Key lessons from TetRRIS for integrating RRI into regional innovation systems and development.

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5.0	16/06/2023	Konstantina Varlami (YAG), Alexandra Yaghil (YAG), Emad Yaghmaei	Updated report

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Introduction

This deliverable presents the key lessons that the regions of Cantabria (ES), Karlsruhe (DE), Tampere (FI), and Szeged-Timisoara (HU) gained through the pilot actions organized through the TetRRIS project. The main lessons for integrating RRI into regional innovation systems and development are presented, analysed, and validated by external stakeholders as the program comes to its end. Each region has executed the activities laid out in previously submitted deliverables as well as those that were developed throughout the implementation of work packages 4 and 5.

The objectives of the work were the following:

- Finalize documentation of activities and of outcomes conducted in each individual pilot regions.

- Unveil the concrete challenges that the local/regional stakeholders involved in the pilot actions face.

- Understand the environmental/social/economic and policy impact that the TetRRIs activities have had on addressing these local/regional challenges.

- Have external stakeholder evaluate the overall impact of the project for the regions.

In the following sections each studied region (Tampere, Cantabria, Karlsruhe, and Szeged-Timisoara) present in detail the goals and targets of their pilot actions, revise their roadmaps, their Sustainable Development Goals (SDGs) and provide impact narratives in order to validate and indicate how their pilots performed.

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I. Goals and targets for the pilots

This section briefly summarizes each regional pilot action, target audiences, key learnings, and main challenges.

1.Cantabria

The pilot actions, key learnings and main challenges for Cantabria region are summarised in Table 1.

Table 1 Cantabria Action Plan + Follow-up Actions (WP4)

Drivers	- Set up the TetRRIS lab to promote RRI into S3 regional strategy. - Common presence of sustainability and responsibility notions in the regional innovation system - RRI awareness for some research actors closely related to RRI keys such as ethics or gender equality. - Keys such as public engagement, open access and/or science education not widely popular in R&I organizations in the region (p.10, D3.2) - Emerging actions around CSR, Social innovation, SDGs and social challenges

Challenges	• Modest innovation culture and cooperation culture (socio-cultural challenges).
	• Lack of an official open innovation strategy.
	• Lack of synergy between R&I stakeholders (p.11, D3.2)
	• Societal challenges in coming years related with rural depopulation, ageing, energy transition, post-industrialization and/or mobility.
	• Retention and attraction of talent
Solutions to challenges	1. "Collaborative/Cooperative Health Forum",
	2. "Sustainable consumption model based on technological alternatives",
	3. "Digital Empowerment"
	4. "Sustainability Education"
Unique opportunity	• The RRI vision projected in the TetRRIS project in the region seems to be aligned with what the policy makers will try to aim during the period between 2021-2027 (p. 12, D3.2)
Cantabria desired impacts	• To position Cantabria TetRRIS Lab as a meeting point in the regional innovation ecosystem and a forum dedicated to strengthening science-society interactions in the four domains of opportunity identified.

Action Plan:

Cantabria develops its pilot activities following their social lab (SL) approach and builds on existing past and present initiatives in the region (D3.2). Actions consist of 3 participatory workshops (starting in the fall 2021, ending in spring 2022). The actions planned and conducted throughout the last years in Cantabria region are summarized in Table 2. Outcomes include:

1st stage: exploration

- o **Time frame**: (Fall 2021-Spring 2022)
- o Participants: regional R&I stakeholders in the selected opportunity domains–
- o Cantabria expects the creation and promotion of debates about discussions of socio-cultural and ethical issues that are of concern for regional R&I stakeholders. This should be the first step towards the diffusion, adoption and institutionalization of RRI in the regional innovation ecosystem (p.12&25, D3.2)
- o Develop a highly attractive value proposal for participants.
- o Create incentives for stakeholders understood as motivations and expectations to participate.
- o Promote an understanding which are the critical socio-ethical and cultural particularities for innovation that have been observed during the previous fieldwork in Work Package 2.
- o Foster a culture of co-creation
- o First workshop to be held on the 29th of October 2021
- o The above to be addressed in the report/results of the workshop.

2nd stage including two workshops: work on the definition and initiation of pilot actions (p.26, D3.2)

- o **Time frame**: On a three-monthly basis - to be done by the end of January 2022 and May 2022
- o Participants: participants from 1st stage
- o Based on the results of the first workshop, the implementation and execution of pilot actions will be kicked off through a roadmap-focus process managed in Work Package 4 (p.26, D3.2)

o   Second and third workshops to take place in different cities to delocalize SL process.

3rd stage including Survey: horizontal evaluation stage consisting in the assessment of the co-creation processes.

- o   **Time Frame**: Fall 2021 – October 2022
- o   Participants: participants from 1st and 2nd stage
- o   Survey:
    - o   to try to capture, monitor and report the different learning and recommendations provided by the participants.
    - o   to evaluate the adequacy, suitability and performance of the co-creation tools employed during the development of the action plan.

Table 2 Cantabria Pilot Actions updated 27/1/2023.

2021	2022	2023
TetRRIS Cantabria Lab (WS1), October 2021	Co-Creation workshop (WS2), March 2022	
	Follow-up meetings, with Social Lab participants January 2022, April 2022, July 2022	Co-Creation workshop (WS3) & Policy Lab II, 8-10 February 2023
		Policy Lab III, 4-5 July 2023
	Policy Lab I, 12-13 October 2022	Pilot 3: Digital skills training, continuation based on survey results
	In order to combine complementarities with the reflection process already existing in the region within the framework of reflection of the Smart Specialization Strategy of Cantabria (RIS3) in which the DG of Innovation leads Tetris participates in the EDPs sessions https://www.cise.es/programas-para-emprendedores/ 21 June 2022, 30 Sept 2022, 28 October 2022	Pilot 4: Sustainability education and training, several events scheduled in 2023
	Pilot1: #ONEHEALTH CANTABRIA FORUM Leaded by the Innovation DG meeting in July with the Ministry of Health. Different meetings have been held with the Director general of Innovation of the Regional Government to launch a Health Forum in the region without specific results so far; conversations between	

	the Regional Ministers of Health and Industry are being held.	
	Pilot 2: Sustainable consumption model based on technological alternatives; part of a bigger regional initiative funded by NEXT	
	Pilot 3: Digital skills training, The TERA Cluster (Information and Communication Technologies) has carried out a study in Cantabria on digital competences, actions in 2023 based on the results. The cluster will be responsible for developing a formal training on digital competences detected as necessary by the different members of the regional Cluster Sea of Innovation (marine and offshore energies' value chain). Different meetings were held between SODERCAN, and the TERA cluster followed by meetings between TERA and the Cluster Sea of Innovation in order to design the specific and real needs of the latter in digitalisation training.	Training on digitalisation (cluster TERA as trainer and the cluster Sea of Innovation as trainee)
	Pilot 4: Sustainability education and training, several meetings with the Chamber of Commerce of Cantabria which is leading this initiative. Specific offer from one specific stakeholder to implement a pilot action in the region, more specifically at colleges, where workshops are foreseen to promote education and training on sustainability	workshops on sustainability at different regional colleges, together with the regional Chamber of Commerce.

Cantabria´s pilot plan focused on four domains of opportunity identified for the diffusion and adoption of RRI concept in the territory. These four domains were selected in D3.1 and refined in D3.2 and finally defined as:

1. Bioeconomies, Health and post-Covid-19 Society
2. Blue Economy and Fair Energy Transitions
3. Responsible Industry 4.0
4. Territorial Sustainability and Responsibility

The pilot actions were conceptualized and codesigned under the "TetRRIS Lab" which was a core component of the intervention into the regional innovation system. The setting up of the lab was oriented to gathering a significant number of stakeholders around the RRI paradigm for facilitating its uptaking through experimentation and co-creation. The lab aimed to be situated as a meeting point (see D4.1 of the TetRRIS project) into the regional innovation ecosystem to stimulate a forum dedicated to the need of strengthening science-society interactions in the four domains of opportunity identified and to explore societal challenges that the territory is facing and will face in coming years such as aging, rural depopulation, energy transition, post-industrialization and/or mobility.

The actions developed during the piloting phase were spurred thanks to the Social Lab approach, that helped to meet the major stakeholders of the regional innovation system. Co-creation processes have been facilitated through different workshops as well as interactions and activities demanded by participants such as training, dedicated events, follow-up meetings, and others. These co-creation processes started with an exploration stage thought to promote engagement with selected stakeholders. A second stage helped to work on the definition and initiation of pilot actions along the lines of region-specific challenges in the identified domains. The four pilot actions developed during the experimentation were: "Collaborative/Cooperative Health Forum", "Sustainable consumption model based on technological alternatives", "Digital Empowerment" and "Sustainability Education"

Throughout the various workshops organised and the knowledge transfer, it was argued that specific actions should be developed. Overall, the regional stakeholders perceived the participatory workshops deployed in their territory as a local continuation of the regional innovation forum deployed before the pandemic took place. During the project, the TetRRIS social lab succeeded in gathering a significant number of stakeholders that could continue what has been set up by the prior regional forum. Thus, the importance of multi-stakeholder engagement processes was emphasized. The pilot actions that have been developed under the umbrella of the TetRRIS lab have helped to make visible the interests and motivations of different regional stakeholders, but also the different barriers and challenges that difficult these ambitions. Pilot actions have helped to clarify what are the priorities from a bottom-up perspective and how these priorities could be framed under RRI lenses, engaging other stakeholders that are not usually considered into the regional innovation system and that represent citizens expectations and needs.

The impact of the TetRRIS project into the development of the new S3 has been significant.and several of the dimensions and values that are promoted by RRI are also visible in this policy document. In addition, there are explicit mentions to RRI in the evaluation documents of the S3 strategy as a way for improving the regional innovation ecosystem

2.Tampere

The pilot actions, key learnings and main challenges for Tampere region are summarised in Table 3.

Table 3 Tampere Action Plan + Follow-up Actions (WP4)

Drivers	• Sustainability and responsibility are seen crucial for the regions RDI

	• A strong co-operation culture exists among multiple actors. • Public initiatives include public engagement and stakeholder inclusion activities. • Various co-creation platforms have been established
Challenges	• Lack of practical know-how of RRI among regional actors • Lack of experience in transferring sustainability and responsibility strategies into practices • Achieving dialogue between the traditional innovation ecosystem and the manufacturing industry in the region
Solutions to challenges	• Concrete training activities, open dialogue, information sharing as well as sharing of good and failed practices. • Regional development program • Collaboration between the Tampere and Karlsruhe regions • Corporate responsibility accelerator hub • Partnering with the SPRINT Innovation Festival 2021 • Co-creation with Ekothon II event
Unique opportunity	• New regional plan, early 2021 • Small number of ongoing or soon to be launched promising processes and initiatives from a perspective of the project objectives. • Shift toward S4+ • Tampere pilot has already taken steps in promoting the RRI dimensions within the regional stakeholders through the programme preparatory process
Tampere desired impacts	• contribute to the development of an innovation ecosystem which while supporting renewal of traditionally strong manufacturing industry, would also be attentive to ecological, ethical, and social considerations in a way that systematically integrates them into innovation activities in the region (p.27, D3.2) • RRI to be strongly integrated into regional development processes promoting sustainability through regional development work (p.28, D3.2) • sustainability promoted through industrial RDI ecosystem through which the RRI themes will be integrated into industrial RDI practices (p.28, D3.2)

Action Plan(s):

The actions planned and conducted throughout the last years in Tampere region is summarized in Table 4.

Table 4 Tampere Pilot Actions updated 01/02/2023.

2021	2022	2023

Ekothon II 12/2021	Regional Exchange with Tampere and Szeged-Timisoara, Hungary-Romania, 12/ 2022	Concept note of responsibility accelerator in collaboration with Tampere and Szeged by 03/2023
SPRINT challenge competition with students 11/2021	3rd RRI Roundtable hybrid event, 12/ 2022. To further advance the regional implementation of RRI.	European cooperation: Exchange between Tampere- and Karlsruhe technology region is ongoing (2022-2023). *Specific events tbd 02-05/2023*
2nd RRI Roundtable meeting in Tampere, 11/ 2021	SPRINT challenge competition with students 11/2022	Building a roadmap of the regional digital compass in Pirkanmaan liitto. *Specific engagement events tbd 02-05/2023*
Regional Development Program: intertwining with ongoing regional development program process, by enhancing RRI-dimensions. Final version of programme completed by end of November 2021 and enters into force at the beginning of 2022	Tampere & Karlsruhe regional exchange meeting in Tampere, 11/2022	4th RRI Roundtable event on 05/2023
Building bridges between the two pilot spearheads workshop, 10/ 2021	RRI (engagement) workshop in the High -Level Forum 11/2022 with Karlsruhe pilot	
	VTT sustainability seminar in Tampere, 10/2022	
	Piloting of Corporate responsibility Accelerator Hub February-May 2022	

The vision of the pilot in the region of Tampere is based on the actions promoting sustainability and integrating RRI themes in the regional innovation ecosystem, especially in the regional strategical processes including the Regional Development Programme and Smart Specialization Strategy. As the regional development strategies continue to shift towards strengthening the sustainability transition, and as the upcoming smart specialization strategy shifts towards the concept of S4+, embedding the RRI dimensions deeper into the regional innovation system will become more important and visible. The TetRRIS pilot anticipated these changes and aided with the transition.

The Tampere pilot also recognized that the traditional innovation ecosystem cannot drive a responsible sustainability transition without including the region's biggest economical actors, namely, the manufacturing industry. Thus, the pilot was divided into two spearheads, one focusing on the regional development processes and the other on the manufacturing industry's ecosystem and processes (see Figure 1). The spearheads supported each other and had a strong linkage through continuous dialogue during the project's lifecycle. 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".

Main Goal

Integrating RRI themes and promoting sustainability in the region's RDI system

Spearheads

Industrial RDI networks - spearhead
Promoting sustainability through industrial RDI ecosystems for related actors and integrating RRI into industrial RDI practices.

Regional development - spearhead
Integrating RRI into regional development processes and promoting sustainability through regional development work in the region of Tampere.

Figure 1. The spearheads and the main goal of the pilot

To answer the two targets of the pilot, the Tampere pilot organized the following 16 actions:

In 2021:

- Regional Development Program: Intertwining with the ongoing regional development program process by enhancing RRI dimensions. The programme entered into force in the beginning of 2022. Altogether 70-80 representatives from key stakeholder organizations participated in the preparatory workshops.
- 'Our Common Responsible and Sustainable Future' workshop on 24 August 2021: The workshop collected views from regional stakeholders and reflected on the future of the region from the perspective of the sustainability transition. 29 participants attended the workshop.
- SPRINT Innovation Festival on 15-19 November 2021: The Tampere pilot, the SIX Initiative and Business Tampere prepared a challenge to the SPRINT innovation competition for students, on the challenge of manufacturing industry to attract young people. 34 students worked with the TetRRIS challenge.
- 1st RRI Roundtable meeting on 14 November 2021: The RRI Roundtable meeting series started, bringing together the regional RRI-related projects, and 14 participants.
- Ekothon2: A two-day co-creation online event that enhanced public engagement with the civil society and the grass-root-level actors of the region, developing ideas on making real-life sustainability projects more successful. The event was organized on 1-2 December 2021. 51 participants took part in the event.

In 2022:
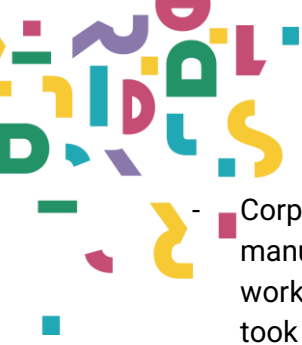
- Corporate Responsibility Accelerator: A series of workshops targeted at SMEs in the manufacturing sector to support their sustainable business development efforts. The workshops took place from 16 February to 17 May 2022. Seven company representatives took part in the workshops.
- 2nd RRI Roundtable meeting on 17 June 2022: The second roundtable meeting brought together the regional RRI-related projects, and 10 participants.
- High-Level Forum workshop on 7 November 2022: The workshops promoted responsible innovation and stronger stakeholder engagement. The workshops attracted some 70-80 participants.
- STRONG, STRONGER, RESPONSIBLE hybrid seminar on sustainability and responsibility, organized on 19 October 2022: Participating in the preparation and organization of sustainability and responsibility seminar, targeted especially at SMEs. Approximately 40 persons participated on-site and 120 on-line.
- SPRINT Innovation Festival on 7-11 November 2022: VTT together with the Council of Tampere region and Business Tampere prepared a challenge for student teams, on envisioning a sustainable digital future of the region. 34 students worked with the TetRRIS challenge.
- 3rd RRI Roundtable meeting on 1 December 2022: The third roundtable meeting, bringing together the regional RRI-related projects and 12 participants.
- Regional Exchange with Tampere and Szeged-Timisoara, Hungary-Romania, on 7-9 December 2022: the 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 workshop on 8th December hosted 14 persons in the morning session and 6 persons in the afternoon session.

