levels interact and match regional demands and experience with broader societal goals, the better the policy delivery process will be in the end. Referring to this, the implementation of tetRRIS in the TRK region results in the following recommendation:

- use the existing political exchange format to further push RRI vis-à-vis policy makers and funding institutions on the EU level, the federal level and the level of the federal state;
- motivate the shareholders of TRK GmbH (i.e. mainly the mayors of the different cities and municipalities in the region) to actively push RRI in their respective administration and networks (e.g. economic development, German Association of Cities and Towns, municipal companies, technology and start-up centres);

- regarding the next ERDF period guarantee input of experience, results and strategic objectives into the operational programme of the federal states and their new Regional Innovation Strategy; activate the relevant boards and committees to actively push the strategic discussions.
- try to establish a dialogue with the political parties in the region and beyond to communicate the RRI concept with regard to the ongoing programme debates of the party; of specific interest seems to be ideas of white and green washing of the concept, i.e. to operationalize the concept to bring forward eco-innovations and projects related to the circular economy and bio-economy (link to the concept of "mission oriented innovation policy).

### **Establish a specific fund to support RRI activities in RTDI projects in which such activities are not yet foreseen**

To guarantee structural continuity and in terms of RRI contents the financing of RRI related instruments and measures - either complimentary to newly initiated R&D&I projects, or on an overarching level - is the most important. Observations from other innovation support measures show that a significant and long-lasting impact is quite often connected to a sustainable financing. Although in the TRK region, a few de facto RRI measures were already implemented prior to tetRRIS, the broadening of the concept and the integration of additional stakeholders can only be achieved when financial incentives support the further implementation. Against this background, we recommend finding ways to establish a specific fund to support RRI on the level of specific R&D&I projects, which can either be initiated by SMEs or within public innovation support programmes (in which RRI is not yet intended). The recommendation is based on the assumption that a significant potential with regard to RRI is available in the region but needs to be activated. The sheer communication of good practices and the elements of RRI is not sufficient to achieve impact as such. As TRK GmbH is formally not allowed to set up such a fund, creative ways on who could be in charge of conceptualising the RRI fund and also for the later implementation have to be found. Summarising, we recommend the following:

- establish a specific RRI fund initiated and managed by a regional actor with the aim to further activate RRI in the region in general and more specifically to use the funds for additional co-financing of RRI elements.
- the concrete specifications of the fund should be defined by regional authorities, which includes the mobilisation of potential financiers (e.g. private firms, philanthropist, federal states, other regional stakeholders); we recommend to focus on the idea of a fund, opposite to a project-based financing structure (like tetRRIS);
- the implementation of the fund could be done on the basis of annual project calls (i.e. in the form of a competition), or within the initiating of project consortia to apply for funding in the frame of calls for proposals.

### **Setting-up specific or adapt existing infrastructures with the aim to integrate RRI in early phases of R&D projects**

Technical infrastructures are regarded as essential elements of (regional) innovation systems. On the level of cities and municipalities these are not only laboratories and technical facilities (mostly at scientific institutions) rather than start-up labs, hubs, accelerators, technology centres and more recently maker spaces or sandboxes. The

TRK region for instance has a technology park, the technology fabric for innovative firms and start-ups as well as several other facilities (e.g. innovation hubs, smart production park, craftsmen's yard, or the culture and creative economy office). The integration of RRI in the early phases of R&D&I projects or the start-up process appears to be an important approach, as these phases are typically characterised by experimentation with open results. The early adoption of RRI elements seem to be an important success factor for projects and firms. Therefore we, recommend making use of the existing infrastructures - which had already been integrated into the pilots, at least the actors have been informed - to not only broaden the RRI concept, but also to be innovative to integrate it in the current activities. To be more specific, we recommend:

- to actively approach the different infrastructure facilities to search for possibilities on how to integrate RRI into the services provided (concept, provision of information with the elements, instruments and goals of RRI);
- use the different communication measures and best-practices to demonstrate the benefits of RRI to the community within the technical facilities.
- to organise regular workshops or seminars jointly with the operators of the facilities to discuss the experience and further steps on the level of the concrete project work of the firms located in the facilities.

#### **Initiate an annual RRI award in the region and communicate the specific selection criteria**

The TRK GmbH already initiates an annual Innovation Award NEO to rewards outstanding achievements in applied research and development. These kinds of awards can be regarded as valuable instruments to motivate entrepreneurs and researchers and also as a marketing instrument within the TRK region and beyond. Based on this format and the high interest among the community, we recommend making use of the Innovation Award regarding the further implementation of RRI. In details, the following recommendations are given:

- communicate the RRI concept within the context of the annual Innovation Award and include RRI criteria into the selection process.
- if necessary, enlarge the jury responsible for the selection of the winner team or project (setting-up a jury of both technology experts familiar with the RRI concept);
- if possible, focus the selection on different types of ideas/projects to show the possible effects and instruments of RRI (e.g. from risky technologies with a high regional impact to more low-technology innovations with concrete and expectable results (e.g. RegioMove App).

The derived recommendations show different approaches to link the various measures and operational work of the different groups of actors in the regional innovation system with the RRI concepts. tetRRIS has laid the foundation for the further implementation which can result not only in more technology acceptance in the region but also in the general improvement of systemic competitive advantages and the chance to become one of the pilot regions in Germany having implemented RRI as a strategic and operational tool.



## 4. Tampere Region policy brief

### 4.1 Introduction

The vision of the pilot in the region of Tampere was based on the actions promoting sustainability and integrating RRI themes in the regional innovation ecosystem, especially in the regional strategic processes including the Regional Development Programme and Smart Specialisation Strategy. The Tampere pilot also recognised that the traditional innovation ecosystem cannot drive the responsible sustainability transition alone without including the region's biggest economical actors, namely, the manufacturing industry. Thus, the pilot was divided into two spearheads, one focusing more on the regional development processes and one more on the manufacturing industry's ecosystem and processes. The overall vision of the pilot was "to create a cohesive, responsible and sustainable regional innovation system that works in a cooperation towards building a better future for the region". To answer the two targets of the pilot, the Tampere pilot organized the following actions, here presented under thematic topics:

#### Regional strategies and programmes

- Regional programme and Regional Digital Compass: Intertwining with the ongoing regional development program process by enhancing RRI dimensions and building a roadmap of the regional digital compass in the Council of Tampere Region. Especially engagement, open access and inclusivity were promoted.

