



JRC SCIENCE FOR POLICY REPORT

# Enhancing the sustainability dimension in Smart Specialisation strategies: a framework for reflection

*Step-by-step reflection framework and lessons from policy practice to align Smart Specialisation with Sustainable Development Goals*



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# Enhancing the sustainability dimension in Smart Specialisation strategies: a framework for reflection

*Step-by-step reflection framework and lessons from policy practice to align Smart Specialisation with Sustainable Development Goals*

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## ABSTRACT

This report introduces a tested reflection framework directed at policy practitioners and experts working in regions and countries willing to strengthen the sustainability dimension of their Smart Specialisation strategies. The framework features reflection questions based on extensive theoretical research and tested in practice. The questions are illustrated with examples of current practices and practical insights from policy makers about each step of the Smart Specialisation process. The framework was co-developed in close collaboration with more than 30 policy practitioners from 12 regions and countries in Europe and beyond. It was designed to spark inspiration and offer concrete examples on how to mobilise research and innovation for addressing the SDGs in diverse territorial contexts, including places facing significant institutional and structural challenges. The framework is underpinned by an inclusive approach to thinking about innovation and innovation policy considering these fundamental for fostering sustainability transition in all territories.

## CONTRIBUTIONS AND ACKNOWLEDGEMENTS

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## EXECUTIVE SUMMARY

### A REFLECTION FRAMEWORK FOR ALIGNING S3 WITH THE SDGs

This report introduces a tested reflection framework that aims to provide guidance for enhancing the sustainability outcomes of Smart Specialisation strategies. To make the framework accessible and useful for policy makers in all interested regions and countries, the JRC consulted and tested the framework on the ground. The report is the result of a collaborative co-creation process that engaged more than 30 regional and national Smart Specialisation policy makers and experts from 12 regions and countries in Europe and beyond. Consultations and numerous exchanges with policy practitioners helped to significantly rework the framework and illustrate it with many practical insights into how sustainability challenges and the Sustainable Development Goals (SDGs) can be integrated into steps of the Smart Specialisation process in practice in different territories.

The framework is a formative tool created to help policymakers, practitioners and analysts localise and integrate sustainability challenges and goals into Smart Specialisation Strategies at regional and national levels. It is designed to guide a process of critical reflection on how to mobilise research and innovation to address the SDGs and sustainability challenges in diverse territorial contexts, including in places facing significant institutional and structural challenges. The framework is underpinned by an inclusive approach to thinking about sustainable innovation and innovation policy considering them fundamental for fostering sustainability transition in all territories.

The report discusses the main implications and challenges of integrating sustainability challenges and the SDGs for each step of S3. To guide the reflection process, the framework proposes questions for all steps of the S3 process (see *Figure 1*). Links to existing tools and methods relevant for aligning S3 with the SDGs are provided for further reading.

The reflection framework is one of the tools featured in the Partnerships for Regional Innovation (PRI) - a new approach to place-based innovation policy, which builds on the experience of Smart Specialisation strategies<sup>1</sup>. The framework is included in the “PRI Playbook”<sup>2</sup> developed by the JRC with the support of a Scientific Committee of recognised experts.

### KEY EMPIRICAL FINDINGS

The empirical research conducted to inform the report allows the formulation of several overall findings and policy messages. First, the overall sustainability orientation is now broadly accepted and considered relevant for Smart Specialisation across diverse territories. This is partly because of the overall strategic direction given by policy (e.g. the European Green Deal in the EU) but also because of a growing understanding of the necessity and urgency to act to address sustainability challenges at national, regional and local levels.

Second, the SDGs and the 2030 Agenda are considered important strategic references for providing broad directionality and context for societal challenge-led Smart Specialisation processes. However, the main challenge for policy makers is to translate and localise sustainability challenges and goals into regional and local realities. The policy practitioners we spoke to share their insights on how to translate and situate the SDGs in the different stages of Smart Specialisation processes, in particular EDP and implementation.

Third, policy makers welcomed the idea of a reflection framework focused on strengthening the sustainability dimension in Smart Specialisation strategies. However, they were unanimous in their plea to translate it into a language understandable by policymakers and to make it as practical as possible. The new concepts and vocabulary focusing on sustainability transitions risk creating an unintended communication gap between theory and practice. In our attempt to address this con-

1 See <https://s3platform.jrc.ec.europa.eu/pri>

2 See <https://s3platform.jrc.ec.europa.eu/pri-playbook>

cern, we tried to simplify the language and, most importantly, invited consulted regions and countries to express the challenges they face in their own words. This is why most of the examples were prepared by or consulted with S3 practitioners.

### LESSONS AND SUGGESTIONS ON HOW TO EMBED SUSTAINABILITY IN S3

The co-creation sessions and consultations with policy practitioners allowed us to learn about existing practices and discuss possible ways to align S3 with sustainability challenges and the SDGs. The following are lessons and suggestions drawn up for the original six S3 steps (Foray et al., 2012).

#### Diagnosis

- Localise SDGs in specific national, regional and local contexts based on a comprehensive analysis of the current and potential future impacts and risks of environmental and societal challenges for the economy, society and natural environment. Voluntary Local Reviews provide a useful and proven approach to localising SDGs.
- Analyse the STI potential of actors, institutions and infrastructure to adapt and innovate to tackle societal challenges and contribute to the SDGs. The analysis should have a balanced focus on the demand and supply-side of the innovation system. The pilot JRC methodology<sup>3</sup> can be used for this exercise.
- Make diagnosis robust by applying mixed-method research designs balancing quantitative and qualitative tools, including new methods and data relevant for the sustainability challenges. Alongside scientific evidence, it should use local knowledge and expertise considering diverse stakeholder perspectives on the challenges.

#### Governance

- Broaden participation in S3 governance and processes to engage new actors, including civil

society. Broader inclusion is challenging but it is key for ensuring shared ownership and the legitimacy of the process and helps to prevent the risk of capture. Engaging new actors may help translate SDGs into specific local (or trans-local) measures and missions.

- Strengthen institutional capacity and build new public sector organisational capabilities to ensure societal challenge-led collaborative governance arrangements in S3.
- Reconsider the role of intermediaries in engaging difficult-to-reach stakeholder groups and previously-excluded communities and territories.

#### Vision

- Develop a shared territorial vision based on the systemic reflection on the opportunities, risks and uncertainties of sustainability transitions.
- Focus the vision and scenarios, deliberating alternative pathways to achieve sustainability goals, on the role of research and innovation in fostering the achievement of the SDGs and addressing sustainability challenges.
- Deliberate alternative transition pathways considering the role of a variety of innovation approaches for tackling sustainability challenges. The reflection should discuss uncertainties and risks and reflect on the social and environmental impacts of different pathways.
- Consider developing scenarios and transition pathways for each specialisation (priority domain) of the region. This may create a more active engagement of stakeholders in the process and becomes part of a societal challenge-led EDP.

#### Priorities and EDP

- When selecting S3 priorities consider the potential of place-based research and innovation systems for responding to the localised sustainability challenges.
- S3 priorities should mobilise research and innovation actors to respond to sustainability challenges.
- Ensure a dynamic balance between top-down identification of priorities with bottom-up

<sup>3</sup> See <https://publications.jrc.ec.europa.eu/repository/handle/JRC126846>

entrepreneurial discovery. The bottom-up processes of discovery and social learning are essential for situating broad sustainability goals, including the SDGs, in the territorial context.

- Consider adopting a societal challenge-led or mission-oriented approach to EDP to align it with the directionality towards sustainability challenges and harness a variety of bottom-up ideas for transformative innovations and experimentation.
- Place a stronger emphasis on ensuring the inclusiveness and continuity of EDP. EDP can become a transformational process supporting social learning including diverse actors, such as NGOs, civil society, public sector and research organisations.