In 2023:

- European cooperation: Exchange between Tampere- and Karlsruhe technology region is ongoing (2022-2023). The exchange has already included several workshops and meetings. E.g., in November 2022, the exchange brought together nine regional experts from regional organizations.
- Building a roadmap of the regional digital compass in the Council of Tampere Region is ongoing. The work has engaged a broad range of experts from region's stakeholder groups, e.g., 80 people in a stakeholder meeting in May 2022.
- *Planned activity for spring 2023: Regional exchange with Tampere and Szeged-Timisoara, Hungary-Romania: Creating a Concept Note to Responsibility Accelerator*
- *Planned activity for May 2023: 4th RRI Roundtable event.*

In terms of RRI, six themes were identified as particularly important to the Tampere region: 1) anticipation, 2) openness, 3) diversity (incl. gender questions), 4) stakeholder inclusion and public engagement, 5) transparency and communication of RDI activities, 6) reflexivity and responsiveness. Further, responsibility and sustainable development related perspectives are getting increasingly significant in policies and businesses in the Tampere region.

3. Karlsruhe

The pilot actions, key learnings and main challenges for the Karlsruhe region are summarised in Table 5.

Table 5 Karlsruhe Action Plan + Follow-up Actions (WP4)

Drivers	- Comparatively high level of *de facto* RRI practices - Long tradition of citizen and stakeholder engagement - Participation is a legal requirement in some contexts - High interest for exchanging experiences and good practices - Strong recognition of the importance of public and stakeholder engagement in social and technology innovation, and in regional development. This especially true in the context of renewable energy and sustainable mobility infrastructures (well-run public engagement processes viewed as a means to reduce social conflict around build-out) - Social and political environment as well as the culture are broadly receptive and sympathetic towards RRI (and related) concerns
Challenges	- Existing *de facto* RRI practices sometimes done in a rather ad-hoc and disjointed manner. - Few pre-existing structures for exchange of knowledge and experience, and mutual learning between citizens and stakeholders (Note: this is also an opportunity for the TetRRIS project) - Limited insight into practices, activities and experiences in other European regions - Little awareness of "RRI discourse" and a rather practically oriented culture that emphasizes immediate concrete outcomes and can be impatient with "academic theory." - Karlsruhe Technology Region (KTR) is characterized by a wide variety of technological, institutional, and sectoral structures that might impede RRI practices. In particular, the governance structures in the "KTR" are complex, as they cut across and include several different administrative districts in both Germany and France, which have equal standing within the KTR
Solutions to challenges	1. Creation of a practitioner network for citizen and stakeholder engagement and participation, targeted at innovation and development as well as civil-society actors within the KTR 2. Initiation of an intensified dialogue and exchange between regional innovation and development policy makers in Karlsruhe and Tampere
Unique opportunity	- Pre-existing *de facto* RRI practices and a culture receptive to the concerns and objectives of RRI - Growing emphasis on public engagement/participation in contemporary public discourse in Germany - Clearly identifiable gap in the support services currently provided regarding participation/engagement issues
Karlsruhe desired impacts	Strengthen the practical public engagement/participation-related "know-how" and awareness among innovation and regional-development actors in the KTR, to thus:

> - Directly: Durably improve public-engagement practices in innovation and development projects in the KTR
> - Indirectly: Improve innovation and development outcomes in general, and facilitate the build-out of renewable energy and sustainable mobility related infrastructure by fostering better public engagement practices and, thereby, reduced social conflict
>
> - Create new linkages among actors in the KTR around the topic of public engagement/participation.
> - Foster new linkages between Karlsruhe and other European regions to facilitate the exchange of knowledge surrounding the role of RRI in regional development, and regional development/innovation-related good practices in general

Action Plan:

The creation of a *practitioner network on citizen and stakeholder engagement:* In discussions with local innovation actors it became clear that a "safe space", where conversations on who conducts participation processes, uses them in their innovation projects to exchange experiences, discuss problems, and advise each other was needed. It would have to take place in a trustworthy, confidential environment, allowing actors to be open, especially about failures, problems and challenges and to receive constructive feedback from their peers. The network is intended to fill this gap.

- Time frame: (semi)-formal founding meeting in the autumn of 2021 – first event in winter – thereafter, one event/meeting every 2 to 4 months.
- Participants: local practitioners including private companies, consultancies that offer participation facilitation and communications services, innovation project managers from the (applied-) research institutions of the region and public administration → no more than 20 people.
- Workshops of 1.5-2.5 hours; other formats also possible
- Maintain productive dialogue with members if asked to participate.

The initiation of an *intensified dialogue and exchange* between regional innovation and development policy makers in *Karlsruhe and Tampere*

- Time frame: Mostly in 2022, but to be continued throughout the duration of the project. Preparatory online meetings between the Karlsruhe and Tampere teams of the TetRRIS project took place in Spring and Summer 2022. An in-person meeting to further explore and scope out future possibilities took place in November 2022 on the side-lines of the High Level Forum in Tampere, with hopes for further exchanges in 2023 and later.
- Participants: regional innovation and development policy makers in Karlsruhe and Tampere
- Intention: to begin the "Pilot Activities" - stage of the TetRRIS project by building up the practitioner network and subsequently initiating stronger dialogue between Karlsruhe and Tampere. As a joint pilot activity, a workshop on "How can engagement enhance

responsibility?" was conducted at the High-Level Forum in Tampere, with more than 100 innovation ecosystem experts from across the world.

- The creation of a *mobility advisory Council* (*Mobilitätsbeirat*): A way to further facilitate citizen and stakeholder input into regional mobility projects, priorities and strategies that emerged in TetRRIS dialogues with local innovation system actors – akin to existing structures for energy sector development.

  - Time frame: unspecified
  - Participants: include representatives of stakeholder groups (e.g., local businesses, research institutions, and various citizen associations and/or NGOs)

Note: The hoped-for pilot action "mobility advisory Council" could not be conducted within the pilot time frame of the TetRRIS project.

Table 6 Karlsruhe Pilot Actions updated 07/02/2023.

2021	2022	2023
Workshop: Citizen participation and living labs for new technologies in the Karlsruhe Technology Region; 07/2021	**Founding meeting** "Practitioners' Network for Citizen and Stakeholder Participation; 02/2022	**Workshop:** Citizen and stakeholder participation from the RegioWIN projects from the region; 03/2023
Kick-off Meeting online: Collaboration Karlsruhe & Tampere; 12/2021	**Workshop:** Successful project communication between marketing, co-creation and technology acceptance: the example of efeuCampus; 04/2022	
	Survey: The influence of RRI aspects; 04/2022	
	online Meeting: Collaboration Karlsruhe & Szeged-Timisoara; 05/2022	
	Workshop: Participation in practice - objectives, challenges and formats; 07/2022	
	High Level Forum: Together with Tampere Pilot hosting the workshop: "How can engagement enhance responsibility?"; 11/2022	
	Regional exchange meeting In Tampere between Tampere and Karlsruhe; 11/2022	
	Workshop: Conflict resolution in spatial innovations and large-scale technical facilities: Experiences and recommendations from practice; 11/2022	

Stakeholders in the Karlsruhe Technology Region (KTR) use participatory processes and generally try to develop more sophisticated communication strategies in the context of local innovation and development projects. A substantial literature on public participation and communication now exists.

However, at the time when the pilot action was initiated, few structures existed in the KTR to facilitate dedicated dialogue and exchange among practitioners about participation, communication, and engagement issues. This gap became clear during the initial investigations ("mapping") of the region's innovation ecosystem and the role of RRI in it conducted in Winter 2020/21 and was repeatedly articulated in the scoping workshops with actors and stakeholders from the KTR in Spring and Summer 2021. The value of a "safe space" to discuss experiences, successes, problems, and failures, and get feedback from peers, became thus clear. To facilitate such exchanges and develop an appropriate structure, the TetRRIS project team in Karlsruhe sought to build a "practitioner network of citizens and stakeholders". However, as the problem of public engagement and participation turned out to be highly relevant for many stakeholders, the network was opened to a wider range of actors from across the whole Karlsruhe Technology Region.

The primary goals of the "Practitioner Network" were to 1) deepen the knowledge of local innovation and development actors 2) increase the understanding of the public and the engagement of stakeholders and 3) foster personal and professional ties to create a network among local actors with an interest in public and stakeholder engagement. This includes exchanges of experience at the organizational level on contacts, networks, cooperation partners and support structures, as well as exchanges of experience on recent activities, best practices, and challenges. "Engagement" was construed as encompassing both *communication* (i.e., informing stakeholders and the public at large about what e.g., an innovation project was doing) and *participation* (involving them in some way in the design, implementation and even decision-making in and about the project).

As discussed in Deliverables 3.1 and 3.2 of the TetRRIS project, deepening the practice of RRI in the Karlsruhe Technology Region (KTR) faced several challenges. Some were structural but, largely they were external to the region. Thus, it was mostly outside of the local actors' scope to affect change.

While structural challenges of the division of administrative power and funding requirements are fundamentally beyond the scope of TetRRIS to address, the "Practitioner Network" pilot action set out to address the internal problem of local actors' lack of knowledge about the "how-to" questions of public engagement and participation.

The "Practitioner Network" made important contributions to overcoming these challenges. Through the key-note presentations from expert speakers and the subsequent discussions and interactive workshop sessions, we deepened local actors' understanding of the potential for and the practice of public engagement and participation. We provided them with practical knowledge, ideas, best practices and inspiration for how to conduct public engagement activities in the context of their own work, as well as greater awareness of the resources and knowledge related to public engagement available within the region and beyond. It also stimulated the formation of new topic-related personal linkages among the local actors.

However, during the Pilot Actions it also became clear that there are limits to the impact the "Practitioner Network" and "Tampere-Karlsruhe exchange" have been able to make. The greatest challenge for both pilot actions to make an impact beyond the immediate learnings and networking nodes achieved in 2022 and 2023 is the difficulty of sustaining a high level of active participation on a purely voluntary basis. Running networking activities, exchanges and events like workshops involves a non-trivial amount of work – scheduling meetings, managing memberships and email lists, researching topics, defining programs and agendas, organising speakers, booking rooms and catering etc. – and generates costs (e.g., room bookings, travel). These were covered by TetRRIS staff and funds for the duration of the project, with additional support from the (voluntary, unpaid) group of Network core members.

While the Network events generated much interest among the wider population of actors in the Technology Region, and the network core members were willing to put in work for it in 2022 on a voluntary basis, it currently seems unlikely that they will be willing to take over the running of the Network themselves. A core learning of TetRRIS is thus the importance of funding and organisational infrastructure to keep Pilot Action-like activities running in the long run.

4. Szeged-Timisoara:

The pilot actions, key learnings, and main challenges for the two running pilots (TalentMagnet and DIH world) in Szeged-Timisoara region are summarised in Tables 7 and 9.

TalentMagnet

Table 7 TalentMagnet Action Plan + Follow-up Actions (WP4)

Drivers	• The personal networks of local RRI experts are the main drivers in this region
Challenges	• Internal drivers to the implementation of RRI are very rare. • Lack of trust • Lack of willingness to cooperate • Low familiarity and exposure to RRI
Solutions to challenges	1. TalentMagnet
Unique opportunity	• Starting anew, introducing the concept to the entire region from scratch • The RRI concept has been introduced to the participants and they were ready to discuss their experience which made it possible to identify areas of potential RRI actions. • The presented ongoing activities and planned actions of local stakeholders already contain some elements of RRI which can be further developed within the DIH-World project. • DUTIREG is committed to creating the roadmap for implementing Digital Innovation Hub in Szeged (which is a DIH-World result). It shall follow the open innovation process and public engagement shall be an important element (which is TetRRIS's result) • The participants have learned about the good practices and practical examples from the West region which makes it possible to implement

	knowledge transfer from the town of Timisoara toward Szeged, including their agglomeration zones.
TalentMagnet	• Bring about engagement and knowledge of RRI concept

Action Plan:

- Raise awareness of RRI in a post socialist innovation environment (starting challenge): the general knowledge about RRI issues in post-socialist countries is very low. However, the openness to be familiar with RRI issues has been tested and the result is very positive: based on a bottom-up approach, TalentMagnet partnership invited TetRRIS's experts for an online workshop about RRI in the close future.

- Having TalentMagnet's steering committee meetings on the importance of RRI (raising awareness on RRI in the partnership).

- An RRI training with TetRRIS.

- Creating RRI-related visuals (infographics, animations, leaflets) with easy-to understand key RRI-messages and advantages: This is a key activity, since visuals can help to summarize and understand the most important issues of RRI very quickly and efficiently. TetRRIS experts will develop and edit attractive RRI-related visuals. These visuals will be very important in the next activities.

- Helping trained partners start to use RRI thinking during their work.

- Ask TalentMagnet partners to distribute the importance of RRI among their stakeholders: After getting the RRI knowledge and understanding its importance and applying it during their work, partners will be asked to try to distribute the importance of RRI among their stakeholders. The helpdesk will help partners to do that if needed. RRI visuals will help this work.

- Invite TalentMagnet key persons to main TetRRIS activities to continue cooperation and get more support.

- Transferability of Open Access RRI Key: Transferability requires that the outputs of the projects are presented in a format that is easy to use and adapt by another beneficiaries.

- Involving RRI keys and dimensions into the deliverables

D.T2.1.2 Local Talent Clubs established.

D.T2.1.5 Urban hackathons implemented.

Action Plan:

The actions planned and conducted throughout the last years in DIH world and Szeged - Timisoara region are summarized in Table 8.

Creating RRI-related video material with easy-to understand key RRI-messages and advantages as communication actions that shall be continued after the completion of DIH-World project (May 2023)

DIH-World partner clusters shall distribute information materials about the RRI among their members followed by structured online discussions organized by new regional "TetRRIS Innovation Lab" following the model from Cantabria.

DIH-World partner clusters shall be invited to TetRRIS activities to continue regional involvement in transnational cooperation.

Integrating RRI in regional innovation services by DIH Business Plan

S3 training with RRI in focus – practical online education to cluster managers and economic development professionals organized following the model of TalentMagnet.

Integrating RRI in European DIH cooperation between Szeged and Timisoara – cross-border concept and pilot implementation following the model from Tampere

RRI community of professionals – supporting RRI with knowledge and experience generated by TetRRIS partners following the model from Karlsruhe.

Table 8 DIH-World Action Plan + Follow-up Actions (WP4)

Drivers	• West region is the model region in Hungary. • The first region in the country to develop regional innovation strategy (RIS) 2005-2008, 2009-2013 • Smart Specialisation strategy (S3) developed in 2013 → Promising for further development. • Exploring spill-over effects of some key enabling technologies – namely ICT
Challenges	• fully addressing and maximising the impact of the thematic objectives identified in the S3 process and translating the process into a manageable procedure involving all relevant regional players: industry, S&T, intermediary sector as well as regional authorities • Restricted resources • RRI is a new concept to the region
Solutions to challenges	• Development of an innovation ecosystem in Szeged • Cross-border approach, international cooperation: development regions led by Szeged (Hungary), Timisoara (Romania) and Novi Sad (Serbia) • Responsible innovation within ICC within Timisoara • Innovation in RIS3: Regional Innovation Strategy (RIS3) for the West Region of Romania, a Smart Specialisation Strategy under approval in Serbia, anS3 and several innovation-oriented organizations in Hungary
Unique opportunity	• First real opportunity to address RRI in the region and offer an impact path for the future
DIH-World	• Addressing and maximizing the impact of the identified thematic objectives in the s3 and translating the process into a manageable procedure involving all relevant regional players,

Table 9 S-T Pilot Actions updated 18/1/2023.