#### Awareness raising

- Collaboration with regional initiatives Ekothon2 and Sprint Innovation Festival: Ekothon2 was a co-creation online event that enhanced public engagement with the civil society and the grass-root-level actors of the region. In Sprint Innovation Festival, the pilot prepared challenges to innovation competition for students, on the first year on the challenge of manufacturing industry to attract young people and increase diversity of recruiting, and on the second year, on envisioning a sustainable digital future of the region. The prepared challenges promoted widely different responsibility and sustainability topics, especially inclusion and engagement.
- 'Strong, stronger, responsible' seminar series on sustainability and responsibility targeted especially at SMEs. The seminar addressed especially corporate social responsibility (CSR) and within that social and environmental sustainability including various themes from the need of foresight (anticipation) to ethical solutions (e.g., inclusion and diversity) to environmental ones (e.g., technological solutions).
- The RRI Roundtable meeting series brought together the regional RRI-related projects to discuss topical issues and the future development of RRI. Wide array of RRI elements were discussed in each event. For example, gender equality, citizen science, and engagement have received attention although none of the meetings has concentrated on only one specific RRI topic. Rather the action has on purpose addressed the RRI concept broadly.

### Training and intervention

- Corporate Responsibility Accelerator: A series of workshops targeted at manufacturing industry SMEs, to support their sustainable business development efforts and strengthen their abilities to anticipate possible outcomes of business activities. The accelerator did not address specific RRI elements but had general sustainability and responsibility focus. For example, social, economic, and environmental sustainability were discussed throughout the pilot action. The focus was to improve skills and knowledge in CSR, in particular of small businesses. Reflexivity was also one of the key RRI elements.

### International collaboration

- Regional exchange between Tampere and Karlsruhe technology regions: The pilot action facilitated collaboration among representatives of regional partners and stakeholders, thus supporting mutual learning and reflection. The exchange program addressed a range of topics, including the challenges of scarcity of qualified personnel, the transition towards sustainable mobility and energy systems, and the development of neighbourhoods. Under RRI themes, the process placed particular emphasis on exploring and examining the various aspects and dimensions of participation, citizen engagement, corporate responsibility, and relating to talent attraction also diversity and inclusiveness.
- Collaboration with High-Level Forum: The workshop organized by the project promoted responsible innovation and stronger stakeholder engagement.
- Regional exchange between Tampere and Szeged-Timisoara: Exchange was organised to share knowledge, regional learnings and good practices. VTT and YAGHMA ran a foresight workshop, and discussions were started on replicating Responsibility Accelerator in Szeged. The key RRI elements that were discussed during the action related to overarching topics of sustainability and responsibility. A particular focus was on improving corporate responsibility knowledge in small ICT businesses, and regional expertise in anticipatory aspects of responsibility.

## 4.2 Observed barriers, challenges and drivers

Barriers and challenges for getting RRI into local policy making and research, development and innovation (RDI) practices depend on various dimensions, layers and structures. We identified challenges that relate to (1) structures of the regional innovation ecosystem; (2) regional capacity to adopt RRI; and (3) regional mindset (norms, values) to RRI.

### *Barriers in the structures of regional innovation ecosystem*

#### **Ecosystem structures are not fully established**

In many contexts, an (innovation) ecosystem is a metaphoric concept which means it is challenging to identify (e.g., core, dynamics, boundaries) although the ecosystem actors are known. This challenge applies also to regional contexts and the Tampere region. A specific challenge of the regional ecosystem structures in Tampere is that the region has traditionally had strong cluster policies in technological innovation development. Transformation from branch-based and tech-centered clusters to more broad-based and “cross-border” value co-creation (including social, environmental and economic value



creation) in innovation takes time, while collaboration and information exchange are restrained within traditional cluster boundaries.

Path dependency has slowed down the development towards a more complex innovation ecosystem which holds interdependencies, and shared objectives and values. Today, one might say, the innovation system in the Tampere region is rather a 'multi-actor, multi-level innovation network' than an innovation ecosystem in the aforementioned sense.

### **Danger of (too) dominating actors**

To adopt RRI, a strong orchestrator, who is well networked and has a legitimate position in the ecosystem, is needed. The region of Tampere has an established co-operation culture and well institutionalized actors and practices for joint actions. It also has well-functioning public-private platforms to support evolvement of co-operation relations, yet concurrently it has many different city/regional development institutions whose responsibilities might seem unclear for other innovation ecosystem actors. Therefore, although strong institutions are a strength of the region, it would be beneficial to assess whether there are situations when certain strong institutions and actors dominate the RDI field too much with their own targets and visions.

### ***Barriers for building capacity to adopt RRI***

#### **Lack of orchestration of cross-industry ecosystems towards shared sustainability goals**

Formulating shared sustainability and responsibility goals and values is a demanding task. The danger is that narrower field- or industry-focused innovation systems or clusters, within the wider regional innovation system, remain closed, and perspectives do not transfer across industries because of operational and cultural differences between industries and companies. Sustainability however demands horizontal and interdisciplinary, industry crossing exchange of ideas and cooperation, which in turn needs proper orchestration of cross-industry ecosystems. Technologies to address sustainability goals require many times versatile know-how and cannot be created in silos, nor cannot sustainability or responsibility be addressed in one organization only due to dependencies in value chains. Cross-industry collaboration capability among regional innovation ecosystem actors is a must to reach shared sustainability targets which, in turn, lead to actions and wider regional transformation.

#### **No or unclear incentives to tackle responsibility**

Practically, incentives to tackle responsibility may come from regulation, money and customers or stakeholders. From a company perspective, failing in sustainability can be a business risk leading to degrading of brand and diminishing income. As the operational environment needs to be foreseeable, actors of an ecosystem need to have a clear vision for both regulatory and business environment development, so that they can plan for their own development steps and make investments with smaller risks. The unclear regulatory environment and expectations from customers and stakeholders may slow down the development. Alternatively, businesses may also lead the transition, set new sustainability targets, and push the legislation to answer the changing needs. This requires, however, clear vision and target setting from the business actors.