### **Action plan and policy mix**

- Use action plan to provide mechanisms for implementation and arrangements ensuring coherence and directionality of policy mix towards sustainability goals.
- Open policy mix of S3 to new instruments supporting different types of innovation and collaboration with other policy domains relevant to sustainability challenges.
- Apply demand-side instruments to create demand for sustainable innovation and shape niche markets to foster and enable transformative innovation (e.g. innovation procurement).
- Support experimentation and demonstration fostering innovation aligned with the selected transition pathways. Include learning from experimentation and acceptance of risk linked to experimentation in the design of instruments.
- Be flexible to allow adjustment of the action plan based on monitoring and evaluation and on the EDP.

### **Monitoring and evaluation**

- Extend monitoring and evaluation system to include new indicators and evidence to analyse outcomes and impacts of S3 on sustainability challenges and the SDGs.

- Place stronger emphasis on formative evaluation focused on policy learning.
- Develop dedicated approaches to monitoring and learning from experimentation projects.
- Experiment with and introduce new methods for helping to navigate complexity and analyse systemic change, including understanding place-based interlinkages between sustainability goals.
- Build evaluation and policy learning capacities and establish learning mechanisms (e.g. community of practice) and knowledge management tools supporting the on-going EDP.

### **POLICY RECOMMENDATIONS**

Implementing lessons learned requires changes in the wider policy framework. There is a need to develop a policy environment that enables and incentivises regions and countries to experiment with innovative designs of policy portfolios and programmes and to invest in transformative projects. In the context of S3, one such approach could be encouraging place-based missions selected and co-designed during the EDP. Place-based missions could be a constructive way to foster bottom-up experimentation in EU research and innovation policy.

Policy evaluation and monitoring systems, from the local to EU level, must ensure that lessons learned from policy experiments are taken into account in policy design and implementation across governance levels. This means investing in specific programmes supporting the development of new governance methods (including public sector innovation), and forming new partnerships where needed.

The reflection framework should be seen above all as an invitation to all the regions and countries to reflect on their current Smart Specialisation practices and consider how to step up their efforts to foster sustainability in their Smart Specialisation strategies. The framework is an initial step and needs to be accompanied by practical application and further testing in diverse territorial contexts.

# Introduction

In December 2021, the JRC published a paper discussing the theoretical and conceptual implications of embedding sustainability challenges and the Sustainable Development Goals (SDGs) in the Smart Specialisation approach. Based on a comprehensive review of academic research, the authors proposed conceptual characteristics for Smart Specialisation for the SDGs and put forward a tentative set of questions for a reflection and self-assessment framework for regions and countries wishing to strengthen the sustainability dimension in their Smart Specialisation strategies (Miedzinski et al. 2021).

JRC committed to testing the framework on the ground with Smart Specialisation practitioners. This report is an outcome of the empirical test conducted in close collaboration with regional and national Smart Specialisation practitioners in Europe and beyond. The report introduces a revised framework illustrated with recommendations and practical examples on how to address sustainability challenges and the SDGs in Smart Specialisation strategies. The publication is intended mainly for regional and national policymakers engaged in designing and implementing Smart Specialisation strategies but it will be also of interest to researchers and consultants active in the field.

Preparing the report was an intellectual journey to regions and countries of diverse economic, social and cultural contexts. One common message emphasised during all the co-creation sessions was that while a conceptual and reflection framework is welcome, it should not be too prescriptive and needs to remain open to all local and regional realities and capacities. Practitioners were weary of “checklist” approaches. They preferred an open framework allowing them to reflect on sustainability challenges and obtain inspiration on how to mobilise research and innovation to address the SDGs in diverse contexts, including places facing

institutional and structural challenges. The framework is designed with this consideration in mind. It proposes an inclusive approach to thinking about innovation and innovation policy considering them fundamental for fostering sustainability transition in all territories.

The reflection framework is featured in the Partnerships for Regional Innovation (PRI) Playbook<sup>4</sup> as one of the tools regions and countries can use to design and implement their innovation strategies and policies with a focus on sustainability challenges and the SDGs. We warmly invite all interested policy practitioners to test and further improve the framework in their work.

*Chapter 1* and the *Annex* explain our overall approach and methodology to develop this framework. *Chapter 2* recaps the conceptual and methodological implications of embedding the SDGs in the Smart Specialisation approach. *Chapter 3* introduces the reflection framework and self-assessment tool on how to embed the SDGs in all the stages of Smart Specialisation design, implementation, monitoring and evaluation, following the original six steps proposed in the S3 Guidebook<sup>5</sup>. These are illustrated with practical examples provided by countries and regions consulted in the process of developing the reflection framework. *Chapter 4* summarises challenges encountered by regions and countries when integrating sustainability-related aspects in the Smart Specialisation and offers the main policy messages while discussing new knowledge and capacity needs.

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<sup>4</sup> See <https://publications.jrc.ec.europa.eu/repository/handle/JRC129327>

<sup>5</sup> See <https://s3platform.jrc.ec.europa.eu/en/w/guide-on-research-and-innovation-strategies-for-smart-specialisation-ris3-guide->

# How we developed this framework

# 1.

The main foundations of the reflection framework are theoretical and empirical. The report builds on the earlier work on theoretical basis and a series of inspiring co-creation sessions with regional and national authorities responsible for Smart Specialisation conducted between December 2021 and June 2022.

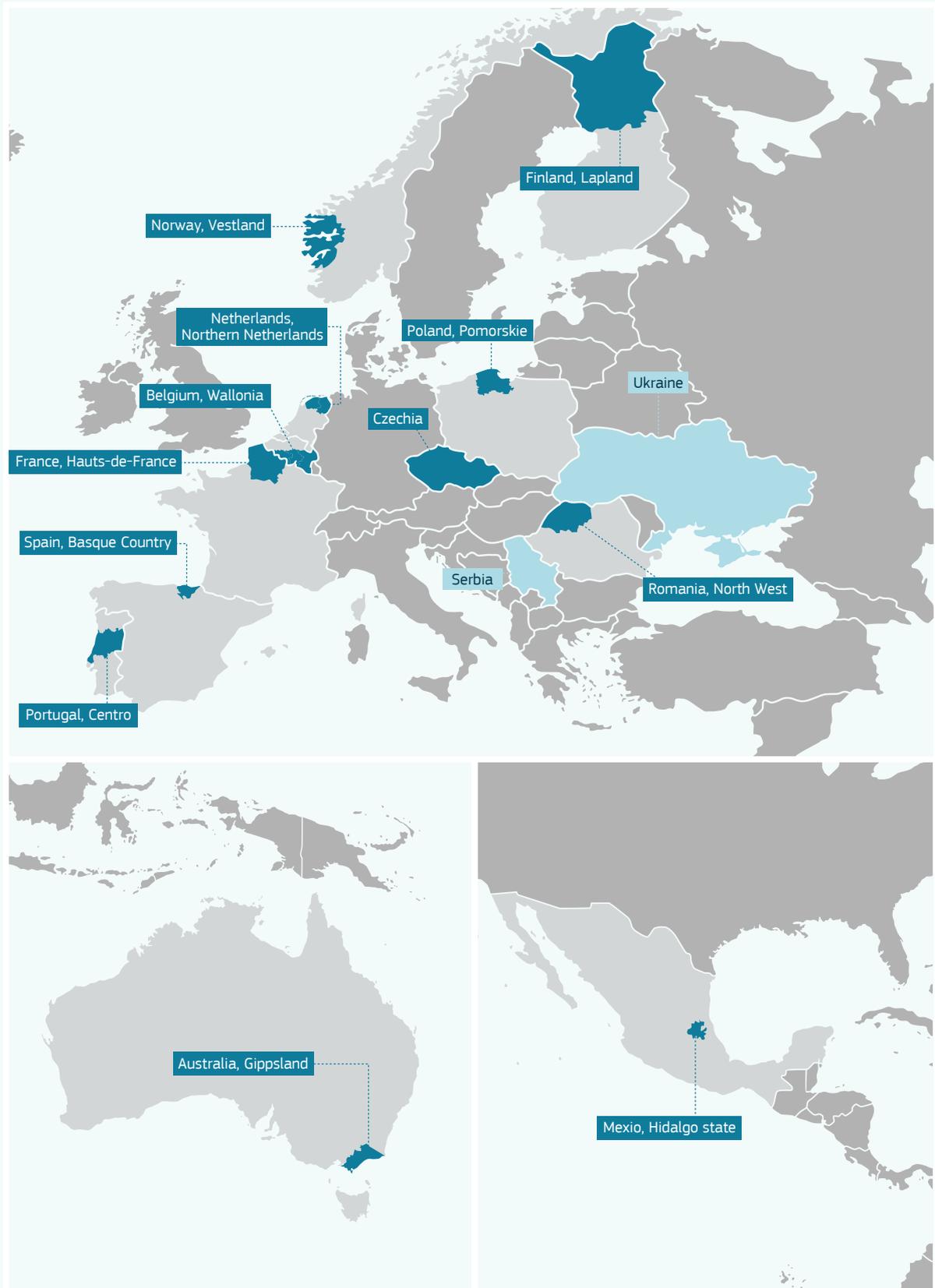
In the process of preparing this publication, we organised co-creation sessions with 12 regions and countries from the EU and beyond, during which we spoke to more than 30 policy makers and practitioners working on Smart Specialisation. The sample was selected to provide an analytical representation of the diverse socio-economic and policy contexts in which Smart Specialisation practitioners in Europe and beyond work. Some examples from earlier JRC work on Smart Specialisation as a methodology for Science, Technology and Innovation for Sustainable Development Goals Roadmaps were used as examples in the report.