2021	2022	2023
Local Talent Clubs established, December 2021		
Forum for projects by Territorial Innovation Platform on 8th November 2021	Foresight workshop on regional responsible innovation in Szeged, 8th December 2022	Concept note of responsibility accelerator in collaboration with Tampere and Szeged by March 2023
TalentMagnet's steering committee meetings on the importance of RRI (raising awareness on RRI in the partnership) 15th September 2021.	Online RRI training for TalentMagnet staff. During the 1,5-hour training, we had 18-22 participants. 18th February 2022	Partner clusters in EPIX project shall be invited to TetRRIS activities to continue regional involvement in transnational cooperation from February 2023
Creating RRI-related visuals (infographics, animations, leaflets), October – December 2021	Involving RRI keys and dimensions into the TalentMagnet deliverables: D.T2.1.5 Urban hackathons implemented, June 2022	S3 training with RRI in focus – practical online education to cluster managers and economic development professionals, from March 2023 – 3-month online training (planned twice yearly)
DIH Online workshop on 16 September 2021:	Involving RRI keys and dimensions into the TalentMagnet deliverables: D.T2.1.2 Local Talent Clubs established	RRI community of professionals – supporting RRI with knowledge and experience generated by TetRRIS partners, start of networking function from April 2023
Invite TalentMagnet key persons to main TetRRIS activities in order to continue cooperation and get more support 19th October 2021	Integrating RRI in regional innovation services by DIH Business Plan, Nov. 2021 – April 2022 partnership with regional stakeholders / May 2022 – Initial start of DIH functions / April 2023	Integrating RRI in European DIH cooperation between Szeged and other DIH-World partners for joint projects in Horizon Europe April 2023
Creating RRI-related podcasts and video material with easy-to understand key RRI-messages and advantages, November 2021 – August 2022	27/10/2022 – 1st workshop for Chemist talents	International Community Day by DIH-World partners where DIH Business Plan for Szeged is presented officially by May 2023
DIH-World partner clusters shall distribute information materials about the RRI among their members followed by structured online discussions, Oct.-Dec. 2021 – distribution / Jan.-June 2022 – follow-up online discussions	31/10/2022 – 1st workshop for Economist talents with Emad Yaghmaei's RRI keynote	
	03/11/2022 – 2nd workshop for Chemist talents	

	14/11/2022 – 2nd workshop for Economist talents with Krisztina Kádár's CCU keynote	
	21/11/2022 – 3rd workshop for Economist talents: RRI and CCU debate day1	
	28/11/2022 – 4th workshop for Economist talents: RRI and CCU debate day2	

DIH-World has been included in TetRRIS as "learning pilot" which meant that the expert team of DIH-World shall participate in all activities of the TetRRIS project. On the other hand, it is also an "experimental policy pilot" because it aims to bring together regional stakeholders in a particular local context on national level. Consequently, it is difficult to raise interest for RRI among the Hungarian companies and other potential partners. There is also an overall lack of interest for professional policy making actions. These challenges, however, aimed to be tackled within the TetRRIS project.

Cooperation has been particularly active between Tampere, Cantabria, Karlsruhe and Szeged-Timisoara regions with joint implementation of the responsibility accelerator as cross-border sustainability operations. The TetRRIS project therefore brought knowledge and practical examples to the regional stakeholders in the Szeged-Timisoara region and therefore it can be considered a practical outcome of the knowledge transfer activities by a transnational cooperation project.

II. RRI roadmaps for each pilot region.

At the beginning of the project, the pilot regions were asked to create a\n RRI roadmap. The roadmap design, as stated by the 'CWA 17796 Responsibility-by-design standard' is meant to guide an organization as it puts into practice the key RRI dimensions: Anticipation and reflection; inclusion; and responsiveness. Each RRI roadmap (except for that of Cantabria) has four areas of action and is designed to start with the definition of the desired outcome of the RRI vision for the region.

The logic behind the roadmaps is to show how each pilot's risks and barriers, identified earlier in the project, would be targeted through RRI approaches, tools, and actions. Over time, regional partners could adjust their pilot actions if risks and barriers were not overcome as a result of pilot actions. The road-map is being kept as a living document to help regional partners identify risks and barriers, benefits, drivers and challenges, overtime and as these may change. Partners were asked to revisit their roadmaps during WP6's implementation, and the updated results are presented below.
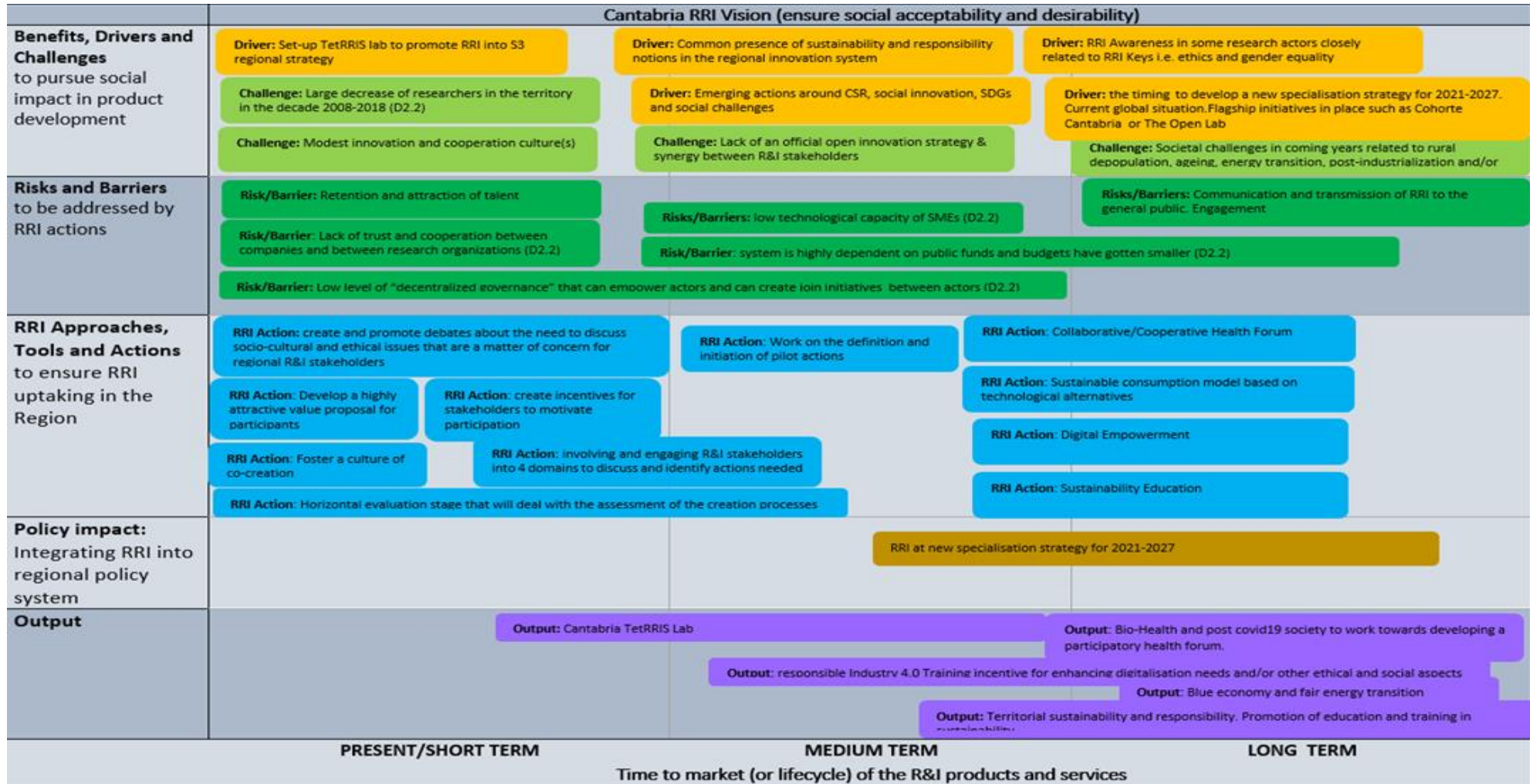
Cantabria RRI Vision (ensure social acceptability and desirability)

	PRESENT/SHORT TERM	MEDIUM TERM	LONG TERM
Benefits, Drivers and Challenges to pursue social impact in product development	Driver: Set-up TetRRIS lab to promote RRI into S3 regional strategy Challenge: Large decrease of researchers in the territory in the decade 2008-2018 (D2.2) Challenge: Modest innovation and cooperation culture(s)	Driver: Common presence of sustainability and responsibility notions in the regional innovation system Driver: Emerging actions around CSR, social innovation, SDGs and social challenges Challenge: Lack of an official open innovation strategy & synergy between R&I stakeholders	Driver: RRI Awareness in some research actors closely related to RRI Keys i.e. ethics and gender equality Driver: the timing to develop a new specialisation strategy for 2021-2027. Current global situation.Flagship initiatives in place such as Cohorte Cantabria or The Open Lab Challenge: Societal challenges in coming years related to rural depopulation, ageing, energy transition, post-industrialization and/or
Risks and Barriers to be addressed by RRI actions	Risk/Barrier: Retention and attraction of talent Risk/Barrier: Lack of trust and cooperation between companies and between research organizations (D2.2) Risk/Barrier: Low level of "decentralized governance" that can empower actors and can create join initiatives between actors (D2.2)	Risks/Barriers: low technological capacity of SMEs (D2.2) Risk/Barrier: system is highly dependent on public funds and budgets have gotten smaller (D2.2)	Risks/Barriers: Communication and transmission of RRI to the general public. Engagement
RRI Approaches, Tools and Actions to ensure RRI uptaking in the Region	RRI Action: create and promote debates about the need to discuss socio-cultural and ethical issues that are a matter of concern for regional R&I stakeholders RRI Action: Develop a highly attractive value proposal for participants RRI Action: create incentives for stakeholders to motivate participation RRI Action: Foster a culture of co-creation RRI Action: involving and engaging R&I stakeholders into 4 domains to discuss and identify actions needed RRI Action: Horizontal evaluation stage that will deal with the assessment of the creation processes	RRI Action: Work on the definition and initiation of pilot actions	RRI Action: Collaborative/Cooperative Health Forum RRI Action: Sustainable consumption model based on technological alternatives RRI Action: Digital Empowerment RRI Action: Sustainability Education
Policy impact: Integrating RRI into regional policy system		RRI at new specialisation strategy for 2021-2027	
Output	Output: Cantabria TetRRIS Lab	Output: responsible Industry 4.0 Training incentive for enhancing digitalisation needs and/or other ethical and social aspects	Output: Bio-Health and post covid19 society to work towards developing a participatory health forum. Output: Blue economy and fair energy transition Output: Territorial sustainability and responsibility. Promotion of education and training in sustainability

Time to market (or lifecycle) of the R&I products and services

Figure 2. Roadmap elements of the Cantabria region pilot as identified at the end of the project.

During the project period, one of the challenges in the region was, and still is, the lack of practical know-how and experience in implementing sustainability and responsibility strategies. Moreover, there is a gap between the implementation of RRI and the theory of RRI. In addition, the lack of trust and cooperation between companies, and between research organizations and companies, creates difficulties for innovation. Cantabria also faces significant challenges for retaining and attracting talent, and the region has a deficit in the training and skills development of R&D&I professionals.

As a general reflection of the roadmap, it can be said that the challenges and opportunities in place at the beginning of the project are **still relevant** while, **concurrently, considerable progress in the sustainability and responsibility thinking** in the region has made due to the change of operational environment and the initiatives of the project. TetRRIS Cantabria lab, Biohealth and post-covid-19 society have helped the d**evelopment of a participatory health forum**. **Blue economy** and **fair energy transition,** as well as **digitalization needs** have also been enhanced.
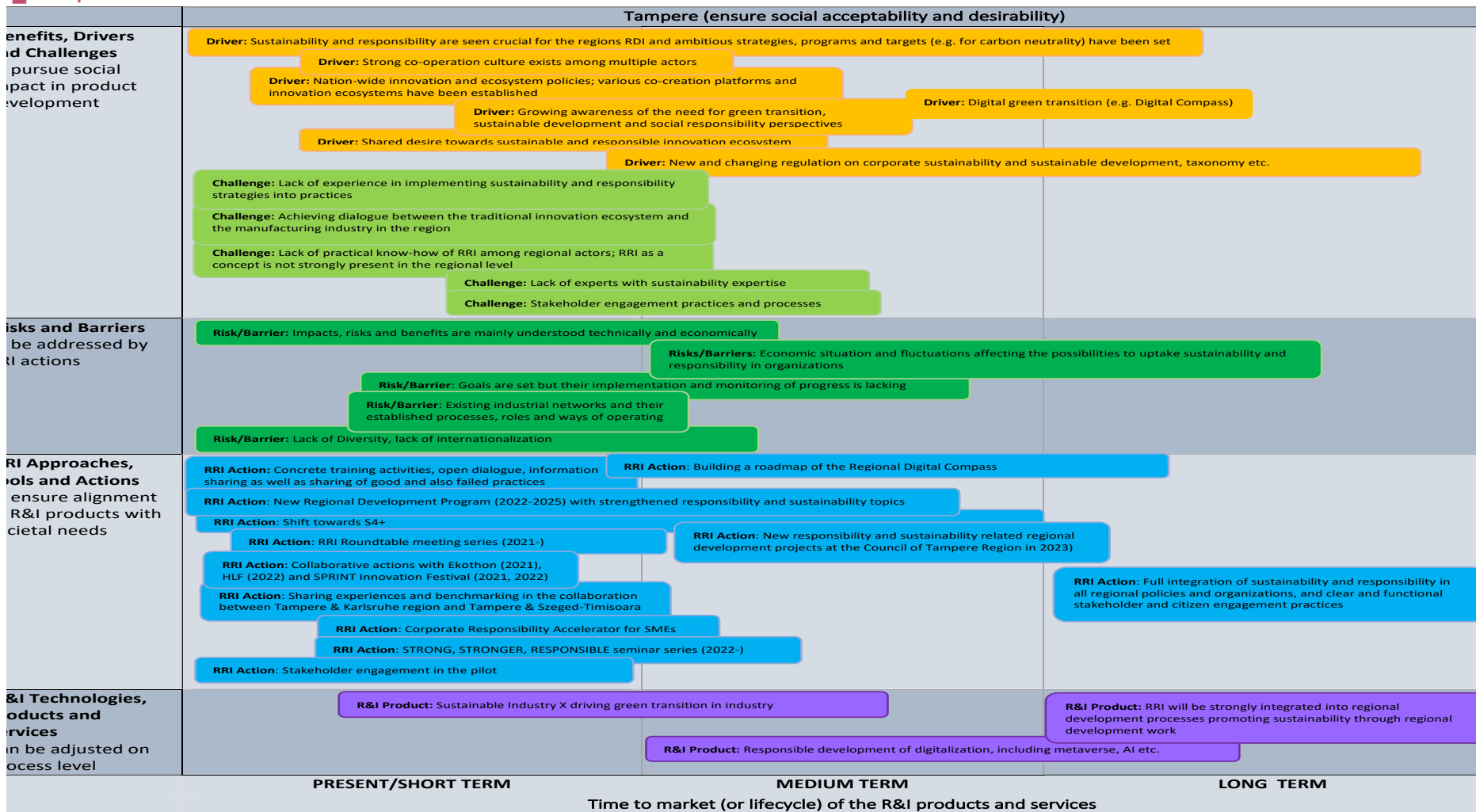
Figure 3. Roadmap elements of the Tampere region pilot as identified at the end of the project.

It is noteworthy that the concepts are constantly developing and reshaping. For instance, during the project period, **the gender equality target has been increasingly included into wider concepts and related discussions on diversity, inclusiveness, and equality**. One of the challenges in the region was, and still is, the **lack of practical know-how and experience in implementing sustainability and responsibility strategies**. In companies this means questioning how to implement the sustainability strategy and integrate it into product development processes and the product design phase, or how to network with others with similar challenges, and share resources and expertise without risking one's key business idea. Further, from a company perspective, it is a **challenge to find the right people with whom to discuss sustainability related issues**. A more general challenge is **stakeholder engagemen**t: How to reach a representative sample of stakeholders, and how to carry out stakeholder engagement activities in a way that supports the better understanding of RRI values while being efficient and effective in terms of resource use.

One of the strengths of the Tampere region has been its strong co-operation culture, and the various co-creation platforms among educational institutions and individual companies. Thus, especially in the beginning of the project, the project team closely collaborated with regional industrial networks, Smart Manufacturing Hub project and the national SIX Smart Manufacturing initiative. However, with established industrial networks, the building of continuous, deep collaboration, and co-creation is a challenge as it requires trust, a common language as well as a shared understanding and vision of the future. Existing networks may already have established processes, roles and ways of operating in place, and introducing new ideas and creating new connections with these networks is not an easy task. It takes a lot of time and effort.

As planned in the beginning of the project, the **regional development spearhead was implemented through successful participation** in the regional development program. In addition, related actions have been the initiative for policy and development collaboration between the Tampere and Karlsruhe regions, as well as **regional co-creation activities** of various stakeholders in the Ekothon2, aiming at **the implementation of sustainability thinking** in the region, more broadly.