Policy instruments may also be fuzzy and in continuous flux. While this concerns the continuity of the policy measures, another risk factor is the missing consistency across various policymaking and governance levels leading to the challenge of multi-level governance. Open communication and coordination between EU institutions, national governments, and regional governments are essential to ensure a coherent and effective implementation of regional policies.

### **No resources (funding instruments or human resources) for the uptake of RRI**

Relating to the regional capacity to adopt RRI, a challenge is the uncertainty of funding for the uptake of RRI. This may mean, for example, uncertainty around the implementation of responsibility and sustainability related strategies.

Lack of resources relates also to SMEs in the region. Already in the beginning of the project, a major challenge identified was the lack of resources and competencies of SMEs to develop their responsibility related operations, corporate sustainability measures and sustainable business. Changing legislation (e.g. Corporate sustainability reporting directive) and requirements coming from stakeholders put pressure to not only the big companies, but through their value chains also to the small ones that do not have the same resources, and thus need more support in the transition. Corporate Responsibility Accelerator developed and piloted in the Tampere pilot aimed to answer this problem, but the challenge for the next steps of the Accelerator is its funding. The accelerator could be developed to a service, but SMEs seldom have the possibility to buy consultative development services. A solution could be collaborating with regional development agencies that have in their interest to support the SMEs in their region, and could purchase the Accelerator service, but this requires specific, sustainability and business development focused funding instruments.

### **Lack of shared vision of RRI/ sustainability and responsibility, too project-driven approach**

A challenge for getting RRI into regional policy making and innovation and development practices relates to the projects and individuals dealing with RRI. Regional collaboration, as any mode of collaboration, is strongly dependent on the active individuals. Thus, a key challenge is if persons active in the collaboration within and between the regions and having the contacts leave their job, thus leaving also the collaboration and the RRI development role behind.

Active individuals are needed in all development. For example, replicating the Corporate Responsibility Accelerator requires that there are active actors developing the concept, communicating it in the region, and finding the SMEs that have the acute need to develop their practices and business, and possibility to join.

Also, if the discussions around RRI and the development take place only in projects, there is a fear that the momentum to drive RRI more widely in organizations and collaborations is gone after the project ends. In the bigger picture it can be noted that regional development is in constant change: actors, topical issues and emphasized focus areas change, due to organization-based factors but also along e.g. societal trends. Moreover, sustainability and responsibility are both somewhat politicized concepts, which also has its impact on the ways they are approached in organizations, over time.

## *Barriers for building RRI mindset*

### **Shared understanding of sustainability/ responsibility still emerging**

Sustainability may be difficult to approach as it covers a vast array of different perspectives and is also somewhat context specific. Even though its importance is noted, and there is to some extent shared understanding also of the common targets, for many it is unclear how to take it into practice: what are impacts of operations, and how to make change, and also how to assess and measure the success of the measures taken. Active discussion is needed so that regional actors can recognize what sustainability means for them, what kind of impact they can create and thus how they can drive the regional themes and targets from their perspectives, and then for sharing these ideas and values.

A challenge for promoting RRI in the Tampere region is that the concept is still less known than sustainability and responsibility in the region, even though there are many “de facto RRI” activities taking place. Active information sharing is needed on all these concepts, and the development around them. In the Tampere pilot, one tool for information sharing between RRI-related projects was the RRI Roundtable series that gathered together people involved in such projects and supported their commitment to promote the topics also in the coming projects, further consolidating the perspectives in their organizations. However, it is still unsure whether the practice is institutionalized enough and will the RRI perspectives be discussed in such a manner after the key RRI-focused projects end. At the moment RRI is also very personified, and thus the number of people involved in RRI-related discussion should be extended. In Tampere, it can be argued that the RRI concept is too strongly limited to research and innovation activities.

### *Main drivers for getting RRI into local policy making and innovation and development practice*

Similar to barriers, we categorized dimensions accelerating regional adoption of RRI into three groups: (1) structures of the regional innovation ecosystem; (2) regional capacity to adopt RRI; and (3) regional mindset (norms, values) to RRI.

#### *Drivers in innovation ecosystem to implement RRI*

##### **Established co-creation culture**

The Tampere region has a long tradition in joint actions and vivid co-creation culture in innovation. This co-operative environment creates a fertile base for co-actions tackling sustainability challenges and drives fostering of sustainable development in the region. The region has taken determined steps towards building and addressing the common RRI agenda. Institutional thickness in the sense that the region embeds enough strong and different types of innovation ecosystem actors besides firms (from institutionalized knowledge producers to intermediaries and public actors), and the regional institutional and cultural traditions are observable, creates a fertile ground for implementing RRI.

##### **Pockets of innovation (eco)systems/ networks**

One of the preconditions for a well-functioning region-wide innovation ecosystem is that the region has a good amount of industry or field-specific innovation co-creation initiatives. These initiatives are referred here as pockets of innovation. In the Tampere region, it is visible, for instance, in the industrial sector which has remarkable platforms

and initiatives promoting co-creation, such as Smart Manufacturing Hub (SMH) and Sustainable Industry X (SIX). Although these initiatives have (partly) separate objectives, aims and participants that can counteract as hindering factor in the regional R&I development, they do promote critical mass and serve as needed platforms for interaction.

### *Drivers for building capacity to adopt RRI*

#### **Regional 'Role model' of sustainability**

Sustainability transformation demands leadership that has, on the strategical level, been materialized by a proactive role taken by the City of Tampere. It has included broadly cultural, social, environmental and economic values as well as citizen inclusion and engagement in Tampere City Strategy. These kinds of examples are needed not only in building and spreading sustainability related mind-set but showing concrete steps how to integrate sustainability and responsibility in the regional decision-making.

#### **Sustainability is integrated in policy strategies**

Sustainability and responsibility are increasingly integrated in various regional strategies, which creates a potential impetus for further uptake of sustainability and responsibility practices in various organizations. Thus, one of the activities of the Tampere pilot was to contribute to the regional development program process. By incorporating responsibility and sustainability elements into the strategy, there is potential for long-term impact on the other stakeholders in the region.

The way in which the strategy process was this time carried out – by paying extensive attention to inclusion of diverse perspectives into the process and broadening the scope of groups involved – played a role in creating shared understanding of common objectives and translating strategy into practical actions in the future.