The sessions with policy makers provided an opportunity for discussing the specific context of countries and regions. First, they helped us to get a better understanding of the practical experiences of regions in preparing Smart Specialisation strategies. Second, they allowed the identification of specific practices and lessons learned on how to strengthen the sustainability dimension of this approach.

Finally, the sessions provided an opportunity for interviewees to provide concrete feedback on the relative strengths and weaknesses of the emerging conceptual and reflection framework. We used them to gather suggestions on how to revise the reflection framework by comparing it with practical policy-making experiences and perspectives from various policy and governance contexts. The detailed methodology is summarised in the [Annex](#).

**FIGURE 1**

*Regions and countries involved in co-creation sessions*



Country Regions and countries involved in the co-creation sessions

Country Countries supported by JRC in the Global Pilot Programme on STI for SDGs roadmaps

# Embedding sustainability challenges and the SDGs in S3: theoretical and policy background

## 2.

### 2.1. Innovation and place are essential for delivering the SDGs

#### *Key principles of the 2030 Agenda for Sustainable Development and the SDGs*

In 2015, United Nations Member States adopted the 2030 Agenda for Sustainable Development and 17 Sustainable Development Goals (SDGs). The vision of the 2030 Agenda is “supremely ambitious and transformational” as it aims to “transform our world for the better by 2030”.<sup>6</sup>

The SDGs are a comprehensive set of high-level objectives balancing the three dimensions of sustainable development: economic, social and environmental. The SDGs are universal, indivisible and interlinked. They are universal as they are global and universally applicable, but they consider different national realities, capacities and levels of development and respect national policies and priorities.

#### *Science, technology and innovation are key to achieving the SDGs*

The Member States of the United Nations (includ-

ing all EU Member States) recognise the essential role of science, technology and innovation (STI) for delivering the SDGs in the Addis Ababa Action Agenda.<sup>7</sup> Achieving the SDGs will require a variety of innovations with the potential to transform systems of production and consumption (TWI2050, 2020). The challenge for developed and developing countries alike is to create and deploy knowledge and innovation with a transformative impact across the society and economy. This transformation requires radical changes in all areas of economic and social activity. New technologies, as well as social, institutional and policy innovations are needed to deliver on the ambition of the SDGs.

#### *Localising the SDGs is essential for global transformation*

Achieving the SDGs will require effort across all levels of governance (Nakicenovic et al, 2021). Regions, cities, and municipalities play an essential role in translating SDGs to local contexts. For instance, UN SDSN estimated that 65% of the SDG targets require the involvement of local and urban actors (SDSN, 2016). Smart Specialisation strate-

6 See <https://sdgs.un.org/2030agenda>

7 See <https://www.un.org/esa/ffd/publications/aaaa-outcome.html>

FIGURE 2

Sustainable Development Goals



Source: United Nations <https://sdgs.un.org/goals>

gies can play a central role in mobilising regional STI ecosystems to foster the transformation towards the SDGs and in developing synergies with other relevant policies.

Sustainable development is enshrined in the Treaty on European Union and adopted as a priority for both internal and external policies. SDGs form a part of the European Commission's political priorities and are being integrated into all proposals, policies and strategies, with the aim of achieving tangible progress.<sup>8</sup>

The EU has committed to the global Agenda 2030 with its Sustainable Development Goals, making the European Green Deal the main channel for delivering on this ambition. The global health, security and energy crises created a challenge of recovery and strengthening resilience, but also offered an opportunity to reconfigure our current unsustainable systems of production and consumption and to not only 'build back better' but also build back differently. The key EU policies, such as Recovery and Resilience Facility, Cohesion policy, and also their external dimension – Development Cooper-

ation and foreign policy are vehicles providing instruments and funding for change.