As a general reflection of the roadmap, it can be said that the challenges and opportunities in place in the beginning of the project are **still relevant, while concurrently considerable progress in the sustainability and responsibility thinking in the region has been made due to the change of operational environment and the initiatives of the project**.

Karlsruhe (ensure social acceptability and desirability)

	PRESENT/SHORT TERM	MEDIUM TERM	LONG TERM
Benefits, Drivers and Challenges to pursue social impact in product development	Driver: High-Level of de facto RRI Practices		
	Driver: Long Tradition of citizen and stakeholder engagement		Driver: Long Cooperation Praxis
	Driver: Participation as legal requirement in some contexts		Driver: High Level of mutual Trust
	Driver: High interest in exchange of experiences and good practices	Driver: New awareness and deeper understanding of RRI due to TetRRIS project	
	Challenge: Few structures for exchange and mutual learning with regard to citizen and stakeholder engagement		
	Challenge: Limited insight into practices, activities, and experiences in other European regions		
	Challenge: Limited resources (time, labour, capital) for RRI practice outside of dedicated projects, unless clear and direct benefits are visible		
	Challenge: Complex regulations and approval processes		Challenge:
Risks and Barriers to be addressed by RRI actions	Risk/Barrier: Few structures for exchange and mutual learning with regard to citizen and stakeholder engagement. (identified as challenge)	Risks/Barriers:	
	Risk/Barrier: Limited insight into practices, activities, and experiences in other European regions	Risks/Barriers:	
	Risk/Barrier: Limited resources (identified as challenge)		
	Risk/Barrier: Karlsruhe Technology Region is characterized by a wide variety of technological, institutional and sectoral structures that might impede RRI practices. (identified as challenge)		
RRI Approaches, Tools and Actions to ensure alignment of R&I products with societal needs	RRI Action: Creation of a practitioner network on citizen and stakeholder engagement		
	RRI Action: Initiation of an intensified dialogue and exchange between regional innovation and development policy makers in Karlsruhe and Tampere		
	RRI Action: (prospective action) – shared learning between Szeged-Timisoara and Karlsruhe region on cross-border cooperation		
R&I Technologies, Products and Services Can be adjusted on process level		R&I Product: Practitioner network for citizen and stakeholder engagement	
	R&I Product: Mobility advisory Council → Karlsruhe Mobility Lab		
	Exchange between TechnologieRegion Karlsruhe and Pirkanmaan Region → resulted in a Workshop at the High Level Forum 2022		
		R&I Product: Integration of insights, good practices and networks developed during TetRRIS project into regional strategy and new projects	

Time for uptake of the R&I products and services

Figure 4. Roadmap elements of the Karlsruhe region pilot as identified at the end of the project.

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During the project period, one of the challenges in the region was and still is the **lack of practical know-how and the limited resources and limited insight** into other European practices. Moreover, the region is also characterized by a wide variety of technological and institutional structures that can impede RRI practices.

As a general reflection of the roadmap, it can be said that the challenges and opportunities in place in the beginning of the project are still relevant, while concurrently **considerable progress has been made regarding stakeholder engagement thanks to practitioner networks and the mobility advisory Council**. Furthermore, the **integration of insights, good practices and networks that were developed during the TetRRIS project resulted into new projects and new regional strategies**.
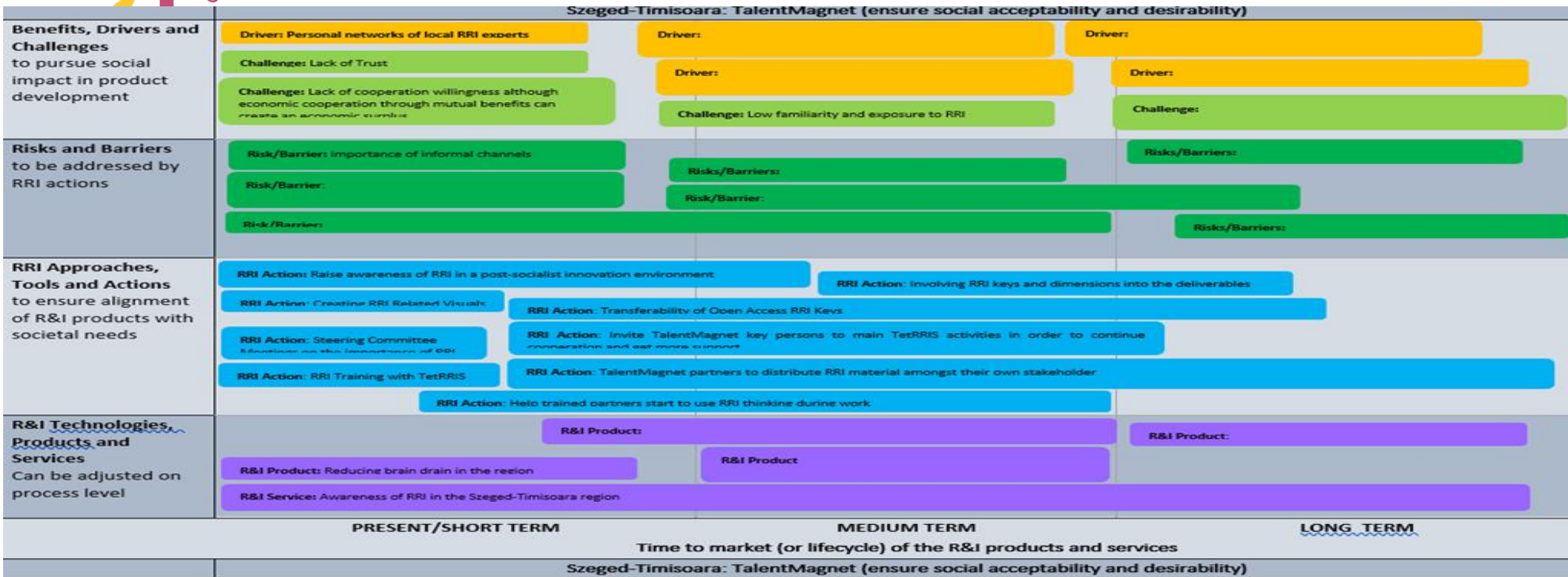
Figure 5. Roadmap elements of the Szeged-Timisoara region pilot as identified at the end of the project.

During the project period, one of the challenges in the region was, and still is, the lack of practical know-how to implement RRI and the lack of trust since it is an unknown concept for Hungary. Moreover, there is a challenge with the political situation in Hungary that does not enable for sustainability and responsibility actions to emerge.

As a general reflection of the roadmap, it can be said that the challenges and opportunities in place in the beginning of the project are still relevant. However, there is **significant better understanding of and familiarity with the RRI concept at least at educational level, which was one of the expectations of the project**, as Szeged-Timisoara pilot is a 'learning pilot' aiming to gain knowledge from collaborating with the rest pilots.

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III. Reflection surveys

To evaluate the added value of RRI within the TetRRIs project, a reflection survey with 15 questions around RRI implementation at current stage for each region was developed. This would be reflected at the middle of pilot actions (work package 4) and at the end of the project (work package 6).

1. Cantabria

For Cantabria the reflection surveys were filled in in the middle of the pilot actions (November 2022) and at the end (May 2023) by pilot partners (Sodercan) and scientific partners (Tecnalia) and the results are presented below.

RRI dimensions	Item	RRI key performance indicators	Select	Score Nov 2022	Score May 2023
RRI Awareness	1	Awareness of public and social values	Pilot recognizes public and social values, but does not mention them in business plans or on their website	2	2
	2	Awareness of ethical issues raised by the pilot's innovations	If asked, ethical issues are recognized, but no active awareness	2	3
	3	Awareness of stakeholder views	Aware of the opinion of all main stakeholders	3	3
RRI Implementation	4	Stakeholder engagement (inclusion) - external stakeholders and third party networks (e.g. CSOs)	Only occasionally	2	3
	5	Employee engagement level in the pilot	Employee'voice occasionally be heard and understood, at the same time employees become aware of pilot' plans/activities	2	3
	6	(Responsiveness) does the pilot respond to (new) societal demands and developments? - Capacity to align to societal goals	Pilot responds to new demands and developments, but not as part of their long-term regional strategy	3	3
	7	(Reflexivity) does the pilot embed public and social values in its innovations?	Can mention public and social values but no active implementation or policy	2	3
	8	(Anticipation) does the pilot (actively) anticipate social effects of its innovations?	Only anticipation of societal effects if triggered by events from outside the pilot	3	3
	9	Transparency and accountability about RRI-relevant choices: is the pilot transparent about it RRI-relevant choices?	The pilot responds to questions but does not actively communicate	2	2
	10	Diversity and gender equality	Communicating pilot' commitment to promoting diversity/ gender equality but not systematically applied to the regional innovation process	3	4
	11	Does the pilot learn mechanisms to address public and social values in service and product development?	Aware that learning mechanisms are needed to gain experience with the new technology and to reduce uncertainty	2	2
RRI Assessment	12	Risk identification and risk management	External risk identification is performed only occasionally	2	3
	13	(Impact assessment) does the pilot assess the environmental, social, governmental, ethical, and legal impacts of its innovations?	Pilot aware of its impacts but the impacts of innovations are not documented well enough	2	3
	14	Technology assessment (TA)	Occasionally creating, executing, and communicating TA, but not as part of the pilot' long-term regional strategy	3	3
	15	Is the pilot monitoring its RRI efforts and the consequences of these?	The pilot regularly review its RRI efforts and looks for improvements	3	3

Figure 6 Reflection Survey Tecnalia

One difference that can be observed is the increase of seven out of fifteen indicators. The indicators with the increased scores in the comparison are about the awareness of ethical issues raised by the pilot's innovations, stakeholder engagement, employee engagement level, reflexivity, diversity and gender equality, risk identification and management as wells as about impact assessment. This increase could be a result of better evaluation and changes that have happened during the last months in the pilot actions. Furthermore, transparency, is a crucial dimension for Tecnalia and they tend to be active in communication and consultation with everyone that is involved and willing to help. It is worth mentioning that after two rounds of scores there was no decrease in any score and a slight increase was observed for several indicators.

RRI dimensions	Item	RRI key performance indicators	Select	Score Nov 2022	Score May 2023
RRI Awareness	1	Awareness of public and social values	Pilot recognizes public and social values, but does not mention them in business plans or on their website ▼	2	2
	2	Awareness of ethical issues raised by the pilot's innovations	If asked, ethical issues are recognized, but no active awareness ▼	2	4
	3	Awareness of stakeholder views	Aware of the opinion of all main stakeholders ▼	3	3
RRI Implementation	4	Stakeholder engagement (inclusion) - external stakeholders and third party networks (e.g. CSOs)	Only occasionally ▼	2	3
	5	Employee engagement level in the pilot	Never ▼	1	3
	6	(Responsiveness) does the pilot respond to (new) societal demands and developments? - Capacity to align to societal goals	Yes, but the pilot is a follower; other pilots respond earlier ▼	2	3
	7	(Reflexivity) does the pilot embed public and social values in its innovations?	Can mention public and social values but no active implementation or policy ▼	2	3
	8	(Anticipation) does the pilot (actively) anticipate social effects of its innovations?	No anticipation ▼	1	3
	9	Transparency and accountability about RRI-relevant choices: is the pilot transparent about it RRI-relevant choices?	The pilot responds to questions but does not actively communicate ▼	2	3
	10	Diversity and gender equality	Pilot lacks diversity and gender equality ▼	1	4
	11	Does the pilot learn mechanisms to address public and social values in service and product development?	No ▼	1	2
RRI Assessment	12	Risk identification and risk management	External risk identification is performed only occasionally ▼	2	3
	13	(Impact assessment) does the pilot assess the environmental, social, governmental, ethical, and legal impacts of its innovations?	Pilot aware of its impacts but the impacts of innovations are not documented well enough ▼	2	3
	14	Technology assessment (TA)	No technology assessment (TA) ▼	1	3
	15	Is the pilot monitoring its RRI efforts and the consequences of these?	The pilot regularly review its RRI efforts and looks for improvements ▼	3	3

Figure 7 Reflection Survey Sodercan.

One difference that can be observed is the increase of twelve out of fifteen indicators. The indicators with the increased scores in the comparison are about the awareness of ethical issues raised by the pilot's innovations, stakeholder and employee engagement, responsiveness, reflexivity, anticipation, transparency, diversity and gender equality, risk identification and management, learning mechanisms to address public and social values, as well as impact and technology assessment. This increase could be a result of better evaluation and changes that have happened during the last months in the pilot actions, resulting in a more RRI familiar approach from Sodercan. It is worth mentioning that after two rounds of scores there was no decrease in any of their indicators.

For Tampere, the reflection surveys were filled in in the middle of the pilot actions (November 2022) and at the end (May 2023) by pilot partners (Council of Tampere region) and scientific partners (VTT) and the results are presented below.

RRI dimensions	Item	RRI key performance indicators	Select	Score Nov 2022	Score May 2023
RRI Awareness	1	Awareness of public and social values	Pilot actively asks other parties (e.g. supplier) to take into account public and social values	5	5
	2	Awareness of ethical issues raised by the pilot's innovations	pilot makes other actors aware of potential ethical issues	5	5
	3	Awareness of stakeholder views	Active procedures to engage with stakeholders are in place	4	5
RRI Implementation	4	Stakeholder engagement (inclusion) - external stakeholders and third party networks (e.g. CSOs)	Stakeholder engagement is part of long-term strategy planning and pilot recognizes legitimacy of views of all regional stakeholders	4	4
	5	Employee engagement level in the pilot	Employees to be actively and truly engaged as part of long-term strategy planning	4	4
	6	(Responsiveness) does the pilot respond to (new) societal demands and developments? - Capacity to align to societal goals	Pilot is generally recognized as a forerunner in addressing new regional social demands and developments	5	5
	7	(Reflexivity) does the pilot embed public and social values in its innovations?	Public and social values are actively taken into account in innovation and product development	4	4
	8	(Anticipation) does the pilot (actively) anticipate social effects of its innovations?	Anticipates societal effects together with other stakeholders and encourages others also to do more active anticipation	5	5
	9	Transparency and accountability about RRI-relevant choices: is the pilot transparent about it RRI-relevant choices?	Main RRI-relevant choices are explained in key documents and/or website	3	4
	10	Diversity and gender equality	Pilot has strategic plan for diversity and gender equality with wide alignment between them and business priorities	4	4
	11	Does the pilot learn mechanisms to address public and social values in service and product development?	Carrying out user experience tools to respond (new) societal demands and developments, but not as part of the pilot' long-term regional strategy	3	4
RRI Assessment	12	Risk identification and risk management	Only monitoring internal and external risks when they are imposed to the pilot, but no sufficien processes in place	3	3
	13	(Impact assessment) does the pilot assess the environmental, social, governmental, ethical, and legal impacts of its innovations?	Pilot assesses the imapcts of its regional innovations and developments, but not as part of their long-term regional strategy	3	3
	14	Technology assessment (TA)	No technology assessment (TA)	1	1
	15	Is the pilot monitoring its RRI efforts and the consequences of these?	The pilot regularly review its RRI efforts and looks for improvements	3	3

Figure 8 Reflection Survey VTT

One difference that can be observed is the increase of three out of fifteen indicators. The indicators with the increased scores in the comparison are about the awareness of stakeholders' view, transparency and accountability and learning mechanisms to address social and public values. This increase could be a result of better evaluation and changes that have happened during the last months in the pilot actions. Furthermore, awareness of public and social values, as well as awareness of ethical issues, are crucial dimensions for VTT. It is worth mentioning that after two rounds of scores, there was no decrease in any score and high scores remained stable for several indicators.