Another example was the building of the roadmap of the regional digital compass in the Council of Tampere region. In the roadmap especially engagement, open access and inclusivity were promoted.

### *Drivers for regional RRI mindset*

#### **Awareness of the importance of shared value creation in sustainability**

The importance of sustainability and responsibility for all kinds of organizations and all levels of societies has been recognized, which has a positive, driving impact for the awareness of the RRI elements. In firms, especially, it has been recognized that economic value creation can be challenging without concurrently paying attention to environmental and social value creation. Thus, for instance, firms are increasingly interested in their environmental “handprint” as well as equity, inclusivity, and diversity in their work organization. This, in turn, turns increasingly attention to research and innovation processes and their environmental and social impacts. The process is, however, taking place unevenly in firms and it takes time before shared value creation is mainstream thinking.



## Right state of mind for RRI (citizen inclusion, cross sectoral co-operation), openness


Currently there is a growing consensus in various regional projects and initiatives that various stakeholder groups and citizens should be included in the planning and their views should have an impact in the end-result. For instance, as mentioned already, in our case, the Council of Tampere region has introduced inclusive and engaging approach in the development of new regional strategy and in the process of developing digital compass. There are also other examples, like the planning of new city region of Hiedanranta in Tampere, which has been implemented from the very beginning in collaboration with the future inhabitants. These examples reflect new kind of thinking in planning and policymaking which paves way to more inclusive and future-oriented practices reflected in the RRI frame.

### 4.3 Tools for experimentation and RRI implementation

In the context of the TetRRIS pilots carried out in Tampere region common research tools, such as semi-structured interviews and stakeholder workshops, were used to collect information, and at the same time introduce and bring into force RRI practices and perspectives with local actors. We developed approaches and instruments fitted to the identified needs and purposes of the pilot activities. In following is introduced tools developed in the project: RRI roundtable series, a RRI themed questionnaire and responsibility guidelines while collaborating with Ekothon2 co-creation event, Corporate Responsibility Accelerator designed especially for small businesses and resulting from the VTT team's cooperation with a consultancy company, and a workshop concept for increasing awareness of RRI and sustainability in regional development piloted during the regional strategy preparation process.

**RRI Roundtable series** for regional RRI related projects is a need-based initiative as it was realised that regional RDI actors are involved in multiple responsibility related projects, but information and knowledge does not transfer in an effective way either between the projects inside or between organisations. The RRI roundtable meeting series was established to address insufficient and non-systematic communication and facilitate information flow and identify common interests of RRI-themed projects. The 1st RRI Roundtable collected seven regional RRI projects which are managed by three institutions, namely VTT, University of Tampere and Council of Tampere Region. So far, 4 Roundtable have been organised and need for continuation of the activity is recognised among the participating actors.

**The RRI themed questionnaire and responsibility guidelines** developed by the pilot team introduced the responsibility topics and the thinking to the participants of the Ekothon2 event organised in late 2021. The questionnaire on responsibility and social sustainability and the guidelines were applied as a part of the two-day co-creation process bringing together variety of regional actors from grassroots level actors to research and higher education institutions, businesses, and regional development authorities. The questionnaire was divided into two main sections, one of which focused on gender equality and social equity and the other on societal interaction and inclusion. The questionnaire could be used also for other purposes, for example events or projects that need to be evaluated in terms of their ability to take responsibility issues into consideration, and thus for the needs of further development.



**Corporate Responsibility Accelerator** is a concept designed to support SMEs to develop their corporate sustainability measures and to investigate the possibilities of sustainable business. The piloted tool consists of workshops which offer participating companies' information on the key concepts of sustainable development and corporate sustainability, the trends around the development, and tools that support their development. Co-learning and reflection are the key elements of the concept; companies are brought together in a workshop setting, giving them possibility to share and learn from another. The accelerator focused on the following themes: changes in regulation, trends of the operational environment, key areas of corporate responsibility, and opportunities for business development, such as circular business models.

The Accelerator concept was developed and piloted jointly by VTT and 4Front, a Finnish consultancy company, and it was also a cross-organisational learning and co-creation process. As the Accelerator concept is now ready and piloted, it can quite easily be developed further and modified to the needs of different sets of organisations. The material has already served in the use of other projects and company cases at VTT, and the collaboration with companies has given valuable insights on how companies perceive and understand sustainability and responsibility. A key learning of the action was the benefit of concepting: the set of workshops was concepted and offered under the label of accelerator, which arouses the interest of companies. The concept note of the Accelerator was also shared with the TetRRIS partners and stakeholders in Szeged-Timisoara as part of a pilot action.

**A Workshop concept** to enhance stakeholder inclusion and promote RRI and sustainability in regional development were developed and piloted as part of the Tampere region's strategy process. The aim was to collect inputs and views from a wider group of stakeholders while enhancing open access and public engagement to strategy process, fostering dialogue between ecosystem actors, and advancing systemic thinking in the region. The workshop was also meant to be a pilot exercise for workshops to promote awareness of the RRI dimensions and sustainability aspects in regional development in future. A specific goal in the pilot was to engage actors from business and industry in the region to discuss, give feedback and input on the upcoming Regional Development Program's mission "Tampere region business-sector has a positive handprint". In preparation of the workshop, we organised several meetings with stakeholders having close connection to manufacturing industry in the region (in effect representatives of the national Sustainable Industry X initiative and Business Tampere). The event combined different methods. The invited speakers framed and approached sustainable transition from different angles and highlighted interlinked/parallel developments at regional, national and EU-level. Facilitated small groups were used to spark ideation and collect the participants inputs regarding practical ways to achieve positive ecological handprint by the region's business and industry sector. Facilitators encouraged participants also to record their views in Mural online whiteboard during the event. In addition, the small group discussions and results of the session were observed and recorded in visual sketches by a visual storyteller.