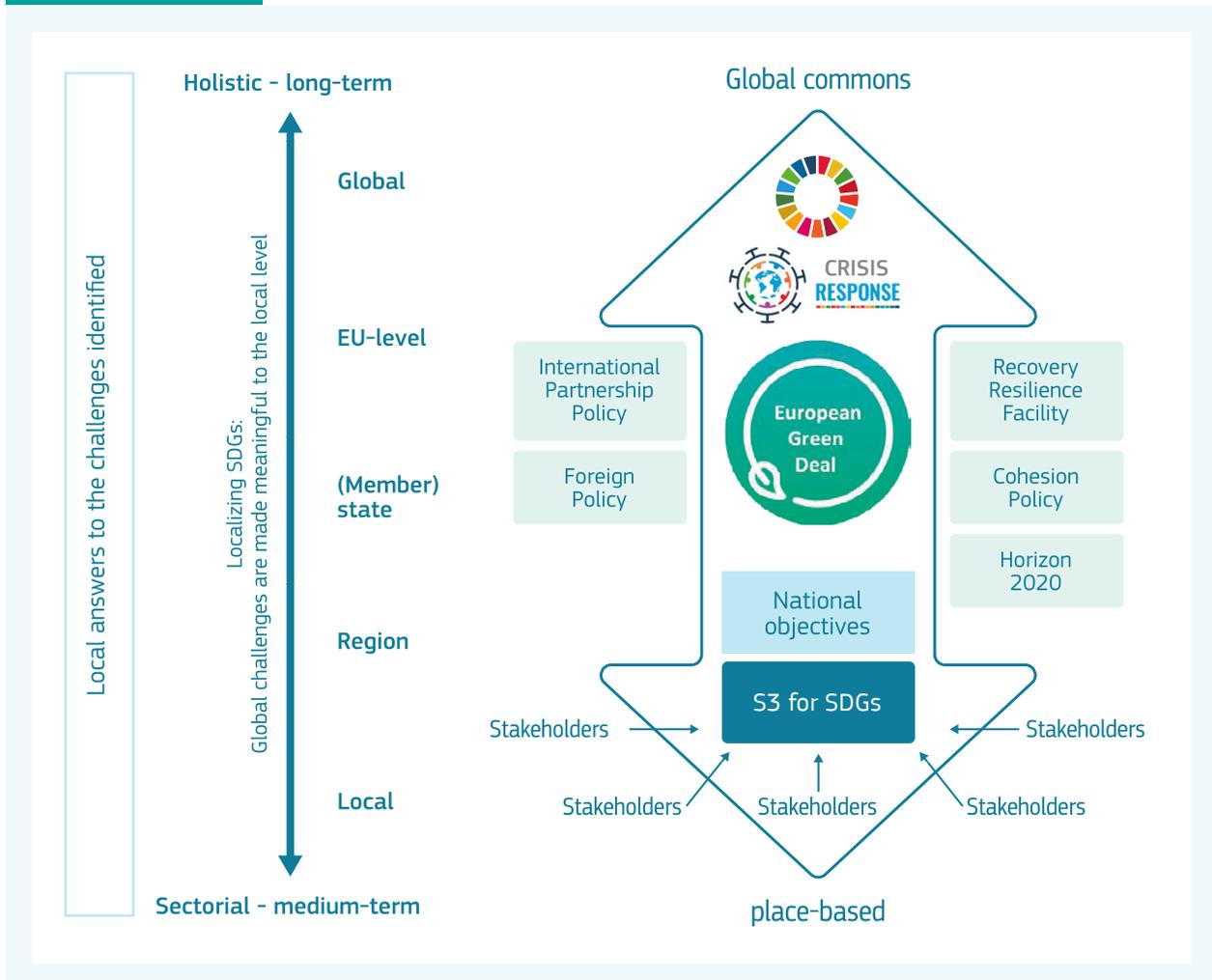
The actual deployment of these policy instruments happens in specific territorial contexts, and it is at local, regional and national level that priorities and corresponding innovative solutions need to be identified. The localisation (regionalisation, nationalisation) of challenges is a necessary aspect of change, which makes it socially acceptable and meaningful to our diverse communities. We should strive to ensure that the large European and global transformations leave no one and no place behind.

SDG monitoring was one of the first practical measures that local and regional governments completed to start the process of localisation of the 2030 Agenda for Sustainable Development, and increase awareness among policy makers. Since 2017, frontrunner regions have been producing SDG Voluntary Local Reviews, applying indicators for SDGs adapted at subnational level.

<sup>8</sup> See [https://ec.europa.eu/info/strategy/international-strategies/sustainable-development-goals\\_en](https://ec.europa.eu/info/strategy/international-strategies/sustainable-development-goals_en)

FIGURE 3

Localising S3: a directional approach combining top-down directionality with bottom-up development



Source: Nakicenovic et al, 2021

In some countries, such as Spain<sup>9</sup> and France<sup>10</sup>, regional statistical offices have also tried to establish harmonised sets of indicators for regions to monitor progress towards SDG targets. Based on these experiences and on research activities involving urban indicators for the SDGs, in 2022-2023 the JRC will test a harmonised SDG indicator set for EU regions (NUTS3 level) in 10 regions. The availability of harmonised data at subnational

level could feed the Voluntary National Reviews for SDGs with relevant insights and provide comparable information on territorial inequalities and specific achievements.

## 2.2. How Smart Specialisation can help meet the ambition of the 2030 Agenda for sustainable development

### The origins of Smart Specialisation

Smart Specialisation is a place-based approach to innovation strategies that was conceptualised in the 2000s. Since then it has primarily found large-scale practical application in European regional pol-

9 See <https://www.juntadeandalucia.es/institutodeestadisticaycartografia/ods/index-en.htm> and <https://pegv.gva.es/es/ods>

10 See <https://www.insee.fr/fr/statistiques/5044468?sommaire=5053902#documentation> and <https://www.insee.fr/fr/statistiques/4629011>

FIGURE 4

European Commission priorities align with the SDGs



Source: [https://ec.europa.eu/info/strategy/international-strategies/sustainable-development-goals\\_en](https://ec.europa.eu/info/strategy/international-strategies/sustainable-development-goals_en)

icymaking. Over 180 regions in Europe and beyond have prepared Smart Specialisation strategies giving rise to the development of a global circuit of policy knowledge and practice. The original guide to Smart Specialisation strategies (Foray et al., 2012) proposed four principles to guide the design and process of Smart Specialisation strategies:

- *Choices and critical mass*: Smart Specialisation should be based on a limited number of

priorities selected based on own strengths and international specialisation, to avoid duplication and fragmentation in the European Research Area and help concentrate funding sources and ensure more effective budgetary management.

- *Competitive advantage*: Smart Specialisation should mobilise talent by matching research and innovation capacities and business needs through an entrepreneurial discovery process.

- *Connectivity and clusters:* Smart Specialisation should develop world-class clusters and provide arenas for related variety and cross-sector links internally in the region and externally to drive specialised technological diversification.
- *Collaborative leadership:* Smart Specialisation should support efficient innovation systems as a collective endeavour based on public-private partnerships (quadruple helix) and provide an experimental platform to give voice to unusual “suspects”.

### ***Reframing Smart Specialisation to address sustainability challenges and the SDGs***

Smart Specialisation strategies addressing the SDGs aim to mobilise research and innovation to respond to localised sustainability challenges. The initial development of Smart Specialisation was mainly focused on fostering industrial transformation and enhancing regional competitiveness. The new directionality towards sustainability raises the ambition for innovation to respond to societal challenges and foster systemic changes in key societal systems, such as energy, food, mobility or housing.

Embedding the SDGs into Smart Specialisation strategies requires an explicit focus on ‘transformative change’, as in the “third frame” of innovation policy (Schot and Steinmueller, 2018). Transformative innovation policy involves the explicit mobilisation of science, technology, and innovation to tackle societal challenges of sustainability. It places emphasis on prioritising environmental sustainability and social wellbeing, in addition to economic competitiveness, at a more fundamental level than previous framings of innovation, such as the linear science-push and innovation system approaches, which Schot and Steinmueller (2018) associate with first and second generations of innovation policy framings, respectively. Drawing on socio-technical transition theory, transformative change explicitly calls attention to two novel aspects: directionality of innovation, and transforming socio-technical systems, which radically change the provision of societal functions, such as food, energy, mobility or housing, making them sustainable and resilient.

Directionality emphasises that innovation and growth not only have a rate, but also a direction. This phrase is closely aligned with the concept of missions and mission-oriented innovation policy (Mazzucato, 2021). OECD (2021) defines missions as coordinated packages of policy and regulatory measures explicitly tailored to mobilise innovation to address well-defined objectives related to a societal challenge, in a defined timeframe. Addressing system innovation is vital for raising the ambition of innovation policy to reconfigure functional systems and to avoid unambitious incrementalism.

The smart specialisation approach, covering six stages of strategy development and implementation, offers a suitable framework for challenge-led innovation policy addressing sustainability goals. Moreover, it helps to adapt transformative innovation policies that address global societal challenges to local circumstances and conditions. The participative and inclusive nature of the process makes it also meaningful to local actors and communities, allowing them to translate the global problems to their specific context. This is an important adaptation in view of the complexity of many sustainability challenges and considering the multi-dimensional nature of the SDGs.