RRI dimensions	Item	RRI key performance indicators	Select	Score Nov 2022	Score May 2023
RRI Awareness	1	Awareness of public and social values	Pilot actively asks other parties (e.g. supplies) to take into account public and social values ▼	5	5
	2	Awareness of ethical issues raised by the pilot's innovations	If asked, ethical issues are recognized, but no active awareness ▼	2	4
	3	Awareness of stakeholder views	Aware that stakeholders may have different views than the pilot but does not know what these views exactly are ▼	2	4
RRI Implementation	4	Stakeholder engagement (inclusion) - external stakeholders and third party networks (e.g. CSOs)	Systematic efforts at stakeholder engagement, but mainly aimed at regional pilot goals ▼	3	4
	5	Employee engagement level in the pilot	Employees opinions and inputs continuously and repetitively lead to changes in pilot policies that encourages others also to do more active engagem ▼	5	5
	6	(Responsiveness) does the pilot respond to (new) societal demands and developments? - Capacity to align to societal goals	Pilot has active procedure in place to respond to regional societal demands and developments ▼	4	5
	7	(Reflexivity) does the pilot embed public and social values in its innovations?	Public and social values are actively taken into account in innovation and product development ▼	4	4
	8	(Anticipation) does the pilot (actively) anticipate social effects of its innovations?	Active policy and procedures in place to anticipate social effects of the pilot's regional innovations ▼	4	5
	9	Transparency and accountability about RRI-relevant choices: is the pilot transparent about it RRI-relevant choices?	The pilot responds to questions but does not actively communicate ▼	2	3
	10	Diversity and gender equality	Can mention diversity and gender equality but no active implementation or policy ▼	2	3
	11	Does the pilot learn mechanisms to address public and social values in service and product development?	User-centered approaches formally integrated into the pilot innovation model (e.g. user-centered design, co-creation) ▼	4	4
RRI Assessment	12	Risk identification and risk management	External risk identification is performed only occasionally ▼	2	3
	13	(Impact assessment) does the pilot assess the environmental, social, governmental, ethical, and legal impacts of its innovations?	Pilot awares of its impacts but the impacts of innovations are not documented well enough ▼	2	3
	14	Technology assessment (TA)	Recognise the needs of TA, but no active implementation or policy ▼	2	2
	15	Is the pilot monitoring its RRI efforts and the consequences of these?	Only informal or ad hoc monitoring ▼	2	3

Figure 9 Reflection Survey Council of Tampere region

One difference that can be observed is the increase of ten out of fifteen indicators. The indicators with the increased scores in the comparison are about the awareness of ethical issues raised by the pilot's innovations, awareness of stakeholders, stakeholder engagement, responsiveness, anticipation, transparency, diversity and gender equality, risk identification and management, impact assessment and monitoring consequences. This increase could be a result of better evaluation and changes that have happened during the last months in the pilot actions, resulting in a more RRI familiar approach from Tampere Council. It is worth mentioning that after two rounds of scores there was no decrease in any of their indicators.
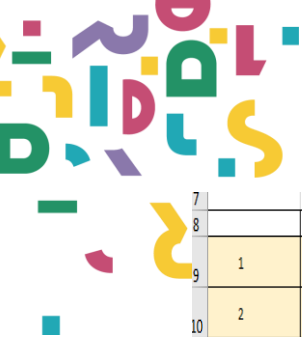
For Karlsruhe the reflection surveys were filled in the middle of the pilot actions (November 2022) and at the end (June 2023) by pilot partners (TRK GmbH) and scientific partners (Fraunhoffer) and the results are presented below.

RRI dimensions	Item	RRI key performance indicators	Select	Score Nov 2022	Score June 2023
RRI Awareness	1	Awareness of public and social values	Pilot actively asks other parties (e.g. supplies) to take into account public and social values	5	4
	2	Awareness of ethical issues raised by the pilot's innovations	pilot makes other actors aware of potential ethical issues	5	5
	3	Awareness of stakeholder views	Active procedures to engage with stakeholders are in place	4	4
RRI Implementation	4	Stakeholder engagement (inclusion) - external stakeholders and third party networks (e.g. CSOs)	Systematic efforts at stakeholder engagement, but mainly aimed at regional pilot goals	3	3
	5	Employee engagement level in the pilot	Employees opinions and inputs continuously and repetitively lead to changes in pilot policies that encourages others also to do more active engagement	5	N.A.
	6	(Responsiveness) does the pilot respond to (new) societal demands and developments? - Capacity to align to societal goals	Pilot has active procedure in place to respond to regional societal demands and developments	4	3
	7	(Reflexivity) does the pilot embed public and social values in its innovations?	Public and social values and societal challenges are starting point of new regional innovations	5	N.A.
	8	(Anticipation) does the pilot (actively) anticipate social effects of its innovations?	Active policy and procedures in place to anticipate social effects of the pilot's regional innovations	4	N.A.
	9	Transparency and accountability about RRI-relevant choices: is the pilot transparent about it RRI-relevant choices?	Main RRI-relevant choices are explained in key documents and/or website	3	N.A.
	10	Diversity and gender equality	Communicating pilot' commitment to promoting diversity/ gender equality but not systematically applied to the regional innovation process	3	4
	11	Does the pilot learn mechanisms to address public and social values in service and product development?			N.A.
RRI Assessment	12	Risk identification and risk management	Only monitoring internal and external risks when they are imposed to the pilot, but no sufficien processes in place	3	3
	13	(Impact assessment) does the pilot assess the environmental, social, governmental, ethical, and legal impacts of its innovations?			N.A.
	14	Technology assessment (TA)			N.A.
	15	Is the pilot monitoring its RRI efforts and the consequences of these?	Only informal or ad hoc monitoring	2	2

Figure 10 Reflection Survey Fraunhoffer

The most obvious difference that can be observed is that several indicators are not applicable for Fraunhoffer since they are not active in producing innovations. The only indicator with increased scores is about diversity and gender equality. This increase could be a result of better evaluation and changes that have happened during the last months in Karlsruhe's pilot actions, which resulted in consistently achieving gender balance in its activities.

		RRI key performance indicators	Select		Score Nov 2022	Score May 2023
8		RRI key performance indicators	Select		Score Nov 2022	Score May 2023
9	1	Awareness of public and social values	Long-term strategy of pilot is driven by public and social values	▼	4	4
10	2	Awareness of ethical issues raised by the pilot's innovations	None	▼	1	5
11	3	Awareness of stakeholder views	Active procedures to engage with stakeholders are in place	▼	4	4
12	4	Stakeholder engagement (inclusion) - external stakeholders and third party networks (e.g. CSOs)	Stakeholder engagement is part of long-term strategy planning and pilot recognizes legitimacy of views of all regional stakeholders	▼	4	4
13	5	Employee engagement level in the pilot	Employees to be actively and truly engaged as part of long-term strategy planning	▼	4	4
14	6	(Responsiveness) does the pilot respond to (new) societal demands and developments? - Capacity to align to societal goals	Yes, but the pilot is a follower, other pilots respond earlier	▼	2	2
15	7	(Reflexivity) does the pilot embed public and social values in its innovations?	Public and social values are actively taken into account in innovation and product development	▼	4	4
16	8	(Anticipation) does the pilot (actively) anticipate social effects of its innovations?	Anticipation of business opportunities and risks, but not of societal effects of innovations	▼	2	2
17	9	Transparency and accountability about RRI-relevant choices: is the pilot transparent about it RRI-relevant choices?	Pilot has active transparency policy with respect to RRI issues, and distinguishes itself in this respect from competitors	▼	4	4
18	10	Diversity and gender equality	Communicating pilot' commitment to promoting diversity/ gender equality but not systematically applied to the regional innovation process	▼	3	4
19	11	Does the pilot learn mechanisms to address public and social values in service and product development?	Aware that learning mechanisms are needed to gain experience with the new technology and to reduce uncertainty	▼	2	2
20	12	Risk identification and risk management	No risk management	▼	1	1
21	13	(Impact assessment) does the pilot assess the environmental, social, governmental, ethical, and legal impacts of its innovations?	Pilot aware of its impacts but the impacts of innovations are not documented well enough	▼	2	2
22	14	Technology assessment (TA)	Recognise the needs of TA, but no active implementation or policy	▼	2	2
23	15	Is the pilot monitoring its RRI efforts and the consequences of these?	Only informal or ad hoc monitoring	▼	2	2

Figure 11 Reflection Survey TRK GmbH

The main difference that can be observed is the increase of two out of fifteen indicators. The indicators with the increased scores in the comparison are about the awareness of ethical issues raised by the pilot's innovations and diversity and gender equality. This increase could be a result of better evaluation and changes that have happened during the last months in the pilot actions, resulting in a more RRI familiar approach from Karlsruhe Council. It is worth mentioning that after two rounds of scores there was no decrease in any of their indicators.

For Szeged-Timisoara the reflection surveys were filled in in the middle of the pilot actions (November 2022) and at the end (June 2023) by DIH-world and the results are presented below.

RRI dimensions	Item	RRI key performance indicators	Select	Score Jan 2023	Score June 2023
RRI Awareness	1	Awareness of public and social values	Pilot recognizes public and social values, but does not mention them in business plans or on their website	2	2
	2	Awareness of ethical issues raised by the pilot's innovations	If asked, ethical issues are recognized, but no active awareness	2	3
	3	Awareness of stakeholder views	Aware that stakeholders may have different views than the pilot but does not know what these views exactly are	2	2
RRI Implementation	4	Stakeholder engagement (inclusion) - external stakeholders and third party networks (e.g. CSOs)	Systematic efforts at stakeholder engagement, but mainly aimed at regional pilot goals	3	3
	5	Employee engagement level in the pilot	Systematic efforts to engage pilot employees and believe them, but not as part of long-term regional strategy	3	4
	6	(Responsiveness) does the pilot respond to (new) societal demands and developments? - Capacity to align to societal goals	Yes, but the pilot is a follower; other pilots respond earlier	2	3
	7	(Reflexivity) does the pilot embed public and social values in its innovations?	Can mention public and social values but no active implementation or policy	2	2
	8	(Anticipation) does the pilot (actively) anticipate social effects of its innovations?	Only anticipation of societal effects if triggered by events from outside the pilot	3	3
	9	Transparency and accountability about RRI-relevant choices: is the pilot transparent about it RRI-relevant choices?	The pilot responds to questions but does not actively communicate	2	2
	10	Diversity and gender equality	Can mention diversity and gender equality but no active implementation or policy	2	3
	11	Does the pilot learn mechanisms to address public and social values in service and product development?	Aware that learning mechanisms are needed to gain experience with the new technology and to reduce uncertainty	2	3
RRI Assessment	12	Risk identification and risk management	External risk identification is performed only occasionally	2	2
	13	(Impact assessment) does the pilot assess the environmental, social, governmental, ethical, and legal impacts of its innovations?	Pilot aware of its impacts but the impacts of innovations are not documented well enough	2	2
	14	Technology assessment (TA)	Recognise the needs of TA, but no active implementation or policy	2	3
	15	Is the pilot monitoring its RRI efforts and the consequences of these?	Only informal or ad hoc monitoring	2	2

Figure 12 Reflection Survey DIH-world

One difference that can be observed is the increase of six out of fifteen indicators. The indicators with the increased scores in the comparison are about the awareness of ethical issues raised by the pilot's innovations, awareness of stakeholders, employee engagement, responsiveness, transparency, diversity and gender equality, learning mechanisms to address social and public values and technology assessment. This increase could be a result of better evaluation and changes that have happened during the last months in the pilot actions, resulting in a more RRI familiar approach from DIH world. It is worth mentioning that after two rounds of scores there was no decrease in any of their indicators.

IV. SDGs for each region

At the beginning of the project, pilot regions were asked to select the most relevant Sustainable Development Goals for their context.

This report aims to revise the existing SDGs & asks regions to redefine and explain SDG prioritisations, connect activities in the regions to SDGs. It also asks regions to explain their choices for environmentally and social sustainability in link to S3.

Table 10 Pilot territories' smart specialization and UN SDGs selected at the beginning of the project.

Pilot Territory	Related Smart Specialization Priorities	UN SDGs
Cantabria	- Cultural and Industrial Model Change - Technology and Knowledge Transfer	5,7,8,9,11,13,14,17
Tampere	- ICT for new production processes, IoT and advanced manufacturing - Social innovation for global co-learning and investment	8,9,11,12,13,15, 17
Karlsruhe	- Sustainable mobility - ICT, renewable energy	3, 4, 8, 9, 10, 11, 12, 13, 15, 17
Szeged-Timisoara	- Sustainable construction - Creative industries	8, 9, 11, 12, 16 17

1.Cantabria

After the revision of SDGs 5 out of the 9 originally selected SDGs align with the region's strategy.

Table 11 Cantabria's revised SDGs selected.

SDG Proposal	SDG Revision/ prioritisation Jan 23
5-Gender Equality	
7-Affordable clean energy	7-Affordable clean energy
8-Decent work and economic growth	8-Decent work and economic growth
9-Industry innovation and infrastructure	9-Industry innovation and infrastructure
11-Sustainable cities and communities	11-Sustainable cities and communities
13-Climate action	13-Climate action
1-No proverty	
4-Quality education	
17-Partnerships	

In the Cantabrian Lab four domains of opportunity were identified, gathering the major strengths of R&D of the regional ecosystem of innovation, but also the significant socio-

technical challenges where the role of RRI could be highly influential for its adoption and translation to the regional context. These four broad areas were entitled: "Bio-Health and post-Covid-19 society", "Blue economy and energy transitions", "Responsible Industry 4.0" and "Sustainability and Responsibility". The four pilot actions developed during the experimentation were: "Collaborative/Cooperative Health Forum", "Sustainable consumption model based on technological alternatives", "Digital Empowerment" and "Sustainability Education". Each pilot includes several key interventions in which has made a contribution or expects to have such contribution in the near future in rolling out the necessary transitions to achieve its SDGs.

Goal 3: Health and Wellbeing: Collaborative/Cooperative Health Forum is a pilot with high social impact potential that reinforces SDG 3's targets to ensure healthy lives and promote well-being for all at all ages.
This forum aimed to establish a space for cooperation in the health sector, with the aim of becoming a meeting point for information and training in response to various societal and regional challenges in the health sector.

Goal 5: Gender Equality: Ensure women's full and effective participation and equal opportunities for leadership at all decision-making levels in political, economic and public life. Regional policies in Cantabria have coherently integrated the transversal principle of equal opportunities between women and men in the different stages of the planning, management and monitoring cycles. This goal was addressed somewhat indirectly as the Cantabrian Lab has been a driver for spreading the RRI "message" and keys (including Gender Equality) amongst the most important players in the region and the awareness of RRI aspects and concept which has been developed during the different workshops/labs we organized in the region.

Goal 7: Affordable and Clean Energy.
Goal 13: Climate Action.
Goal 11: Sustainable cities and communities. (indirectly)
Ensuring access to affordable, reliable, sustainable, modern energy for all. By 2030, substantially increase the share of renewable energy in the energy mix
Incorporating climate change measures into national policies, strategies and plans

For the region, all the actions that facilitate a transition to a low-carbon economy are a priority. Several pilots addressed these goals significantly. Sustainability exists not only with a particular thematic challenge, but also with different lines of action into the territory. Enhancing territorial sustainability and responsibility have been selected as key domains to develop actions, specifically through the "Sustainability and Responsibility" domain.

The Lab contributed to sharing its vision on the energy transition, thus inspiring others and pushing them to shift attention towards the energy transition. This work was accompanied by the development of many strategies on the topic, such as the new S3 strategy for Cantabria and other Plans within the project lifespan (Plan Sostenibilidad Energética de Cantabria PSEC 2021-2030 and Plan de Contingencia Energética de la Comunidad Autónoma de Cantabria).

There is a growing understanding of governance needs for integrated SDG implementation and highlights the S3 concept as one of the regional STI approaches for sustainability.

The Cantabrian Lab contributed to connecting different quadruple helix stakeholders making progress and improving energy efficiency system, enhancing renewable energy production in the global energy mix.

Actions aimed at shifting attention to the urgency of embracing new (greener) markets, guiding companies to undertake green transformations and identifying new opportunities of the energy transition for companies also enable the achievement of the above-mentioned SDGs 7's targets but also SDG 8 on encouraging companies to adopt sustainable practices and to integrate sustainability information into their systems.

Under the "Blue economy and fair energy transition" pilot, different stakeholders of the regional innovation system tried to change consumption patterns towards more sustainable processes. The idea was to encourage organizations to consider aspects related to sustainability at a structural level. These initial discussions led to the creation of a platform that congregates 21 companies, different research institutes and public administrations entitled "Blue Economy Cantabria". This platform will be able to accomplish large R&I projects and to host different events related with the societal impact of these interventions and projects in the territory.

Sustainability education pilot action consisted in providing active coordination to the different activities already existing in the region around sustainability. This idea aimed to promote education and training in sustainability to increase the impact and to engage citizens and the regional ecosystem around this idea. The pilot action has helped to establish synergies between companies, public institutions, and educational institutions (secondary schools) that can help increase the awareness of the need to adopt more sustainable processes within the regional industry.

Goal 8: Decent work and growth.
Goal 9: Industry, Innovation and Infrastructure.
Goal 4: Quality Education. (indirectly)
By 2030, achieve full and productive employment and decent work for all women and men, including young people and persons with disabilities, and equal pay for work of equal value. Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including by focusing on labor-intensive, high value-added sectors. By 2030, significantly increase the number of young people and adults who have the necessary skills, in particular technical and vocational skills, to access employment, decent work and entrepreneurship.