#### 4.4 Practices to share & Lessons learnt

##### Intertwining pilot activities with ongoing processes in the region

Connecting with ongoing and established processes/actions wherever possible has been a key guideline in the project implementation. Matching the TetRRIS' pilots with processes and existing established actions such as regularly recurring events were deemed an efficient way to receive visibility to RRI-related themes and accelerate RRI. It is important to identify the best platforms and institutional processes early on, but at the same time be flexible for evident changes. Another advantage is that engaging to different types of processes, events and audiences' forces to reflect and challenge own thinking of RRI when formulating messages and adapting terminology to address audiences with different understanding of responsibility. No matter of format of activity and collaboration, there is need to reserve time for building a mutual understanding of RRI - it is important that parties involved understand the concepts in a similar manner, so that the implementation of activity is fruitful for all parties. It is also important to notice that the parties should speak "the same language". Thus, if other participants are used to talk on e.g. equality, engagement, ethics, or foresight, there is no need to confuse them by abstract RRI terminology as in practice the talk is of the same issues. "De facto RRI" practices are responsibility and sustainability related ones, and this terminology should not be replaced artificially with RRI terminology – not to say that in some cases RRI terminology might be useful.

Having the project activities aligned with existing processes and regular activities (such as events) brings benefits both in terms of breadth and depth. TetRRIS' participation in the Sprint Innovation festival was a way to connect with higher-education students, while Ekothon2 event enabled us to reach with grassroots actors, and thus to bring RRI themes to the attention of wider audience to encourage and tap into bottom-up local creativity – resembling entrepreneurial discovery process. Whereas intertwining with the ongoing regional strategy work and building a roadmap of the regional digital compass supported integration and embedding of sustainable and responsible themes and thinking in regional development. In context of the regional strategy work carried out in Tampere region, TetRRIS pilot contributed to the 'normalisation' of sustainability and responsibility terminology and language in regional development. Overall, TetRRIS and the other RRI projects implemented in the region have awakened the regional Council to think about e.g. ethics as a value that should be taken into account in different domains. This was brought also into artificial intelligence projects in the Council.

Integrating RRI activities into ongoing processes in the region, helps to couple RRI into existing contexts and language that in turn helps in formulating shared mind-set and building capacity in regional RRI.

##### Engagement as a practice

Engagement has been a recurring theme and practice in the Tampere region pilot activities showing attention to social sustainability in the project. As such, inclusion of societal actors has been an inbuilt feature of the regional strategy (including smart specialisation) preparation process for long – although, essentially representing same stakeholders. This time the regional Council coordinating the process tried and worked hard to get on board also people who are typically not involved in these types of strategy processes to increase diversity of perspectives and insights regarding future of the region. At the same time, aim was also to renew thinking and activities steering the

strategy work from sustainability and responsible perspective covering environmental, social and economic dimensions. TetRRIS' involvement in the process related directly to this effort. It seems that the process emphasising engagement has triggered a new engagement culture in the regional Council. Whether this practice will be institutionalized, is yet to be seen.

Engagement as one of the pillars of RRI concept, nails directly to RRI capacity aiming to become an inherent activity of innovation in the region.

### **Embedding of RRI in the ecosystem beyond individual projects**

The TetRRIS project is anchored in a wider landscape of RRI related projects carried out in the Tampere region in recent years. This has created place-based opportunities for continuous co-learning supporting the mainstreaming and embedding of the RRI perspectives in the regional innovation ecosystem. The broader societal trends have gradually increased interest and consideration of issues close to RRI topics (in the “de facto” form, e.g. gender equality, diversity, open innovation). Innovation ecosystem actors have been proactive and RRI-themed projects, some of which are more research, some more practice oriented, have been developed, funded, and carried out – latest example being Interreg BSR funded ‘We make transition!’ project started in 2023. The RRI Roundtable meeting series, co-organized by the project, has supported the inter-organisational embedding of responsibility themes in the region.

The ‘Strong, stronger, responsible’ seminar organised by VTT is another example of inter-organisational practice bringing together policy and management intelligence of responsibility and sustainability themed projects. The seminar targeted particularly SME sector and it offered a place to introduce sustainability and responsibility related thoughts, initiatives, projects, thus introducing important topics in the regional company level. A marketing campaign was started after the seminar to identify and open discussions with companies on development needs, resulting into new openings, which also contributed to the institutionalisation of the topics at VTT and its stakeholders. When planning for such a big event, collaboration with other projects and teams and utilisation of existing organizational resources and expertise is both resource efficient and a learning opportunity that supports the institutionalization of the event as well as internal information sharing at VTT, resulting also in decreasing of fragmentation. Due to this wider embeddedness, the event will be, it seems at the moment, organized also in the following years.

In general, such initiatives that cross, e.g. project borders, are great tools for sharing and accumulating knowledge on RRI, and help in executing value-related discussions among different innovation ecosystem stakeholders needed for formulating shared sustainability agendas.

### **Co-learning with the partner regions**

An EU-project offers a good opportunity for mutual learning between participating organisations/regions. Getting familiar with the partner organisations/regions provides a mirror against which to benchmark, reflect (and question) own established practices. Mutual learning calls for being sensitive to local structures, institutional set-ups and cultural factors/patterns of ideas impacting on practices of the participants (cf. Karlsruhe practice example).

Identifying early-on concrete actions around which international collaboration between regions can take place is important to have time for joint activity to mature during the project. In the case of TetRRIS, the exchange between Tampere region and Karlsruhe technology region evolved from early months of the project as the regional partners started to identify similarities and common areas of interest – at this stage the research partners role was to provide support for the process, but the regional partners were steering development based on their joint interests. Collaboration with Szeged-Timisoara, a learning partner in the project, evolved more gradually from discussions on topics of sustainability and responsibility to a concrete joint-action in organising the foresight workshop in Szeged and a separate event in which VTT team presented the Responsibility Accelerator Concept piloted with participating SMEs in Tampere region.

Facilitating collaboration not only among the project core team but also among those who are not officially part of the project increases diversity of perspectives and expertise involved in development of the collaboration. Involving relevant stakeholders can be crucial for ensuring the relevance and impact of collaborative activities (cf. inclusion of the Sustainable Industry X initiative and Business Tampere in collaboration/discussions between Tampere region and Karlsruhe Technology Region). Stakeholders can also play a role regarding sustained collaboration in RRI-related themes between the regions after the project is concluded.

When good, and also unsatisfactory, learnings are shared among wider international circle, RRI actors gain confidence to pilot novel ideas in their local contexts.