### ***Challenges in aligning S3 with the SDGs: Main findings from previous JRC work<sup>11</sup>***

Many regions and countries in the EU and beyond have designed Smart Specialisations strategies to address sustainability challenges<sup>12</sup>. In a recent survey, JRC identified 36 such strategies that focused on Sustainable Development Goals or sustainability aspects. The connection was, however, declarative rather than introduced by design. In some cases, these priorities were

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11 This section builds on the previous JRC report on S3 for SDGs (Miedzinski et al 2021).

12 Some examples are offered at following links:  
<https://s3platform.jrc.ec.europa.eu/national-inspirations>  
<https://s3platform.jrc.ec.europa.eu/regional-inspirations>  
<https://s3platform.jrc.ec.europa.eu/urban-inspirations>  
<https://s3platform.jrc.ec.europa.eu/international-partnerships>

**BOX 1*****Uptake of transformative innovation in EU research and policy***

The framing and conceptual approaches underpinning innovation and innovation policy have changed following the adoption of the United Nations 2030 Agenda for Sustainable Development.

Innovation policy has traditionally focussed on addressing the market and systemic failures of innovation systems irrespective of any normative concerns about the directionality of innovation. This aspiration for purposive and directional innovation that is currently missing in mainstream innovation policy represents a 'normative' turn towards transformative innovation policy (Diercks et al. 2019). To this end, new forms of challenge-led innovation policies, promoting directionality, experimentation, and systemic transformation, are proposed to transition key societal systems around energy, mobility and food toward more sustainable modes of production and consumption (Schot and Steinmueller 2018).

The European Green Deal presented by the European Commission in December 2019 sets out an ambitious roadmap to transform the European Union into a climate-neutral, circular economy by 2050. The long-term policy framework reflects an awareness of the limitations of established governance approaches and the scale and character of sustainability challenges facing Europe. At EU level, mission-oriented innovation policies, a specific approach to challenge-led innovation, propose targeted, measurable, and time-bound missions that set a clear direction for research and innovation in the new Horizon Europe programme and consolidate the two main pillars of the European Green Deal around climate action and digitalisation (Mazzucato 2018). The promise of missions is that bottom-up experimentation involving a broader and more diverse set of stakeholders leads to more effective solutions that can be scaled up, thereby contributing to meeting the long-term targets of the European Green Deal. Five mission areas frame part of the €90 billion Horizon Europe programme for 2021-2027. These include conquering cancer, resilience and preparedness for climate change, healthy oceans and waters, climate-neutral cities, and soil health and food.

Mission-oriented innovation policy is also receiving growing attention at national and regional levels, with policymakers formulating and implementing missions as part of their R&D policies and strategies (e.g. Grillitsch et al., 2019, OECD 2021). Accordingly, demonstration and experimentation with missions have started at national and regional levels, drawing on the logic that real-life experiments can stimulate deeper societal embedding of technology and foster alternative transition pathways. Nevertheless, there is a need for better understanding of how missions as coordinating devices can ensure mutually reinforcing dynamics across different levels of governance (Coenen and Morgan 2020). A central question in this regard is how and why experiments are performing differently in different spatial settings and what are the governance dynamics related to the development and upscaling of niche innovations into mainstream regime practices (e.g. Coenen et al. 2010).

successfully translated into projects and investments focused on innovation for sustainability. Two examples from Poland and Abruzzo (Figure 5) show two individual innovation for sustainability project examples (out of many) financed under Smart Specialisation Strategies, which amount to almost 10 million euro. Nevertheless, in order to scale up these applications policy makers face political, conceptual, and implementation challenges to align S3 with the SDGs (Miedzinski et al., 2021).

### POLITICAL CHALLENGES

The SDGs are normative goals rooted in a larger vision of future development. They require a strong political commitment and leadership across governance levels to mobilise collective action. To become an effective vehicle for place-based innovation for the SDGs, Smart Specialisation needs strong political backing. In this context, SDGs are part of the EGD and the EU made a clear commitment to achieving them. SDGs are also used as a strategic reference outside the EU (e.g. Gippsland region in Australia<sup>13</sup>, Serbia<sup>14</sup>, Ukraine<sup>15</sup>).

EU Member States and an increasing number of regional and local authorities are committing to Agenda 2030 and mainstreaming SDGs throughout all their policies. Some of the many examples include Italy at national level with interesting new experiments on SDG budgeting tools (Nakicenovic et al., 2021:23) or at the regional and local level in Aragon<sup>16</sup> in Spain or the city of Espoo<sup>17</sup> in Finland. These commitments give a strong policy mandate

to also include a sustainability dimension in the Smart Specialisation strategies. The challenge is the policy coherence and coordination, as the SDG and Smart Specialisation agendas are often managed by different ministries or departments in the government.

### CONCEPTUAL CHALLENGES

It is important to emphasise that Smart Specialisation is not a finished concept but subject to continuous debate, criticism and evaluation, both in academic and policy circles. Adding a sustainability aspect to the Smart Specialisation concept has considerable implications for substantive and procedural elements of the approach. A fundamental challenge is responding to the transformative ambition of the Agenda 2030 and the SDGs.

The limited transformative potential of S3 was one of the strongest criticisms of S3 (Marques & Morgan, 2018; Hassink and Gong, 2019; Benner, 2020). Another major criticism concerns a dominant focus on innovation based on science and technology, at the expense of other types of innovation. Social innovation and grassroots innovation, often driven by social entrepreneurs, not-for-profit organisations or even the public sector itself, have critical, transformative parts to play as well. Examples from sharing mobility, community energy initiatives and green finance illustrate this. The concept of responsible innovation asks for greater attention to the inclusion of the people in the innovation process as a source of creativity and to achieve social acceptance for novelty and transformation (Fitjar et al., 2019).

### IMPLEMENTATION CHALLENGES

The implementation of Smart Specialisation across a great variety of different territories has provided helpful reflections on and improvements of the approach from practice, shaping its further evolution. Implementation challenges were especially felt in structurally weaker regions with limited competences and institutional capacities to design and implement effective innovation strategies and policies (Morgan, 2018; Marques & Morgan, 2018;

13 See <https://s3platform.jrc.ec.europa.eu/s3-for-sdgs-in-australia>

14 See <https://s3platform.jrc.ec.europa.eu/pilot-methodology> and <https://sdgs.un.org/documents/policy-brief-7-enhancing-sustainable-development-component-action-plan-sti-sdgs-roadmap>

15 See <https://sdgs.un.org/documents/policy-brief-6-localised-science-technology-and-innovation-sti-sdgs-roadmap-ukraine-46769>

16 See [https://s3platform.jrc.ec.europa.eu/en/w/the-aragon-government-meets-the-jrc-on-its-progress-regarding-the-agenda-2030-and-smart-specialisation?p\\_l\\_back\\_url=%2Fsearch%3Fq%3DAragon](https://s3platform.jrc.ec.europa.eu/en/w/the-aragon-government-meets-the-jrc-on-its-progress-regarding-the-agenda-2030-and-smart-specialisation?p_l_back_url=%2Fsearch%3Fq%3DAragon)

17 See <https://s3platform.jrc.ec.europa.eu/s3-for-sdgs-in-the-six-cities-strategy-projects>

Hassink and Gong, 2019; Benner, 2020). Weaker regions lack the capacity and competences to design and implement comprehensive and coherent policy mixes supporting transformation processes. This challenge becomes even stronger with the need of new, sustainability-oriented approaches.