Through the "Responsible Industry 4.0" domain and "Digital Empowerment" pilot action several regional stakeholders such as clusters and companies have promoted digital training at regional level through training programs in digital competences. The aim of this initiative was to provide employment with added value, leading to greater competitiveness, improving the retention of talent in the region, and thus avoiding the brain drain, which is a great challenge in the region. To this end, the initiative called for the involvement of companies in

the ICT sector, but also other types of companies, training centers, universities, trade unions, business schools, financial institutions and education, employment and innovation departments.

In terms of contribution to the Sustainable Development Goals this pilot reinforces the achievement of SDG 8 'Decent work and economic growth' targets and reinforces SDG 9 'Industry, innovation and infrastructure' and SDG 4 "quality education" future professionals with a global vision on smart industry and digital technologies, who are able to lead the societal challenges that the new industrial revolution implies in the region.
Ongoing initiatives could be followed in the near future through the development of this pilot action to help find new ways of developing new economies integrating social innovation and innovative social responsibility.

Goal 17: Partnerships: The contribution of the Lab in connecting various ecosystem actors and providing inspiration by disseminating results reinforces the achievement of SDG 17's targets related to strengthening the means of implementation by creating and reinforcing partnerships. One of the wins of the project has been to provide a meeting point for the regional innovation ecosystem and to stimulate a participatory forum for engaging regional stakeholders into science-society interactions.

2. Tampere

After the revision of SDGs 6 out of the 7 originally selected SDGs align with the region's strategy.

Table 12 Tampere's revised SDGs selected.

SDG Proposal	SDG-Revision
8 -Decent work and growth	5-Gender Equality
9- Industry, Innovation and Infrastructure	8 -Decent work and growth
11 -Sustainable cities and communities	9- Industry, Innovation and Infrastructure
12-Sustainable production and consumption	11 -Sustainable cities and communities
13 -Climate Action	12-Sustainable production and consumption
15- Life on Land	13 -Climate Action
17- Partnerships for the Goals	17- Partnerships for the Goals

Goal 5 Gender equality: The nature of the strong industry sectors and the history of the region of Tampere have created some challenges in the region in terms of diversity issues, as these are traditionally dominated by senior professionals, men, and older generations. Also, the fact that young people and women have typically not been interested in the fields of industry, technology, and RDI underline the need to take gender equality in consideration. It is important

that processes are created for identifying, assessing, and developing gender equality issues on all levels, from practitioners, groups and organizations to industrial networks and regional development.

Goal 8 Decent work and economic growth: A common issue for all actors in the Tampere region is the need to understand sustainability more broadly and multidimensionally, and the lack of practical knowhow and tools to anchor sustainability into processes and actions. Taking sustainability into practice, from high-level strategies and policy plans, brings companies also new business opportunities and competitive edge, which support the region's competitiveness also on international scale. New technologies such as industrial metaverse and artificial intelligence are important topics and under development also in the Tampere region, and integrating responsibility and RRI thinking into this development is needed so that the future solutions are ethical as well as socially and environmentally sustainable.

Goal 9 Industry, innovation, and infrastructure: The Tampere region has a background as an industrial hotspot. Today, the strong industrial base of the region is complemented by diverse research and innovation infrastructures and educational institutions. Technology, manufacturing industry and ICT are the key industrial areas of the region. At the moment, the industrial and manufacturing sectors are in the midst of a transformation where digitalization and new technologies, sustainability and green transition are the most important drivers. The goal of the Tampere region pilot has been to translate and promote sustainability and RRI themes into industrial RDI practices.

Goal 11 Sustainable cities and communities: The region of Tampere and its various actors have determinedly stated the importance of sustainable development and their willingness to be part of the change. A tool taking sustainability into practice is the new regional program in which RRI dimensions and sustainability perspectives were enhanced through dialogue between the regional actors. The project supported the strategy process.

Goal 12 Responsible consumption and production: The manufacturing industry is a key industrial area in the region. Supporting the integration of sustainability and responsibility perspectives into the strategies and operations of industrial actors is important.

Goal 13 Climate action: Besides biodiversity loss, climate change and CO_2 emissions are topical environmental sustainability issues. Because of e.g., new regulation, companies and other organizations need now to assess and report their environmental impacts and actions more carefully.

Goal 17 Partnerships: There is a strong co-operation culture between different actors in the region, which takes practice through e.g., various co-creation platforms and co-operation between educational institutions and individual companies. Partnerships motivate actors to develop their sustainability actions further.

After the revision of SDGs 6 out of the 11 originally selected SDGs align with the region's strategy.

Table 13 Karlsruhe's revised SDGs selected.

SDG Proposal	SDG Revision
4-Quality Education	4-Quality Education
7- Affordable and Clean Energy	7- Affordable and Clean Energy
8 -Decent work and growth	8 -Decent work and growth
9- Industry, Innovation and Infrastructure	9- Industry, Innovation and Infrastructure
11 -Sustainable cities and communities	11 -Sustainable cities and communities
13 -Climate Action	13 -Climate Action
3- Health & Wellbeing	
10- Reduced Inequalities	
12-Sustainable production and consumption	
15- Life on Land	
17- Partnerships for the Goals	

Goal 4: Quality Education. One aspect of "quality education" is science education, which is also one of the RRI keys. "Science education" can be addressed through multiple channels. One channel is public engagement in science projects and technology-heavy innovation/development projects more broadly. We contributed to this with our workshops on public engagement/participation. Workshop 1 focused on how S&T research projects can involve local citizens and productively communicate with them about their S&T activities (e.g., utility of different kinds of formats targeted to different audiences [school kids, parents, adult citizens] and for different purposes). Workshop 3 addressed the theme of science education from a further angle. It focused on conflict prevention and management in the context of large-scale spatial scientific projects and new infrastructural developments (esp. energy projects). Helping the affected population absorb and evaluate scientific evidence, e.g., about risks and impacts, is crucial in these cases, and requires well-thought-out approaches, such as those presented and discussed in the workshop.

Goal 7: Affordable and Clean Energy. Providing affordable and clean energy in Germany requires a major build-out of renewable energy generating capacity. However, in practice this build-out has often become highly controversial, as local citizens frequently object to new energy developments in their neighbourhoods, e.g., wind turbines, geothermal or high-voltage lines. These conflicts are often fought out at the local level, pitting different groups of citizens, investors, local business interests and local authorities and NGOs and even "astro-turf"

"citizens' initiatives" against each other in complex and sometimes lengthy conflicts. Ensuring affordable and clean energy therefore increasingly depends on equipping local actors on all sides with appropriate conflict prevention/resolution/management as well as public engagement strategies. We directly contributed to this with our workshops on public engagement/participation, esp. Workshops 1 and 3 on public engagement and conflict resolution in the case of large-scale and/or spatially "invasive" research and infrastructural projects, especially in the energy sector.

Goal 8: Decent work and growth. Growth and the creation of "good" jobs are increasingly dependent on the innovation and deployment of new technologies. However, technological innovation can run into opposition from citizens. One factor stimulating such opposition is when the innovation in question is felt to disrupt the spatial *status quo* and the citizens' "life world". Examples of such innovations are autonomous vehicles and robots, and new energy systems. As discussed above, workshops systematically addressed how technological innovation projects may interact, engage and communicate with citizens to reduce such conflicts (whether by altering their projects in view of citizen concerns, or by reducing citizen concerns through better communication of facts and information). In this context, in particular workshop 1 also sought to address how innovation projects might use citizen input to improve their innovation outputs. All these measures help build flourishing S&T systems, which in turn contribute to growth and decent work.

Goal 9: Industry, Innovation and Infrastructure. See discussions above.

Goal 11: Sustainable cities and communities. This was addressed somewhat indirectly. One aspect of sustainable cities is safe, affordable, and sustainable transportation (Goal 11.2). Making existing transport systems more sustainable requires significant changes, which often are accompanied by public conflict (e.g., over infrastructural buildout like bike lanes or public transport, or over new and unfamiliar technologies like autonomous vehicles or robots). By strengthening the general capabilities of the actors in the local innovation system in Karlsruhe Technology Region to communicate with the public, take citizens' opinions into account, and manage conflicts, we also contributed to the gradual reform of transportation systems. However, transportation and changes to it ("mobility transformation"/*Verkehrswende*) ended up being less of a focus of the pilot activities than initially expected.

Goal 13: Climate Action. This was addressed indirectly by addressing Goal 7 (Clean Energy).

Goals mentioned in the Proposal that were NOT addressed.

Goal 3: Health & Wellbeing. It was not addressed.

Goal 10. Reduced Inequalities. This was included in the Proposal due to RRI's concern with gender equality/diversity. While very important, this topic ultimately took a backseat in the pilot actions to the issues around public engagement and science education, as these were of particular concern to the stakeholders.

Goal 12: Sustainable production and consumption. This was not addressed in the pilot actions, as during the initial scoping phase of the project, the interviewed stakeholders suggested putting the focus on the public engagement/participation.

Goal 15: Life on Land. It was not addressed.

Goal 17: Partnerships for the Goals. It was not addressed.

4.Szeged-Timisoara

After the revision of SDGs 5 out of the 6 originally selected SDGs align with the region's strategy.

Table 14 Szeged-Timisoara's revised SDGs selected.

SDG Proposal	SDG Revision
8 -Decent work and growth	8 -Decent work and growth
9- Industry, Innovation and Infrastructure	9- Industry, Innovation and Infrastructure
11 -Sustainable cities and communities	11 -Sustainable cities and communities
12-Sustainable production and consumption	12-Sustainable production and consumption
16-Peace, Justice and Strong Institutions	13 -Climate Action
17- Partnerships for the Goals	17- Partnerships for the Goals

SDG 8: Decent work and growth. The pilot contributes indirectly by the training activities that were implemented by TalentMagnet as pilot initiative. The RRI concept was introduced and the open mindset for lifelong learning was promoted in the events of the TetRRIS project in Hungary.

SDG 9: Industry, Innovation and Infrastructure. The pilot contributes directly by bringing innovation stakeholders together to project event in Szeged where the foresight actions enabled the participants to evaluate the possible futures for the major innovation infrastructures in Szeged as well as research cooperation with Timisoara to use the innovation infrastructure jointly was also discussed.

SDG 11: Sustainable cities and communities. The pilot contributes directly by organising the process of the review of Smart City Strategy of Szeged which was developed several years ago and therefore it is now the appropriate time to update the development roadmap of the town with European and global trends in mind. TetRRIS partners have provided useful content for the start of the strategic review process in Szeged.

SDG 12: Sustainable production and consumption. The pilot contributes indirectly by bringing RRI principles into the daily activities of the local people including objectives for responsible innovation for production which can also promote responsible consumption among the population, as well.

SDG 13: Climate Action. The pilot contributes indirectly by informing local people about environmental initiatives that can produce more climate-friendly attitude among the

population. The communication activities of the TetRRIS project have therefore made a strong influence on the general attitude of the local people toward SDGs during the implementation of the project.

SDG 17: Partnerships for the Goals. The pilot contributes directly by fostering partnership between organisations across the national border as well as encourages the involvement of marginalised groups in the activities of the TetRRIS project. Unfortunately, the current policies of the Hungarian government do not support bottom-up initiatives therefore the challenge is enormous, but it is still worth trying.

V Impact narratives of external stakeholders' interviews.

To achieve a better understanding of the reality of the project's impact in the different regions and to reflect on the overall results and regional impact of the pilots, several interviews were conducted with external stakeholders. These interviews allowed us to develop 'impact narratives', in which the main RRI-related impacts are described. These are presented in this section in the form of a story which develops the sequence of events, from planning pilot actions, results, and perceived impact, focusing on developing a detailed description of inputs, parallel actions contributing to the process and goal achievement.

1.Cantabria

The interviews were organised as online session (via Teams) on the 8th of May 2023 and were recorded and transcribed by using speech recognition programs. The research team conducted a semi-structured interview with key informants. This was a guided session, in which the actors who participated and worked on the pilots reflected together on the overall results and impact (from an environmental, economic, political, and social point of view), as well as on the future of RRI in the region.

The Cantabria TetRRIS Lab involved and engaged R&I stakeholders into four domains. These domains encapsulate the regional R&I strengths, but also regional societal concerns, expectations and demands. Therefore, the interview was collective, involving several interviewees. This was due to the relevance of having several representatives of different organizations that have actively participated in the regional pilots and who represent the four domains for which the TetRRIS Lab was designed. They gathered different visions of the impact of the pilot experiences in the region representing themselves different entities in the innovation ecosystem.

The session was moderated by TECNALIA and twelve regional stakeholders representing the public sector, academia, business, industry, and government participated actively. The participants involved helped to illustrate an updated perspective of the project impact.

The interview focused on several impact narratives questions and was organised in five blocks. The session started with a brief presentation the objectives, results and lessons learned in the implementation of the different regional pilots to give rise to a collective reflection on the impact generated, paying attention to the following blocks of questions: (1) General results and impact in the region, (2) Policy impact, (3) Social impact, (4) Environmental impact, (5) Economic implications. The session concluded with some final remarks.

TETRRIS GENERAL RESULTS AND IMPACT IN THE REGION

- How do you see the role played by the TetRRIS project and its impact on the wider region?
- What kind of initiatives do you think it has enabled?
- What are its most important impacts in your view?
- What doors do you think it has helped to open?
- Do you think it could have had a greater impact? In what way?

As a general comment, participants highlighted the **size** of the region as ideal to carry out a project such as TetRRIs to generate impact. They mentioned that an innovation ecosystem of such size allowed the actors to coordinate the development of joint initiatives in the field of RRI. They also highlighted the **driving role of SODERCAN** as the regional innovation agency. It was fundamental that the project was led by this entity as it brings together agents from different fields (business, academic, public, etc.,). Additionally, SODERCAN's direct connection with the local government was also highlighted as a strength, having the most influence over these strategies at a political level. In this sense, several participants consider the **participation and commitment of the Directorate General for Innovation of the Government of Cantabria** to be essential from the very beginning of this project. This involvement is considered a key factor for the project execution and has helped significantly.

However, when asked about areas for improvement in terms of project organisation, the participants commented that sometimes **they missed some directives** and guidance and that there should have been more regular communication with the actors who participated in TetRRIS. Additionally, they would have liked to see **more regular follow-up**.

One of the successes of the project has been to provide **a meeting point of the regional innovation ecosystem** and to stimulate a particular participatory forum for engaging regional stakeholders into science-society interaction. This is appreciated by many of the regional stakeholders. The general opinion is that the Social Lab created in the project had a big impact by giving room to regional stakeholders to articulate their concerns while actively contributing to building responsible responses to overarching challenges.

"The project gave us a voice".

"It has given us a vision of certain activities that are being carried out in different areas, which is very relevant for us".

Collaboration between actors was another of the points that was highlighted in the session. This collaboration is considered as a key element for sharing visions and interactions with different working groups with which stakeholders do not naturally work but which have complementary visions for the sustainable development of the region.

To this end, the perception is that the relevant agents were brought together: those who have a certain impact on RRI issues in Cantabria. However, several participants criticised the **need for broadening this ecosystem,** for engaging other stakeholders that are not usually considered. This is the case of **the civil society.** What it is still lacking in the region is the culture of including other types of agents, especially citizens. The project tried to overcome this challenge by focusing on various engagement strategies, but it remained challenging to involve them.

The general opinion is that the project has been a **driver for spreading the RRI "message"** and to introduce the concept at regional level. The events organised in the framework of the project have given a lot of visibility to the concept and above all a more practical vision on how to implement it. Some comments refer to the Policy Lab organised in Santander as a practical vision addressing the benefits integrating RRI into the regional innovation and development system.
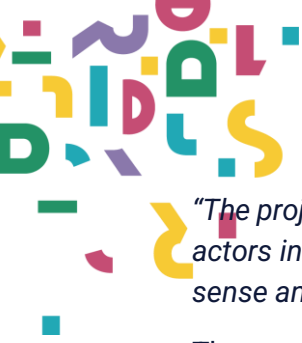
"The project has been a pillar in the region in relation to the RRI. It has served to interact between actors in the region and above all to introduce the RRI concept. A seed has been planted in this sense and it has been very inspiring".

The concept of RRI as such has been introduced or highlighted. Some comments refer to "the de facto RRI", mentioning that RRI has been carried out in Cantabria in an informal way.

"My opinion is that here in Cantabria RRI was only known from an academic point of view, but not from a practical point of view. There are many companies in Cantabria, for example, I am thinking about one company in particular, which has also actively participated in the different discussion forums in the different workshops that said that they were doing RRI without realising that they were doing RRI".