#### 4.5 Policy Recommendations

**To institutionalize RRI, actions need to be designed and linked to existing territorial agendas and processes, i.e., local actors' needs and interests:** the already existing ecosystem of actors, their values, and dynamics. RRI needs also to be interpreted in language and situated in actions the actors are familiar with. Consequently, as it is acknowledged that RRI as a concept is rather unfamiliar, and mainly used in academic research, **talking more broadly about sustainability and responsibility, and bringing up RRI elements within them should be considered alongside.** RRI strongly brings forward social sustainability perspectives, especially ones related to inclusion, diversity and equality that are attainable for many actors.

**There is a need for an advocate/change agent to ensure that perspectives of sustainable and responsible development remain intact in regional development.** In recent years, the Council of Tampere Region has actively promoted and been involved in RRI focused projects in the region. The Council has also made concrete efforts (i.e., the updated regional plan and smart specialisation strategy) to incorporate wider understanding of sustainable and responsible development into regional development agenda. The RRI approach has been a useful intellectual tool in highlighting importance of social dimension alongside environmental and (more traditional) economic concerns and objectives in the regional development. RRI related expertise and understanding has been, however, to large extent person-bound which calls for embedding of RRI perspectives into the organisation and organisational practices.

### Recommendations for policies:

**Organisational level:** Form a sustainability and responsibility task force, which includes persons from different functions of the organisation to coordinate and design activities. Institutionalize its position with sufficient strategic and operational resources.

**Regional level:** Identify an orchestrator / change agent / institutional entrepreneur which has an interest and mandate to motivate regional actors for setting shared sustainability agenda. An orchestrator can be a group of people, like a task force.

**National level:** Ensure longevity of responsibility and sustainability objectives in the national innovation and technology agendas, strategies and action plans so that regional R&I stakeholders have a mandate to act accordingly and there is continuity in the operational environment. Develop long-standing funding for regions to strengthen sustainability and responsibility of their innovation ecosystems. Sustainability objectives should be prioritised, but also monitored and evaluated accordingly.

**EU level:** Transparent and foreseeable regulation environment and policies which consider that policies on EU, national and regional levels should be horizontally and vertically coherent in terms of sustainability and responsibility.

**For institutionalization, key is to create continuity through shared vision, agendas and processes, but the importance of actors and roles within organizations with special RRI knowledge should also be noted.** These actors can maintain and continue RRI-related operations over projects and action periods. Continuity should be pursued, despite of changing political situation e.g. via policy frameworks, funding and guidelines.

It should also be acknowledged that change is created in a continuous process which inherently involves dialogue to balance interests of multiple parties. For instance, in the regional context, aspirations for renewal may vary drastically between more conservative small municipalities and cities versus vibrant fast growing larger city regions, like Tampere city. Needs and resources for adopting sustainability can vary, create conflicts and resistance, and hinder overall development in sustainability and responsibility agendas. Although trade-offs are needed, all parties satisfying compromises might not be reached.

To avoid deadlocks and overcome resistance, it is recommended to enable inclusive, engaging and open dialogue between the regional actors. Given that dialogue takes place in interactions of people, occasions for exchanging opinions and ideas of sustainability and responsibility should be created keeping in mind that roles of different actors in terms of regional development can be restricted and not hinder but slow down envisaged change.

### Recommendations for policies:

**Organisational level:** Ensure that organisational responsibility change-makers have room and resources to operate internally and externally with innovation ecosystem.

**Regional level:** Form a regional-level sustainability task force, or 'sustainability fist' that collects the core innovation ecosystem actors, but which is at the same time open for new members to participate. Such task force is less vulnerable to changes in a political landscape compared to one organization.

**National level:** Build a shared national sustainability and responsibility vision that is inclusive and engages innovation ecosystem actors widely. Vision building could be moderated by the Research and Innovation Council chaired by the Prime Minister.

**EU level:** Enhance policy programs which aim at seeking new ideas, implementing and advancing sustainability and responsibility in concrete national and regional contexts and organizations with flagship pilots, new initiatives, and engagement.

**In order to develop international cooperation,** it is good to involve different types of actors from the region so that the right parties can find each other, and common goals can be identified for continuing cooperation also in the future. International, cross-regional collaboration brings new perspectives to the discussion and should therefore be developed and maintained.

#### **Recommendations for policies:**

**Organizational level:** Create clear international collaboration agenda and strategy for engaging the right parties to the process. Keep it open for new initiatives and ideas. Make sure that the whole organization may learn and benefit from the collaboration.

**Regional level:** Seek actively functional region-to region international collaboration agreements and provide necessary resources for creating these frameworks for organization-level collaboration. Orchestrate organization-level collaboration in the region.

**National level:** Support international regional collaboration with horizontally integrated policy targets in programs and funding as well as with specific programs and funding.

**EU level:** Support international regional collaboration with horizontally integrated policy targets in programs and funding as well as with specific programs and funding.

**It is an effective practice to collaborate with existing platforms and events.** We have been able to bring the RRI theme to the wider audience and bring sustainability and responsibility related new ideas to larger groups by collaborating and engaging actively with already functional platforms and events. By this way it is possible to reach already formed audiences or coalitions of actors. This is much more effective than kick-start an event or platform from a scratch. In addition, this way of acting emphasizes bottom-up type collaboration, supports ability to reach wider or targeted groups of stakeholders and citizens, and makes possible to co-create new solutions.



## Recommendations:

**Organizational level:** Identify relevant regional and national platforms and events, actively engage in them to strengthen your own sustainability and responsibility agenda, to learn and co-create new solutions.

**Regional level:** Orchestrate formation of relevant regional platforms where various actors can come together to learn, co-create and reach various audiences/stakeholders relevant for their work. Develop visions and strengthen collaboration structures towards self-organization to keep platforms dynamic and living.

**National level:** Create national cross-regional collaboration platforms for regional policymakers and organizations.

**EU level:** Create EU-wide cross-regional collaboration platforms for regional policymakers and organizations to enhance the learning and implementation of sustainability and responsibility related themes across Europe.