### ***Rethinking design principles of S3 to address the SDGs***

To become purposeful for sustainability challenges, the S3 framework and methodology need to be revisited and extended if S3 is to facilitate reflexive, responsible innovation and systemic change in line with the transformative ambition of the 2030 Agenda. To recognise these challenges, JRC proposed a theoretical framework (Miedzinski et al, 2021) based on four overarching characteristics:

- *Shared direction towards the SDGs:* Smart Specialisation could be guided by the SDGs as an all-embracing direction of transformative change; SDGs could become a reference for localising the global challenges and identifying and selecting key priorities at different territorial levels; the role of the S3 process is to localise the SDGs and mobilise science, technology and broadly understood innovation to address these challenges in specific territorial contexts.
- *Whole-system transformation towards sustainability:* S3 design calls for the creation of synergies and coherence with other policies, both horizontally and vertically in order to drive structural and systemic change. This focus could be further extended to reflect and foster wider social-technical system transitions needed to tackle sustainability challenges; the Smart Specialisation process helps to clearly identify specific areas and niches where the community of stakeholders can meaningfully act and achieve change while contributing to wider systemic transformations.
- *Responsibility and reflexivity:* S3 could explicitly integrate moral and ethical considerations and discussions needed to navigate difficult transition choices, which balance creating and capturing value for the region with contributing to tackling global environmental and social

challenges. Policy learning capacity is needed to identify and foster synergies and to openly discuss trade-offs and limitations. This is key for harnessing the potential of Smart Specialisation to work towards 'just transitions' that leave no one behind and create shared value for future generations.

These characteristics have implications for the original concept and methodology of S3 ([Table 1](#)). In most cases, they can be usefully aligned. For example, the process of entrepreneurial discovery and experimentations can be highly valuable for co-designing innovation activities fostering niches where transformative innovations are co-created and tested. But they may have more significant implications for the notion of competitive advantage that should not be based on economic factors alone. The quality of life, environmental factors and wellbeing are increasingly seen as elements of territorial attractiveness and require a rethinking of policy goals and objectives. SDGs as a framework imply a deeper reflection on the motivations and rules guiding territorial competitiveness and comparative advantage.

It is crucial that the reflection and design of S3 explicitly considers the challenges of the growing innovation divide within and across territories. The divide may grow even larger in the future because of the lack of capabilities to address sustainability challenges in territories with lower institutional capacity. The revised Smart Specialisation approach - adaptable to different contexts and open to different types of innovation to drive change - may be an important policy instrument for tackling this challenge and helping leave no place behind.

FIGURE 5 Examples of Smart Specialisation strategies addressing the SDGs



**TABLE 1** Implications of integrating the SDGs for the four principles of S3

S3 PRINCIPLES	SHARED DIRECTION TOWARDS THE SDGs	WHOLE-SYSTEM TRANSFORMATION	RESPONSIBILITY AND REFLEXIVITY
<b>CHOICES AND CRITICAL MASS</b>	<p>The choice of S3 priority areas to consider societal challenges identified through the localisation of SDGs.</p> <p>The priorities to build and harness the ‘critical mass’ of the regional research and innovation potential and inter-regional and international partnerships to address the sustainability challenges resulting from the SDGs.</p>	<p>Focus on a broad suite of innovations with the potential to foster systemic transformation of the region towards more sustainable modes of production and consumption.</p> <p>‘Critical mass’ needs to be conceptualised in the context of building innovation potential to foster transitions of key regional systems (e.g. energy, mobility, food). Depending on the challenge, ‘critical mass’ for transition may imply scaling existing solutions or developing a variety of experimental projects.</p> <p>The choice of strategic challenges will become the new prioritisation process, and action plans for specific priorities should focus closely on specific challenges and the best ways to address them.</p>	<p>The choices of priority areas and transition pathways to be underpinned by an assessment of their economic, social and environmental impacts and value created within and beyond the region.</p> <p>Reflection on how to ensure that transitions away from established unsustainable systems and practices do not lead to lasting exclusion and marginalisation (‘just transitions’).</p>
<b>COMPETITIVE ADVANTAGE</b>	<p>Need to redefine competitiveness: Ensuring the development of a sustainable competitive economic advantage does not come at external costs - or does not create future pressures - for society and the environment within and beyond the region, in Europe and globally.</p> <p>Stronger focus on creating local and regional value and on collaboration, including experimentation projects, with other regions facing similar societal challenges.</p>	<p>Focus on creating value for local communities and economies by transforming local societies and economies.</p> <p>The transformation should contribute to social-ecological resilience locally and globally.</p>	<p>Reflection on the potential implications of strategic choices driven by building competitive advantage of the region for social groups and the natural environment in regions potentially adversely affected by these decisions (e.g. choice of suppliers or buyers).</p>
<b>CONNECTIVITY AND CLUSTERS</b>	<p>Providing incentives for partnerships, clusters and networks to develop a shared vision and alignment toward the SDGs. This alignment should create synergies and define single territorial contributions to the wider transformation agenda.</p>	<p>Developing and supporting challenge-oriented or mission-oriented partnerships, clusters and networks engaged in emerging niches or promising demonstrations of transformative innovation addressing sustainability goals.</p>	<p>Ensuring the new challenge-oriented or mission-oriented cross-sectoral partnerships, clusters and networks include relevant stakeholders and are not captured by incumbents.</p>
<b>COLLABORATIVE LEADERSHIP</b>	<p>Ensuring that leaders of the process subscribe to and embrace the sustainability aspect and the SDGs.</p>	<p>Experimenting with new forms of collaborative leadership and forms of governance suitable for orchestrating long-lasting multi-actor and multi-level processes of change.</p>	<p>Ensuring that decisions are taken on priorities and transition pathways, and that the forms of leadership and governance of transitions have a broad social mandate.</p>

Source: Miedzinski et al (2021)

# Reflection framework and policy practices for embedding the SDGs in the S3 process

# 3.

## 3.1. Getting started

### *What to expect from the framework?*

A reflection framework has been designed to assist policymakers and practitioners reflecting on how to better integrate socio-economic and environmental sustainability challenges and goals in Smart Specialisation Strategies at regional and national levels. The framework is not prescriptive about how it should be implemented. It can be used by individual policy makers and practitioners, and it can guide team efforts engaging cross-departmental task forces or even multi-stakeholder teams.

The framework follows the S3 steps as laid out in Foray et al. (2012):

- Diagnosis: Analysing the innovation potential
- Governance: Setting out the RIS3 process and governance
- Vision: Developing a shared vision and scenarios
- Priorities: Identifying the priorities

- Action plan: Defining an action plan with a coherent policy mix
- Policy learning: Monitoring and evaluation.

The framework discusses the main implications and challenges of integrating sustainability challenges and the SDGs for each step of S3. Based on theoretical research and feedback from regional and national authorities, we share lessons learned, examples of existing practices, practical tips, and relevant information sources that can be used at different stages of the S3 design, implementation, monitoring and evaluation. To guide the reflection process, we put forward questions for self-assessment for each step of the process.

### *Preparing the reflection and self-assessment exercise*

We recommend several activities before embarking on the step-by-step process.

First, as the framework is designed to foster reflection and policy learning we recommend forming a team to exchange various experiences and views. The team will benefit from diverse voices from across departments or ministries and, when-

ever feasible, may be extended to invite external stakeholders. Engaging current and former colleagues and experts with longstanding experience and institutional memory of the process will enrich the process.

Second, we suggest developing a shared understanding of the expected outcomes of the reflection process. This may range from an informal reflection on the current situation to a more formal process and commitment to revising or designing policy processes. Regardless of the format, we suggest ensuring that the debate allows open discussion and expression of criticism.

Third, we recommend developing a good understanding of how sustainability challenges and goals have been framed and embedded in the current and former Smart Specialisation strategies and wider regional and national innovation policies and strategies.

Last but not least, it is important to familiarise all those involved in the reflection process with the key elements and features of Agenda 2030 for Sustainable Development and the SDGs.