The general opinion is that the integration of RRI concepts and practices in the Cantabrian region making research and innovation responsible will pay off on the long term, but participants believe that on maintaining the TetRRIS spirit alive is important.

"I believe that this is an initiative that we must not let die, it must be the first step on a long road to continue advancing along this line".

POLICY IMPACT

- Has TetRRIS been able to influence the development of the regional specialisation strategy? In what way? And has TetRRIS served to accompany the activities associated with the current RIS3 strategy? in what way? And what might be the legacy of the project at the policy level, and how could it have been most helpful?

This block of questions tried to reflect on how the TetRRIS project has contributed to promote institutional changes into the region of Cantabria and how RRI has been diffused and adopted into the regional innovation system, specifically in the RIS3.

Participants consider that TetRRIS project has had a **significant impact** in the region and its regional innovation ecosystem. The stakeholders think that by enabling a broader **consultation of regional stakeholders**, the Social Lab in Cantabria helped to convert regional innovation strategies into genuine responses to socio-economic and sustainability challenges. The project allowed for interactions and dynamism. It has given the stakeholders a lot of visibility, as they had the chance to express their concerns, their needs and have asked for support to the Government of Cantabria that is in charge of the elaboration of the strategy. There has been a high level of commitment from the regional government in this project, which made this feasible.

Some comments refer to the project as the beginning of a great alliance where the public-private sectors are more aligned but there is still a long way to go.

The RIS3 strategy and the four identified **opportunity domains** in the project, namely (1) Bioeconomy, Health and Post Covid-19 society; (2) Blue Economy and Fair Energy Transitions; (3) Responsible Industry 4.0; and (4) Territorial Sustainability and Responsibility are the same and help to stimulate science-society interactions in Cantabria in both encapsulate the regional R&I strengths. The pilots that have been developed within the TetRRIS project

coincide with many of the strategies and ecosystems within the new smart specialisation strategy.

According to the government, the impact of the TetRRIS project into the development of the new RIS3 has been significant. The project has influenced **the new strategy for the period 2012-2027**. In this way, we can argue that the policy impact of the project has been significant, and that it has contributed to the development of the new policy strategy of the territory. It is noteworthy that **the timing** of the project has facilitated the integration of the concepts. The project started at the end of the previous strategy (period 2014-2020, the previous ERDF Operational Programme), and with the obligation to develop a new specialisation strategy for 2021-2027. So, according to the policy-makers, the timeframe of the TETRRIS project was particularly fitting. It has **helped to incorporate the RRI concept** into the strategy, and it has permeated different pillars of it.

"The new strategy is now in force, the Commission approved at the end of last year. In the new strategy, we could include the area or vector of social responsibility in innovation and all that it entails in the socio-economic field and, above all, also align them with the priority ecosystems that we have within our smart specialisation strategy, which, in an organised way and also in a natural way, has been emerging in the Tetrris project".

Several of the dimensions and values that are promoted by RRI are also visible in the strategy. There are explicit references to RRI in the evaluation documents of the strategy as a way for improving the regional innovation ecosystem, its governance, and its social responsibility to the territory.

Another impact that was mentioned is that TetRRIS project also helped in bringing an understanding **of what other regions are doing** in terms of RRI. The other European partners that participated in the project showed how they were focusing their RRI strategies on the different support systems for innovation. This exchange of experiences has been considered very inspirational.

A final remark was that fact that policies are **made by the people**. The ecosystem generated through the TetRRIS project allowed to get to each other know better and to carry out joint projects.

SOCIAL IMPACT

- How has TetRRIS facilitated the development of greater social awareness of social responsibility in the regional innovation ecosystem?
- In what ways (gender equality, inclusiveness, ethics, security, social welfare, etc.)?
- How do you think this can be taken further?
- What future directions should be pursued?
- How could I have gone beyond what the project envisaged?

We are living in a moment of technological transition, social **transformation** and modification of our consumption models, lifestyles, etc. There is an imperative need to understand other types of positions and other types of interests. In this block, the participants reflected about:

What is the role of responsibility in R&D? but also regional societal concerns, expectations and demands.

Regional stakeholders mentioned many new relationships that have been created through the workshops and that were promoted in the laboratory. There is a positive part of new relationships that have been created in the ecosystem, but some of them miss the withdrawal of actors who are also very present in the region. The real challenge is the involvement of the civil society through associations, federations, in order to complete the quadruple helix. The lack of identification of this kind of civil associations is mentioned as the principal barrier.

Some stakeholders involved in the pilot actions are quite active regarding RRI and they have a significant number of initiatives to promote public engagement. These participants commented on their experiences integrating civil society in their projects:

"This project has made us a bit more aware of what RRI is. Last week we held an innovation event, and we always have patient associations present at the event. We always try to ensure that there is representation from the public sector or patient associations. So, well, I think that little by little it is permeating".

"From the Cluster we have associated ourselves to a super cluster, counting on neighbouring communities, this is giving us a series of visions. The first is to have a critical mass in common objectives. Secondly, we coordinate, it is very important to coordinate, so that in the end the objectives all go in the same direction".

The case of **One Health Forum** was expressly mentioned as a pilot with high social impact potential. This forum aimed to establish a space oriented towards cooperation in the health sector, with the aim of becoming a meeting point for information and training in response to various societal and regional challenges. Due to different political barriers for collaboration, this forum was not created during the project lifespan, but some steps are being taken to launch an informal forum as a way of getting the health industry together with the incubation services for start-ups. This forum will bring the research teams closer to what the region is doing in terms of start-ups. So, it will be like a legacy of the TetRRIS project too.

Another initiative with high social impact that was mentioned is the **Femina project** (Interreg) where Sodercan has worked with women entrepreneurs in rural areas, which has also been a good example of societal engagement.

A final reflection focused on the future. There will be an increasing number of EU requirements regarding R&I in the coming years and regional stakeholders will have to adapt. In this sense the TetRRIS project has acted as a tool for foreseeing upcoming **policy requirements**, such as societal impact, societal engagement, directionality, transformative innovation, place-based sustainability, mission-driven innovation, etc.

ENVIRONMENTAL IMPACT

- Have any of the discussions generated during the sessions hosted by the project led to concrete actions or measures at the environmental level?
- Have any intangible actions been observed that may have been related to the project?
- How do you see the initiative linking with other types of initiatives outside the region in this regard?

The new **S3 strategy for Cantabria** address sustainability significantly. Sustainability shows not only with a particular thematic challenge, but also with different lines of action into the territory. Enhancing territorial sustainability and responsibility have been selected as key domains to develop actions.

In particular, the discussion took place around the impact of two different pilot actions:

The Sustainability education pilot action consisted in providing active coordination to the different existing activities in the region around sustainability. This idea aimed to promote education and training about sustainability to increase the impact and to engage citizens and the regional ecosystem around this idea. The pilot action has helped to establish synergies between companies, public institutions, and educational institutions (secondary schools) that can help to enhance the understanding of why the regional industry needs to work in more sustainable ways.

"Combining it with our call for circular economy and everything that came up related to sustainability education, some workshops will take place in schools with a businessman or businesswoman who will explain their trajectory, explaining what they do and talk a bit with the kids. Entrepreneurial education towards sustainability and the future of the companies'"

Under the **"Blue economy and fair energy transition"**, different stakeholders of the regional innovation ecosystem tried to change consumption patterns towards more sustainable processes. This idea sought to encourage organisations to consider aspects related to sustainability at a structural level. These initial discussions led to the creation of a platform that gathers 21 companies, different research institutes and public administrations entitled "Blue Economy Cantabria". This platform will be able to accomplish large R&I projects and host different events linked to the societal impact of these interventions and projects in the territory.

"I would like to add that together with the cluster, we have also promoted the blue economy platform, which also in this platform, the fundamental basis is not to cause any damage to the marine environment. But on this basis, we also want to promote and bring together all the actors involved in the sea, setting common objectives that are universally accepted."

We note that the recently approved Next Generation project will be a great opportunity for the region that combines economic, social and strategic impact. Phase I of this funding will include the installation of a hydrogen generation prototype and simulation of an ammonia plant in the Port of Santander.

"The project aims to stop using oil and fossil fuels in general, to move towards a more sustainable, cleaner, economically viable future that will allow us all to access a new sector".

ECONOMIC IMPLICATIONS

- Do you see any economic implications associated with the activities promoted by tetRRIS, can you envisage any beneficiaries and how they have benefited, and how do you think the actions carried out by the project can have a future economic effect on participants or through processes that favour RRI?
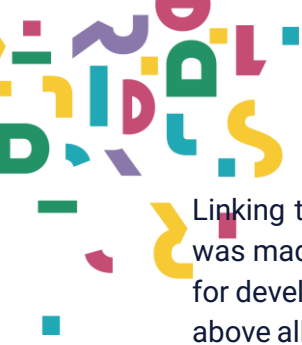
Linking the economic implications of the project with the previous block, a group reflection was made on how environmental **constraints or limitations sometimes can be opportunities** for development. The opinion is that the same happens in the field of social responsibility and above all in the detection of possible niches to improve innovation in this social responsibility.

Several regional firms and cluster associations participated actively in the project pilot activities, forums, debates, interviews, and workshops. This improved the level of understanding of responsibility that translates into practices that can be more tangible in a longer term. The general aim is to continue working, make progress **and find new ways of developing new economies** integrating social innovation and innovative social responsibility.

"I believe that this is an area in which we must continue to deepen. Tetris has begun to stir up a seed within the region and I believe that we must continue to work, mainly from the public sphere, to strengthen these working groups, these strategic sectors, these ecosystems that, through these activities of social innovation and innovative social responsibility of RRI, we can develop new ways of working and new ways of developing new economies. I think that is the objective."

In **Digital empowerment pilot** action several regional stakeholders, such as clusters and companies, were interested in promoting digital training at regional level through training programmes in digital competences. The pilot action also sought to address the gap detected around "retention and attraction of talent" that, in the last years, has been a challenge for the region. The pilot has created several benefits for the stakeholders involved, but also for others that were not involved in this pilot action. The deployment of the pilot action has involved a significant number of organizations (more than 30) that have benefited from this training.

"a course that has focused us and allowed us to make a little more progress and, let's say, to have a result from which many companies have benefited."

> *"For the cluster of technological companies, it has been very interesting as we are a very transversal cluster that supports digitalisation. There are many of those who work in each of the organisations that are involved and have collaborated, so we have done some training as a first point of improvement, which I think may be interesting to evolve in the future in another type of training, workshop, etc."*

Finally, the project has also opened **new project opportunities in this area**. The Government has just been approved for another Interreg Europe project on a topic related to new forms of work and of labour and socio-economic relations in the post-COVID era, especially in sensitive areas such as artificial intelligence and work systems.

The session concluded with some final remarks to thank and congratulate the participants for the work done in the project and with a general shared vision of continuity and co-responsibility between agents in the development of RRI in the region.

"I believe that this project, obviously from my personal point of view, is already a very important project, but it needs continuity, and I believe that it needs the support of all the innovation actors who have participated in the different pilot actions and workshops. I think that on many occasions I believe that there must be co-responsibility between all the innovation agents."

The interviews were organised as online session and were recorded and transcribed by using speech recognition programs. The research team conducted a semi-structured interview with key external stakeholders. In total, 3 interviews were conducted with interviewees. All interviewees were somehow involved with TetRRIS project or its pilot actions in Tampere region.

OVERALL RESULTS AND IMPACT OF TetRRIS IN THE REGION
TetRRIS has been one of the largest RRI-related projects in the region. The discussion about responsible innovation and research has remained alive thanks to the project. RRI expertise is very personified in the Council of Tampere region.

Inclusivity is no new concept to the region. Broader societal trends and development have made it more common to consider equality, diversity and other issues. The RRI-themed projects have taken place at the same time as changes have taken place in society. *The level of expertise has risen thanks to these projects. TetRRIS, has been meaningful in terms of learning.*

The 'We make transition!' project continues the path of RRI projects in the Council. This project is the most relevant spin-off from TetRRIS and provides an interface to other municipalities and regional associations, and through the municipalities to citizens. The aim is to develop new opportunities for municipalities to increase inclusiveness. Karlsruhe co-operation took place in the end of the project (development of the manufacturing industry). It was relatively difficult to reflect with all the partners because they are different than the Council as a municipal operator.

The project succeeded to support integration of the sustainability theme and thinking into the ongoing regional strategy work, which was coordinated by the Pirkanmaa Regional Council. The biggest project impact was probably the **'normalisation' of sustainability and responsibility terminology and language in regional development**.
"Sustainability and responsibility issues have become commonplace; they have become the 'new black'".

In this sense, the project was well-timed and successful in popularising the RRI perspective in the region. As such, the RRI terminology is difficult to read/understand especially for people without prior knowledge, even though the topic is ultimately about simple things.

The approach adopted was characterized by **inclusiveness and participation** - actively engaging in all activities and events that were even slightly related to the theme and reaching out to different types of target groups.

However, it is unclear to what extent RRI themes are still present in the regional Council and how committed the organisation is to sustainability because of the recent changes in the leadership of the organisation. *From this point of view, the project had an unlucky timing*.

Measuring the impact of a project that seeks to promote RRI is a challenge in general, as it is in essence about lobbying for a new ideology and change in attitude. How can the impact of such a change be measured? A project may e.g., generate a new idea that only becomes reality years later while the original source is no longer recognizable. The impact of an individual project is influenced by several factors independent of the project, such as the degree of acceptance by the management of the organisation involved and the degree of integration of the project into the organization's everyday activities.

Ideally, in terms of the impact and effectiveness of an EU project, the project would be integrated closely with the everyday activities of the participating organisation. In this way, the project can generate new ideas and pilots for operational development in the organisation. The question is whether there is an organisation that would really allow such a link between development projects and its core activities. *Often cases, there is a strong attachment to existing core activities, and projects are seen as external and artificially added-on element on top of the activities.*

POLICY IMPLICATIONS

Several activities of the TetRRIS project could well be continued in the future. For example, the RRI round-table concept could be expanded into a wider 'sustainability round-table' – even at national level. It would be useful to involve a cross-section of sustainability experts from both the public and private sectors. *However, the home base for the organisation and coordination of this type of activity should be rethought, as the regional Council is not the right body for such a role.*

The work of the project partners to create cooperation between the Tampere city region and Karlsruhe region in Germany is another example of a measure that would be of regional value if it were to continue after the project has ended. *Karlsruhe region has turned out to be a good counterpart and provides a European peer learning opportunity for Tampere region.* However, there are doubts about the prospects for cooperation in future, and whether the organisation/regional Council is committed to promoting and investing in cooperation in the future.

Achieving more sustainable, lasting policy effects requires that the organisations involved in the projects also commit internally to projects. The institutionalisation and embedding of new perspectives and approaches through projects requires that the measures and activities implemented are not only directed outside the organisation, but also include internal development of the participating organisation. Achieving more lasting policy impact through EU projects would require that the projects are genuinely those of the organization's management to ensure commitment and continuity; project processes take a long time from design and planning to implementation phase and the people involved are subject to frequent changes. To continue from policy implications, one of the side effects of strategy process in the Council was that it triggered a new engagement culture in the organization. Whether this practice has institutionalized, is yet to be seen. The organisational mindset changes related namely to recognizing value of creative industries, and changing an outlook from purely technological to socio-technical which has more human-centric approach. In the end, the

regional strategy included new aspects, and not only aspects of smart manufacturing which is a strong focus area of Tampere.

- Overall, engagement was a theme that recurred in other activities in the region and can be seen as strong points of social sustainability of TetRRIS. Given that engagement is demanding.

Regional program: Both interviewees participated in the process and aimed to bring RRI perspectives to it. The new program wanted to take sustainability issues into account better, but with the project, the perspectives of the participants and themes related to social sustainability were considered more widely in the process. *The impact of the project was not huge, but it was still possible to get different perspectives thanks to the project*; *RRI brings out the diversity of perspectives.*

In the process of the program, inclusiveness is one of the most essential principles, and it is also the easiest to update; it has been considered whether there are enough different perspectives in the process and whether this should be developed. Civil society and companies were groups that the Council wanted to include in the process. The interface with civil society is not clear in such processes but is now more at the center thanks to these projects.

Digi compass: Alongside the TetRRIS project, the "Science meets regions" project was prepared. Also, thanks to TetRRIs, a lot of emphasis was placed on inclusion and other themes. In the roadmaps that are now being developed/implemented, inclusion, gender equality, etc. have been taken into account rigorously. Without the project, inclusion and diversity would not have been achieved in the digital compass project.