## 5. Szeged policy brief

### 5.1 Introduction

The towns of Szeged and Timisoara have already been working together since several years therefore it was a logical choice to include both towns as their surrounding regions as „cross-border pilot” in the TetRRIS project. It meant practically that the majority of project activities were carried out in Szeged but stakeholders from Timisoara were also engaged. TetRRIS partnership decided to carry out learning pilots in the Szeged-Timisoara region, with two pillars: TalentMagnet and DIH-World. TalentMagnet has been a cooperation between Horizon2020 and Interreg Danube initiatives. This pillar aimed to carry out talent attraction and retention activity with the help of RRI-aspects. The following outputs were achieved following the roadmap accepted by the TetRRIS partnership:

1. Steering committee meeting was done where the importance of RRI was explained thereby raising awareness on RRI in the partnership. TalentMagnet project organised its Steering Committee meeting in Nyíregyháza (Hungary) in September 2021 where the basics of RRI were discussed with the TalentMagnet partnership.
2. An online RRI training with TetRRIS for TalentMagnet staff has been successfully organized online on 18th February 2022 where 22 participants were present.
3. Five infographics with easy-to understand key RRI-messages and advantages has been created as RRI-related visuals.
4. Raised awareness of RRI in a post socialist innovation environment was achieved by the RRI training which has been successfully held for 18 TalentMagnet staff members. Based on this training, the cooperation was further extended to local talents as the main target group of the TalentMagnet Project. The RRI education for selected talents was organized in a workshop series. As the main objective of the pilot was to: i) wake-up interest of RRI, ii) build understanding and accurate knowledge of RRI, iii) gain practical experience on RRI, we defined a workshop series for talents, in which an RRI training was followed by an real life problem solving using RRI framework. Our aim was to create real life case study for talents and let them solve individually or in groups, using RRI framework.

Following the logic of socio-technical integration, we worked with both talents from social sciences and technical scientist during the workshop series.

DIH-World has been the strategic project of the regional partner clusters in Szeged with the objective to establish the regional Digital Innovation Hub in Szeged. Knowledge and expertise were used from not only the TetRRIS project but also from other European programmes of professional support like the DIH2 (dih-squared) project where DARINNO was the regional coordinator for digitalization actions in partnership with the Digital Innovation Hub of Kecskemét in Hungary. The following outputs were achieved by this pilot:

1. The business plan for implementing Digital Innovation Hub in Szeged has been developed as cooperative action of the DIH-World project. It followed the open innovation process and public engagement were an important element thanks to the TetRRIS actions for knowledge transfer. The DIH-World working group (6 people) have followed the TetRRIS actions and some of them also participated at networking events in Brussels (in 2022) and in Tampere (in 2023) therefore the knowledge transfer has been done efficiently.
2. TetRRIS workshop on regional foresight was organised by VTT and DARINNO together therefore it has been a cooperative action of the Tampere and Szeged-Timisoara regions. The workshop was held on the 8th of December 2022 as a physical event on two locations: the first part was organised in the main building of the University of Szeged and the second part was held at the ELI Research Centre within the Science Park in Szeged. Participants of the event came mainly from the university and industrial clusters active in the region within the ICT and photonics sector. The participants formulated strategic areas of RRI activities as future actions within the TetRRIS project. One example was the „responsibility accelerator” function which has already been tested as an experimental service by VTT and its implementation in the region of Szeged was started by DEMOLA unit of the University of Szeged in March 2023.
3. Involvement of the stakeholders from Timisoara was achieved by an online workshop on the 9th of December 2022 with the municipality of Timisoara. The interest of the Romanian partners was confirmed and joint implementation of the responsibility accelerator as cross-border sustainability action for companies was agreed upon.
4. Knowledge transfer framework has been put in place where DARINNO – as main actor of TetRRIS in Hungary – works together with DUTIREG Non-profit Kft – as managing organisation of Science, Technology and Education Platform for Photonics – and DEMOLA unit of the University of Szeged as well as Aurel Vlaicu University from Romania – as knowledge centre in the region of Timisoara. Representatives of these organisations have established mutual agreements with the partners from Cantabria, Karlsruhe and Tampere by the TetRRIS Final Conference in Finland therefore the TetRRIS cooperation can have follow-up actions in the Szeged-Timisoara region in 2023 and beyond.



## 5.2 Observed Barriers, challenges and drivers

At the start and during the implementation of TetRRIS various barriers and challenges were observed in the regional innovation system which were crucial to achieve a significant effect in the later stages. Barriers were identified on the different levels of the regional innovation system, mainly on the level of institutions (firms), the intermediary sector and the system level, as well. On the other hand, only few drivers in the region supported TetRRIS and the implementation of RRI.

One of the main RRI-related problems in the region is the lack of knowledge and interest regarding the RI/RRI concept. The results showed that parts of the innovation sector have some rudimentary awareness of the concept (more than half of the interviewees have heard about the concept) but does not have accurate knowledge about the elements, involved responsibility dimensions and benefits of RRI. The participants focus on some emphasised responsibility dimensions during the innovation process, but do not have a comprehensive approach to handle the embedded risks and negative effects of innovation. Based on this starting issue, the main objective of the pilot was to:

- wake-up interest of RRI
- build understanding and accurate knowledge of RRI
- gain practical experience on RRI

*The main **barriers and challenges** observed in the Szeged-Timisoara region include:*

### **No common understanding of the RRI concept and need to "translate" it into practical terms**

The aspects of RRI are not directly visible and don't play significant role in the the Szeged-Timisoara region. These issues are in some cases quite "vague" for the regional actors and play little or no role in the policy discourse or in actual practice. The results showed that parts of the innovation sector have some rudimentary awareness of the RRI concept but does not have accurate knowledge about the elements, involved responsibility dimensions and benefits of RRI.

In the Szeged-Timisoara region there is no strategical conscious RRI-awareness in general: the strategic documents do not include Responsible Research and Innovation or/and Responsible Innovation.

### **No existing strategy or guiding document to get local actors to be interested in RRI**

The last regional strategic plan was prepared in 2006 where competitiveness was presented with emphasis. Social innovation, however, is mentioned only once in the document that served as the Regional Strategy for 2013-2020. The currently relevant S3 for 2021-2027 has been prepared on national level and social innovation is defined as a "dimension" of the strategy but responsible innovation is not mentioned at all in the document "National Smart Specialisation Strategy", neither.

There are some steps being taken in applying RRI in the regional innovation, but these are mainly individual efforts of several organizations. This means, that it is often done in at least an implicit, de-facto manner (i.e., without calling it "RRI") in this region.