#### *Selected preparatory reading and learning resources*

#### **Agenda 2030 for Sustainable Development and the SDGs**

- United Nations: Transforming our World: The 2030 Agenda for Sustainable Development: <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>
- SDG Toolkit: this is tool developed for NGOs but it will be useful for any organisation interested in SDGs: <https://sdgtoolkit.org/>
- JRC KnowSDGs platform for mainstreaming SDGs throughout European, national and local policies: <https://knowsdgs.jrc.ec.europa.eu/>

#### **Science, Technology and Innovation for the SDGs**

- TWI2050 - The World in 2050 (2020). Innovations for Sustainability. Pathways to an efficient and post-pandemic future. Report prepared

by The World in 2050 initiative. International Institute for Applied Systems Analysis, (IIASA). [www.twi2050.org](http://www.twi2050.org)

- UN-IATT - Guidebook for the Preparation of Science, Technology and Innovation (STI) for SDGs Roadmap: <https://sdgs.un.org/documents/guidebook-preparation-sti-sdgs-roadmaps-33019>

- JRC Background paper for UN-IATT: Overview of the existing STI for SDGs roadmapping methodologies, including Smart Specialisation: <https://publications.jrc.ec.europa.eu/>

#### **Localising the SDGs**

- JRC: Localising the SDGs: <https://urban.jrc.ec.europa.eu/sdgs/en>

- OECD toolkit for a territorial approach to the SDGs: <https://www.oecd.org/publications/oecd-toolkit-for-a-territorial-approach-to-the-sdgs-2913bae2-en.htm>

#### **S3 for the SDGs**

- The JRC's S3 platform: the S3 platform highlights emerging examples of regions and countries that use their S3 to contribute to the SDGs: <https://s3platform.jrc.ec.europa.eu/sustainable-development-goals>.

- JRC: Smart Specialisation for SDGs publications on theoretical background, policy framework and pilot analytical methodology:

- <https://publications.jrc.ec.europa.eu/repository/handle/JRC126448>
- <https://publications.jrc.ec.europa.eu/repository/handle/JRC126651>
- <https://publications.jrc.ec.europa.eu/repository/handle/JRC126846>

## 3.2. Diagnosis: Analysing innovation potential to tackle sustainability challenges

### Questions to guide reflection and self-assessment

- Does the diagnosis include evidence on current and potential future impacts and risks for your region or country associated with global environmental and societal challenges for the economy, society and natural environment?
- Does the analysis of the existing specialisations and competitive assets of your region or country include evidence and reflection on the strengths and weakness of actors, institutions and infrastructures to adapt and innovate to address sustainability challenges and the SDGs?
- How are various types of scientific evidence, qualitative and quantitative research methods and sources of expertise on sustainability challenges and opportunities collected and interpreted to support the design and implementation of Smart Specialisation?
- Does the diagnosis consider diverse perspectives on the societal challenges, including from previously not involved or marginalised groups?

### 3.2.1. Key challenges and implications for diagnosis

To make sure a research and innovation strategy is place-based, Smart Specialisation suggests a comprehensive and sound analysis of the regional economy and innovation eco-system as a point of departure. This analysis is aimed at identifying existing regional strengths and leverage points for regional innovation capacity but also potential weaknesses that need to be addressed. Typically, such analysis draws on regional innovation system theory (Asheim et al., 2019) to identify and

benchmark: **1** regional assets, such as technological infrastructures, regional capabilities, clusters of industry, **2** linkages with the rest of the world and the position of the region within the European and global economy, and **3** dynamics of the entrepreneurial environment.

This approach is primarily geared to assess the problem-solving and value-creating capacity in and of the territory but has been criticised for providing inventory-like descriptions, focused on a static landscape of actors and institutions, rather than of functions, roles and relationships (Uyarra, 2010). To arrive at a more dynamic diagnosis, analyses of the regional innovation eco-system have been complemented by relatedness analyses that assess the ability of regions to grow new development paths (Boschma & Frenken, 2006).

The recent literature in evolutionary economic geography on regional diversification looks at the presence of locally related activities as enabling factors (Boschma et al., 2017). Relatedness analysis builds on the idea that existing local capabilities condition which new activities are more likely to develop in regions. Relatedness can be measured along different dimensions such as product relatedness, technological relatedness, skill relatedness, input-output relatedness. Unrelated diversification occurs when a region develops a new activity that requires very different capabilities than those existing locally and, hence, tends to be driven by actors who built up their capabilities elsewhere (migrants, multinationals) and, in some cases, who were supported by public policies.

Diversification and relatedness analyses allow a useful place-based but future-facing perspective to identify development potential in the region and are increasingly used by regions (e.g. Northern Netherlands) as an evidence base to inform their long-term development strategies, priorities and visions. Such analyses are predicated on availability of granular, reliable and high-quality data, in terms of patents, publications, industry structures and work force skills. Such data availability is not a given for all regions. Relatedness analyses have been traditionally used for the identification of

pathways towards increased economic complexity of regions, assuming that increased complexity leads to higher economic value and job creation. We witness, however, a shift towards other directionalities rather than increased competitiveness.

Many regions position their development pathways and diversification strategies in relation to sustainability problems and grand societal challenges. Here the SDGs make a readily available and proven guiding framework to identify societal challenges relevant for a particular economy (e.g. Czechia, Serbia, Ukraine). Given their broad and universal nature, they provide a global opportunity space that offers a menu of options for local innovation activities, projects and problem-solving.

Integrating the SDGs in Smart Specialisation significantly extends the scope of diagnosis in terms of evidence, research methods and experts. S3 diagnosis integrating SDGs needs to include new evidence and metrics on the environmental and social challenges experienced by a territory, which have not been routinely included in the S3. The challenge is not only the availability and quality of data but also to apply methodologies linking research and innovation activities with social and environmental benefits and negative impacts. These new dimensions require multi-disciplinary approaches and opening the process to experts and researchers working on the interface of research and innovation and sustainability.

Further granularity and specificity can be achieved by localising the SDGs and making them relevant for local communities and the public. In some instances, cities, regions and countries have started with the localisation of SDGs to create mini-missions for the smart specialisation strategy of their region while in other territories SDGs have been added onto the innovation domains that characterise the region. The latter open up possibilities for green growth, whereas the former also allow alternative development paradigms beyond economic growth, emphasising for example grassroots just transition (e.g. Haut-de-France).

Orientating S3 towards sustainability goals has significant implications and challenges for diagnosis:

- Need to identify current and potential future impacts and risks associated with environmental and societal challenges for the economy and infrastructure, local communities, and natural environment,
- The innovation potential and capabilities of territorial actors, institutions and infrastructure to adapt and innovate to address sustainability challenges and goals,
- Robust evidence base including scientific knowledge, diverse local expertise and stakeholder perspectives on the challenges and the SDGs, including views held by vulnerable groups.

### 3.2.2. Existing approaches and lessons from S3 practitioners

The status of SDGs as a new directionality for Smart Specialisation is still a developing approach. On the one hand, there is a widely shared ambition among regions to go beyond a competitiveness driven development paradigm. Economic growth for growth's sake is increasingly being questioned when it does not lead to improvement of well-being or it undermines environmental sustainability. Innovation activities, strategies and capabilities are, therefore, increasingly seen against their potential to respond to societal challenges. The turn to sustainability challenges can generate additional co-benefits as it increases inclusiveness in Smart Specialisation strategies: by focusing primarily on societal challenges, rather than technological or industry specialisation, no-one feels excluded in advance (e.g., Northern Netherlands). This in turn, increases the legitimacy of S3 among stakeholders in the region.