Regarding both processes: Support has been received from TetRRIS to take e.g. gender equality better into account. *We have learned from TetRRIs about European groups, and the need and foundations of taking these things into account. These have strengthened discussions in the Council of Tampere region.*

The key areas of smart specialization have sustainability included in them: responsibly renewing industry, sustainable societies, etc. Sustainability has become more pervasive in the provincial program as well. Sustainability is therefore more visible, but it is difficult to assess what is the merit of the project and what is general development.

One of the greatest achievements of TetRRIS is initiating a common learning process, which aims to develop shared understanding. To reach shared understanding, in turn, demands trust and courage, which can only be facilitated in a process of forward and backward loops. TetRRIS has allowed to progress on this journey, with several forward steps, but it is difficult to maintain that good direction.

ENVIRONMENTAL EFFECTS

Issues of environmental sustainability and the green transition are emphasized in the Council. The Council has a separate sustainable development group that institutionalizes development, and a climate team that develops and promotes Council's own climate work. *The RRI projects have awakened us to think about e.g. ethics as a value that should be taken into account. This was brought also into artificial intelligence projects in the Council.*

FINANCIAL EFFECTS

Inclusiveness is important in terms of labor shortage: the fact that people are involved in society and feel included supports active working life. Some citizen groups are separated from the transition, e.g., in relation to climate change. *Citizens should be made a part of science, so that they can understand it, form their own perspective, and take a stand. But whether these processes improve, e.g., the quality of innovations and going to market, cannot be said. It can be an advantage for companies that they know how to deal with such issues.*

The KITE project related to responsible AI: Some technologies enable/require closeness to the citizen interface to develop consumer-friendly innovations. KITE is the only project where a discussion was held in this regard.

The Council does not provide services to companies. From the perspective of inclusivity, more emphasis is placed on the direction of civil society. Companies were involved in Digi compass. It is necessary to think carefully about which themes to seek companies' perspectives on.

SOCIAL EFFECTS

Social perspectives have been brought into all dimensions of the digital compass: *securing citizens' digital skills, accessible and user-friendly services, comprehensive broadband and infra inclusiveness so that everyone could use society's services, reducing the number of digital-passive companies.*

3. Karlsruhe

The interviews were organised as online session and were recorded and transcribed by using speech recognition programs. The research team conducted a semi-structured interview with key external stakeholders. In total, 2 interviews were conducted with interviewees. All interviewees were somehow involved with TetRRIS project or its pilot actions in Karlsruhe region.

Several aspects of RRI became important. Firstly, a deeper understanding (in TRK and in the region) and making individual RRI aspects visible in the region. That this has been systematically taken up. Simplifying the more complex understanding of RRI.

Secondly, a crucial impact of TetRRIS was the networking of actors. Who are the relevant actors? Which experiences are already available? Who needs support in this regard? It was good that the abstract concept was operationalized, and then very concrete instruments and procedures were shown what is available. That was the core of the pilot actions.
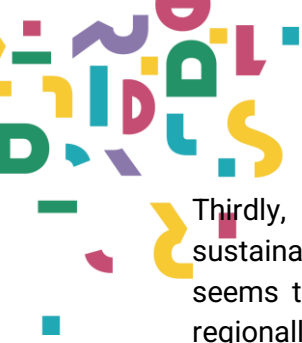
Thirdly, for us as TRK, it was crucial that the individual aspects of RRI (participation, sustainability, etc.) were discussed more broadly. There was an "aha effect", although it seems trivial. For example, we understood that sustainability cannot only be considered regionally and should also be thought of globally. There are other aspects that are important in participation: Focus not only on disruptive technologies that must be accepted, but also other technologies where participation is essential, such as medical research.

Fourthly, there was a side effect in that the exchange with other regions, especially Tampere, was strengthened. For example, at the High-Level Forum in Finland last year. This networking has continued and will now perhaps also be useful in INTERREG-Europe projects.

TetRRIS introduced us to the scientific discourse on RRI. With the TetRRIS project, it was possible to make this manageable for the actors on the ground. We were able to offer a platform.

International exchange at project level. Through TetRRIS, the possibility to organise workshops. It is the case that through TetRRIS we have the RRI aspects more in mind when planning new projects (national, regional, international) and we include them. The same applies to the individual regional strategies. In other words, issues around participation and other aspects will be included to a greater extent. The effect is an increased awareness of the issues. Now, ex-post, we see that there were implicit RRI issues in the existing regional strategy. In the future, therefore, the aim is to address and name RRI in concrete terms. They were all there so far but hidden and under different names. They have now been given a place on the agenda.

We have integrated TetRRIS findings into RIS3 criteria. Difficult for ongoing things overall, but for future developments it will certainly be relevant. Communication and participation were strengthened. We are grateful that we were and are part of the network. Starting with the first meeting. Many people involved in communication and participation came together there. Central questions: What do we mean by this, what are tools, what are best practices? That's why we wanted to participate. The high level of practical relevance and mutual empowerment was also exemplary. The fact that we examined together what we mean by communication and participation. How can it be applied and implemented well? Where are the difficulties?

So, three benefits in total:

1: Awareness. Especially among those who have not yet made much use of participation issues.

2: Networks. You are not alone, there are people doing similar things. You have to involve the general population. Also, against the backdrop of the grand societal challenges.

3: Toolbox. Things that (don't) work. Sometimes it's just nuances, what works for whom?

It is extremely important for the region and the local actors that this is sustained. Especially the diversity of people. In the best case, informal and formal networks that support each other. It would be nice if it were to become permanent.

Ideas of permanence:

There is an association in the federal state (Alliance for Participation). A local group in Karlsruhe could be founded there. There might be interest: Okay, add a second branch to the topic of political participation: technological development. That would be a docking point. TRK is not able to do this in its current structure, nor are scientific institutions. If more organisations would become members, that could be positive. The difficulty about networks is that they need promoters and someone to take over the organisation. Hence the idea of docking it with an association.

An additional event after the project end is needed in a relaxed atmosphere, where all participants consider what would be possible for them and how they would imagine future activities. This must be discussed openly.

The interviews were organised as online session and were recorded and transcribed by using speech recognition programs. The research team conducted a semi-structured interview with key external stakeholders. In total, 4 interviews were conducted with interviewees. All interviewees were somehow involved with TetRRIS project or its pilot actions in Szeged-Timisoara region.

OVERALL TETRRIS RESULTS

Innovation strategies are rather centralized in Hungary, leaving little room for the Regional Innovation Agency. TetRRIS, in general, helped to initiate discussions about RRI which made people think of impact of what they do and provide reflection in different fields, although it remains a quite unknown concept.

So, the number one problem is mainly that we are having a very strong centralization and whatever regional actors decide or started build up a strategy together can just be erased totally or steer it to two very different directions.

RRI concept is mostly unknown and raising awareness of this responsible innovation concept, in general, is missing.

There are many initiatives in the area trying to engage with the local innovation ecosystem stakeholders. Thus it can catalyze the entrepreneurial mindset of the researchers and the students. *There are also many programs that could connect the dots between the different ecosystem players, by engaging through **co-creation**. The university tries to be really the **catalyst of the ecosystem**, for example, we even have established so called **territorial innovation platform**, which is a single contact point for example, companies, stakeholders, locals, and they can request anything they would like to do with their university via it. Although it is a moderate innovation ecosystem, it needs a focus on changing the mindset of the many traditional not so innovative companies in the region.*

SOCIAL IMPACTS

There are several actions in order to help to mitigate social exclusion, since processes try to be fully transparent and inclusive.

There are some initiatives such as the University of Szeged which has a **gender equality plan.** There are also small initiatives, such as events dedicated to women entrepreneurship. However, it is not built in a strategical manner yet.

These challenge-based approaches try to invite the target groups e.g., students into the co-creation processes. For *example, producing ketchup not only working with the company members and the students and the researchers, but also housewives. And this way, we really tried to connect the target group with the development group, and of course, the companies*. Thus, in the end, it can be economically beneficial for the locals as well, because they can truly, in an informal way, express their desires, their product ideas, their problems with the existing ideas, etc. The stakeholders can further develop their product, build their brands in an **open innovation process**.

What is connected to RRI is mainly focused on the resource issue and some ethical technological issues like **acceptance of new technologies or controversial technologies like self-driving cars or artificial intelligence**. *University actors and civil society actors implement projects or certain initiatives together and reflect on these together such as working with the Roma people or like access of disabled people to financial services.*

As for concrete solutions for mitigating social exclusion they focus on actions that help them to raise funding. *It's more of a question because since these are small scale, mainly bottom-up initiatives, sometimes these problems are a vague view beyond the scope of individual projects. So, without better working institutions, without government intervention, or at least the political will, this scale of the change that can be generated remains moderate in these fields.*

The whole society can benefit from the application of responsible innovation concept, because for example, businesses can be more successful if they try to apply these concepts. And on the long term, the whole region can benefit from this because the regional competitiveness can be higher, if we use these responsible innovation concepts, and several studies also highlight this fact.

ENVIRONMENTAL IMPACTS

Demola projects related to environmental challenges and their impact usually come after the end of these co-creation processes. It is important that they are not just interpreting or analysing something, but that by the end they have something tangible to show to the company and to the stakeholders.

During the urban hackathons, the participants had the chance to talk about environmental topics as well as talent magnet aspects i.e., how the city can be more attractive for young talents. This was the main topic, but environmental aspects could be also integrated into the solutions. *If the city is not walkable, or it is really focused on car mobility, this has serious effects on the environment. It can happen that because of that, the air quality is not good and certain talents decide that they would not like to live in a city where the air quality is bad in general, and they don't feel very comfortable.*

POLICY IMPACTS

Regarding policymaking, it is quite hard to involve those stakeholders that are related to policies in Hungary. There was a governmental led programme, it was the Hungarian startup University programme. Following a co-creation methodology and mentoring the teams, they opened a little bit, and there are some changes in their way of working, *for example, we have a governmental that project still ongoing, it's called the somehow the **catalyst of being the innovation ecosystem**. These are usually **top-down initiatives**, telling what they believe that universities should do. And after being provided with kinds of new initiatives there is often change in their mindset. *So maybe it's **not a direct impact, but an indirect** impact that they are realising that as they are **getting more familiar with these co creation and innovation initiatives, they really try to co create and invite us in the policymaking.***

No concrete actions were taken mainly because they don't understand that the long-term benefits are the most crucial ones, not the short term.

During the local talent clubs and the urban hackathons, communities of local towns were gathered several times during project implementation. Through constant dialogues with them the aim was to get to know their needs and requirements regarding their hometown, their city, and to achieve that they are more attached to the place where they are from so that we can avoid **brain drain**. And during these activities, a certain part of the public was involved.

Regarding urban hackathons, they were given the opportunity to think about certain issues and problems that their hometown faces. They tried to come up with ideas and solutions, thinking about different aspects, various thematic areas, such as environment or social inclusion, mobility, or talent magnet, or talent, attraction, and retention itself. And these events were also attended by public and private sector, to the members of public and private sector, so for example, local professionals from different stakeholders.

These events were quite successful, and quite popular. So, there was a high number of attendance and partners managed to successfully involve the local talents and local stakeholders. Regarding the effects of the events every city has different circumstances and different results.

ECONOMIC IMPACTS

Maybe the economic implications and impacts could come up during this urban hackathon events and these kinds of competitions because **talent attraction and retention** *have economic aspects and one cannot talk about one without mentioning the other*. Regarding the talent attraction, we want to boost the economy of the city itself with employing more talented people and involving them into the economic scene of the hometown of their home cities. And, therefore, if dealing with talent management successfully, it will have an impact on the economy, too. For example, talking about the prices of the housing or the salaries, if they are competitive enough or not, in these small and middle-sized cities of the Danube region, young may prefer these to move to, to start working or start families.

VI. Conclusion & Lessons learned.

Throughout the pilot activities of the project, regions were able to redefine their roadmaps, their self-assessment scores, and the SDGs they prioritize regarding RRI.

No matter what the level of RRI implementation is for each region, several common themes were identified and are summarized below.

Raising awareness of RRI concept

RRI concept is vague and relatively unknown in all regions. Awareness raising is necessary for enhancing motivation and understanding. Thus, stakeholders and policymakers can better understand what RRI means, why it is relevant and how it can be of benefit.

"RRI concept is mostly unknown and raising awareness of this responsible innovation concept, in general, is missing. Mainly, if we take into consideration Szeged or Hungary, usually, we cannot find any clue that in this region, this concept is used, or they have any intention to apply it in practice. And the main reason behind it is that the whole concept is unknown for most of the policymakers. And another problem is that mainly in Hungary, and in the post socialist countries and regions, the so-called post socialist attitudes can be experienced, where the trust level is low and the level of willingness to cooperate is also low."

Guidelines for RRI implementation

In order to improve the levels of RRI awareness and implementation in the studied regions, it was generally mentioned that some form of regulations or guidelines could be beneficial. This would make RRI thinking a rule for researchers and stakeholders.

"And in many cases, we must use informal channels to get to policymakers, for example, or innovation actors to involve them. But we try to do our best to, to have policymakers to get familiar with this whole concept."

Moreover, it is worth noticing that during the process of TetRRIs, inclusiveness is the most essential aspect, and also the easiest to achieve; it has been considered whether there are enough different perspectives in the process and whether this should be developed. In particular, civil society and companies were groups that the regions wanted to include in the process. The interface with civil society is not clear in such processes but is now more in the center thanks to these projects.

RRI dimensions can become complex for people included, thus it is of primordial importance to not *overwhelm people with these sorts of agendas but make them understand that it won't be loss of time or resources if they try to* incorporate RRI logic into existing tools and practices.

"In the process of the program, inclusiveness is one of the most essential things, and it is also the easiest to update; it has been considered whether there are enough different perspectives in the process and whether this should be developed. In particular, civil society and companies were groups that the Council wanted to include in the process. The interface with civil society is not clear in such processes but is now more in the centre thanks to these projects".

Also, it is crucial to five some forms of motivation for using RRI principles. This may come from the perceived benefits:

"One of the main internal benefits of the project was its integration to regional strategy process, and how the strategy processes were opened to include different stakeholder groups than in previous rounds and sustainability and responsibility aspects of RDI were integrated in the strategy. "

Building networks

The impact of expanding networks of communication, co-creation and exchange in order to implement RRI effectively was also mentioned by most of the interviewees.

*"This co-creation methodology, especially the how we are mentoring the teams, they opened a little bit, and we can see some changes in their way of working, for example, we have a governmental that project still ongoing, it's called the somehow the **catalyst of being the innovation ecosystem**. And before we notice that they are usually very **top-down initiatives,** they are telling us what they believe that universities should do."*

"You are not alone, there are people doing similar things. You have to involve the general population. Also, against the backdrop of the grand societal challenges."

The main lessons learned throughout the project revolve around raising awareness of RRI concept and enhancing cooperation and co-creation between the different studied regions. The four regions cooperated and formed the "responsibility accelerator" function which has already been tested as experimental service by VTT in 2022 and therefore the regions can further implement to their needs. The TetRRIS Lab organised by Cantabria in Santander has also been a good example for the regions by raising awareness in a good number of interested stakeholders. Thus, it brought knowledge and practical examples to the regional stakeholders and therefore it can be considered a practical outcome of the knowledge transfer activities by a transnational cooperation project.

Moreover, it became clear that there are broad ranging ethical challenges as well as the practical challenges for RRI implementation that arise from working in highly competitive innovation fields. Apart from the fact that RRI is a broad and often unknown concept, it is also challenging to persuade stakeholders that it is required especially when time and money need to be invested in achieving their goal to conduct innovations activities in a responsible manner. The primary challenges to implementation of RRI focussed upon costs and the time that would be involved in engaging in RRI activity. RRI activity might slow the innovation and development process which can be less appealing in short-term activities. However, RRI implementation can improve the overall regions' profile, thus resulting in long-term increased profits.

Finally, inclusion of RRI in the regions' activities is beneficial for the whole society, increases sustainability, addresses societal challenges, and generally is 'doing good for humanity'.

The main needs for better RRI implementation and the potential drivers are summarised in Table 15.

Table 10 Lessons learned.

Current needs for incorporation of RRI	Potential drivers
Acting responsibly requires time and money as it needs more bureaucracy and stakeholders are not always willing to invest time and money. Resources are needed. Networks, experience, awareness etc Co-creation of a similar way of responsible thinking (sharing similar ethical/moral values). Better and more consistent policies and regulations for promoting responsible way of thinking.	Money: Long term commercial gain Providing a competitive edge/advantage Greater good for society and future generations Brain gain