In Timisoara, the new Smart City and Digital Transformation Strategy (2022-2027) includes a few elements related to the social responsibility, but not necessarily in connection to the innovation. On the other hand, the city implemented the AS-Transfer Urbact project, with the involvement of representatives of local public authorities, universities, companies, associations and experts from different fields. The main result was the identification of the challenge at city level: to build a structure specialized at the level of the town hall to be a genuine one link between all urban actors and provide services integrated to all of them within the innovation ecosystem. Even if it is not clearly stated in the final document, during the co-creation process, different stakeholders discussed on the subject of RRI, as being essential for further development of the ecosystem in European context.

### **Lack of a systematic identification of need and interests related to RRI across the diverse group of actors**

The starting challenge is raising RRI awareness in a post-socialist innovation environment. Hungarian researchers and other actors in the innovation process have mostly had minimal exposure to RRI and are unfamiliar with the concept. Diffusion of RRI and related ideas is also hindered by the low levels of societal trust and general climate of “suspiciousness” of cooperative endeavours noted above: Because the default assumption for many people remains that humans are fundamentally selfish and economic and ostensibly cooperative activities are ultimately zero-sum, a concept aimed at securing a “greater good” like RRI tends to evoke scepticism and is often met with disinterest. To address this, we organise RRI educational workshop series for selected talents. Following the recommendation from TetRRIS partners, we created real life case study for talents and let them solve individually and in groups, using RRI framework.

### **5.3 Tools for experimentation and RRI implementation**

Qualitative methods were implemented due to the novelty of the RRI concept mostly unknown to regional stakeholders and to achieve a common understanding and acceptance at the beginning of tetRRIS. The idea was to involve as many representatives as possible of the innovation system and have commitments from a core group supporting tetRRIS all the way through. In the following, the tools used in the project are introduced: structured background interviews with different stakeholders based on semi-standardised interview guidelines, a series of practitioner's workshops as the core of the TalentMagnet pilot.

Most of the instruments were qualitative approaches and commonly used within the empirical social research. The tools were used in line with the different topic or work packages and chosen according to the specific objectives.

Creation of RRI-related podcasts and video material with easy-to understand key RRI-messages and advantages were made by using the recording of the foresight workshop on 8<sup>th</sup> December 2022. The edited video material was used for promoting the online discussion groups that include industrial clusters: STEPP, ArchEnergy, Építő-KIT, MIÉNK, IKOSZ member clusters + clusters in West region of Romania.

DARINNO and the partner clusters in Szeged organized the regional Community Day on 27<sup>th</sup> April with focus on responsible innovation with digital twin applications. The event was also used to promote the new “Responsibility Accelerator” function which – as a new service – became part of the new “Business Plan for Digital Innovation Hub” (which integrated RRI in regional innovation services) which was a key outcome of the DIH-World project.

The Community Day also introduced the concept of the “RRI community of professionals” which is modelled on the experience of Karlsruhe Technology Region with active participation by industrial clusters, IKOSZ, EMFIE and other relevant national networks in Hungary. The primary aim of this community is defined to provide training with RRI in the form of practical online education to cluster managers and economic development professionals during the second half of 2023 with the support of the EPIX project.

## 5.4 Practices to share & Lessons learnt

### Understanding of the RRI concept with operationalisation in the region

As RRI is a generic concept, a common founding according to regional features is basically beneficial. TetRRIS project was a form of experimentation for the Szeged-Timisoara region. Consequently, several practices were tested during the lifespan of the project for the adoption of RRI into the territory. These practices do not have an instrumental character, instead they ways for acting, behaving, and reflecting therefore they belong to the cultural dimension of a particular group of people or a specific territory. This is especially important in a region where actors are unfamiliar with the RRI concept, its objectives and instruments therefore a elaboration of a common understanding is highly beneficial.

### Exchange of experience with TetRRIS partner regions

A region just starting with RRI should think about possible "reference regions" and initiating a systematic exchange on critical issues like stakeholder involvement, governance structure, funding, etc. Consequently, DARINNO as representative of Szeged-Timisoara region has learned tremendously from the Tampere region by the cooperative actions on implementation of cross-border foresight workshop and by the initiation of responsibility accelerator function in Szeged.

It soon became clear from initial presentations that Karlsruhe Technology Region (KTR) Includes also members from France and therefore Karlsruhe had been selected as knowledge provider to Szeged and Timisoara in cross-border cooperation. Information about operational arrangements were shared via online workshops and therefore knowledge transfer was successfully implemented between the partner regions of the TetRRIS project. The cross-border aspect was also relevant when the model of responsibility accelerator was transferred to Szeged because it was agreed that the new responsibility accelerator shall start its operations in Szeged, but it will also provide service to companies from Timisoara later on.

Another model from Karlsruhe is the community of practice that is being implemented as pilot action of the TetRRIS project. Szeged can also follow that model and the companies that received support from the responsibility accelerator shall be invited to join the cross-border community for RRI practice. Further communication toward the

Territorial Innovation Platform is planned during 2023 in Szeged with representatives from Timisoara also invited to the events by in-person or online implementation. Consequently, the pilot actions of Karlsruhe had provided useful model to follow for the Szeged-Timisoara regions therefore further exploitation of results can be realistically expected beyond the implementation period of the TetRRIS project, as well.

## 5.5 Policy Recommendations

Policies for responsible research and innovation can vary significantly based on cultural, legal, and societal contexts. These policies are meant to strike a balance between fostering innovation and safeguarding societal well-being.

- To include in the calls for application (mainly in EU projects) a special compulsory chapter that refers to RRI through which the applicant should give details on the impact of the project implementation on the environment and society – including sustainability, education, data protection, etc.
- To encourage the companies to implement standards related to systematic innovation (like ISO 56000 serie and up-coming) – for instance, by awarding extra points in public tenders, to give public recognition, etc
- To include in the education curricula at different levels a module on the ethics of the research & innovation – or at least the possibility to choose such a learning path
- To encourage international co-operation – to support the participation of the companies to international B2Bs or technological fairs, where the researcher & innovators will have the opportunity for exchange of best practices in the field of RRI.
- To adapt the regulatory framework to comply with the international guidelines and best practices
- To establish ethics committees or review boards in the framework of the intermediary organizations or in the structure of the innovation ecosystem, that will provide guidance and recommendations related to RRI in the whole life-cycle of the innovation.

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