On the other hand, there is a risk of ex-post overlaying of SDGs on Smart Specialisation strategies. This often comes in the form of selectively cherry-picking some of the goals while disregarding the synergies and trade-offs between the range of different SDGs. This interpretation of the SDGs

does not sufficiently consider the wicked nature of the problems and challenges associated with sustainability challenges. Voluntary Local Reviews (VLRs)<sup>18</sup> have recently emerged as a powerful tool for localising the SDGs, helping cities and regions to make progress in their local priorities in a participatory, inclusive and transparent manner. Methodologies and data sources to inform VLRs are however still in an early stage of development.

Regions and countries directing their Smart Specialisation strategies towards sustainability face the challenge that the objective has evolved from a relatively delineated and well-understood focus on competitive advantage towards a more heterogeneous, normative and contested focus. Sustainable development, when it is operationalised through the SDGs, implies far more interpretative flexibility than competitiveness. This makes diagnosis in Smart Specialisation development more political and subjective. While quantitative indicators, such as those developed and used in VLRs and other pilot methodologies<sup>19</sup> and analysis of green relatedness are important means for providing a sound evidence base, practitioners have also highlighted the importance of qualitative data and 'soft' sense-making assessment to inform strategy development (e.g. Gippsland). Qualitative assessments, on the other hand, require careful selection of 'voices' that are heard and open up for bias towards vested interests due to power differences and path-dependency (see below on governance).

Experience of Vestland, Norway, for example, illustrate the additional value of a combined qualitative-quantitative approach in diagnosis but also point out that this process is time-consuming and labour-intensive. In the development of their Green Region Vestland strategy, a key objective has been to search and identify seeds to grow green innovation potential based on existing capabilities, assets and activities related to the incumbent oil and

gas industry, including its suppliers. The diagnosis led to a compelling map of industry hubs in the region that could be mobilised to transform the regional economy beyond-oil. Significantly, the diagnosis was more than a solid report constituting the evidence base for decision-making but took the form of a living document that is used, presented and discussed with stakeholders in the region through a pro-active outreach and engagement programme. As such, the rationale of the diagnosis was not a definitive assessment but rather geared to continuously solicit input and feedback from industry and other stakeholders in the region.

A major challenge for diagnosis is that of transparency. Considering the normative and contested nature of sustainability, inclusion of the diverse set of stakeholders is key for guaranteeing legitimacy. At the same time, the use of academic and expert knowledge is warranted to make sure that the diagnosis is based on best available evidence and "speaks truth to power". There are, however, potential dilemmas and trade-offs in combining the diverse inputs from different kinds of stakeholders in regions with specialised or limited expertise.

The issue of transparency also raises questions with regard to the ownership of the data and evidence base underpinning the diagnosis. Public availability of information and knowledge helps to facilitate an open and inclusive public debate. At the same time, free, publically available data may not be sufficient for a transparent and inclusive process. Communicating the findings of diagnosis requires professional communication strategies to facilitate active and informed engagement by stakeholders.

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18 See <https://unhabitat.org/topics/voluntary-local-reviews> and <https://publications.jrc.ec.europa.eu/repository/handle/JRC118682>

19 See <https://publications.jrc.ec.europa.eu/repository/handle/JRC126846>; <https://knowsdgs.jrc.ec.europa.eu/>

## BOX 2

***Developing evidence base for S3 in Gippsland, Australia***

The diagnosis activities in Gippsland, Australia, were characterised by a lack of quantitative data on innovation and industrial dynamics that are readily available in the EU through the Community Innovation Survey. Indicators of economic activity are, however, symptomatic of a region that has taken the route of ‘business as usual’ for many years. Gippsland, in common with many other regions in Australia, is struggling to identify new sources of competitive advantage and develop a robust S3. The predominance of small and non-employing businesses, generally low educational levels, and the relatively limited technological capabilities of many businesses hamper this process. Generally, connections with research are underdeveloped, despite a regional university and proximity to world-class campuses in Melbourne. There are, however, some well-developed clusters, particularly food and fibre and renewable energy, and an emergent start-up economy.

Diagnosis for the Gippsland smart specialisation strategy primarily drew on qualitative data based on interviews and focus groups with stakeholders across the quadruple helix. Over time, this has become synthesised into a narrative around sustainable regional development that has four primary themes or elements to it. One theme is around the provision of universal services for all the population in terms of health service, utilities, etc. The second theme focuses on transformative challenges such as climate, biodiversity, and natural environment or ecological dimensions in the SDGs. The third theme is around the area referred to as public-private cooperation. The fourth realm is around reconciliation and partnership.

This narrative implies however that bottlenecks and threats, arising from prevailing perspectives, polarisation, and incumbency, could bias the learning process. In these circumstances, targeted networking and stakeholder engagement have been crucial for going forward. Given that in-depth understanding of the local knowledge base facilitates identification of areas where variety, absorptive capacity and the possibility of new path development exist, collating a wide range of information to enrich the evidence base is crucial. This enables potentially vital connections and networks to be hypothesised and enhances the capacity to effectively shape deliberative processes.

For the Gippsland Smart Specialisation Strategy the lack of relevant, place-based data has been both a problem and a source of creativity and progress. It is a problem in the sense that the development of evidence-based policy has been hampered by a lack of data at regional level. This may not stand out immediately when looked at through an Australian lens, but it becomes very clear when seen through an international comparative lens. However, it has led to creative and progressive outcomes in the sense that over the life of the project, innovative approaches and frameworks to record evidence of progress had to be developed such as the Gippsland Business Innovation Survey (GBIS), modelled on the European Community Innovation Survey, and adapted to the Gippsland context.

*Source: Interview with representatives of the Gippsland region, Australia*

*More information:*

<https://sustainable.unimelb.edu.au/research/research-projects/gippsland-smart-specialisation-strategy>

BOX 3

### *Analysing the potential of innovation system to contribute to the SDGs in Serbia*

Serbia decided to align their Smart Specialisation Strategy to the SDGs during an already ongoing Entrepreneurial Discovery Process (EDP) and after an extensive, more traditional analytical exercise that identified the potential priority domains for Smart Specialisation based on the economic, scientific and innovation potential of Serbian regions (<https://publications.jrc.ec.europa.eu/repository/handle/JRC125978>). The new analysis aimed therefore to follow the Smart Specialisation methodology but to identify new types of challenges and priority domains mobilising innovation for sustainability. The new approach, developed in cooperation with JRC, included the following stages: **1** identification of key sustainability challenges based on localisation of SDGs; **2** validation of sustainability challenges with key stakeholders; **3** identification of existing science, technology and innovation (STI) potential to address the SDGs; **4** identification of knowledge gaps and existing national and international cooperation networks that can be mobilised to address the SDGs.

The identification of sustainability challenges was based on the analysis of the priority SDGs and their targets indicated in nationally adopted strategies and policy documents. It was matched with the statistical analysis of progress in all the SDGs and their targets compared to EU Member States, as Serbia is an EU candidate country and has European ambitions. These policy- and evidence-based SDG challenges were compared and validated with policy-makers and other stakeholders in a series of meetings and workshops. In particular, all the findings were discussed with existing EDP working groups in order to enrich the prioritisation process but also to start discussing potential innovative solutions to sustainability challenges.

Once the challenges were validated, an extensive analysis of STI potential for SDGs was performed, based on the keyword analysis of scientific publications, patents, Horizon 2020 projects and nationally funded research and innovation projects. A visual summary of such an analysis for SDG 7 can be found below.

The analysis of SDG-related challenges matched with existing STI potential and actors already working on addressing them, allowed the identification of existing knowledge gaps in addition to key national and international collaboration networks (see below) that can be mobilised to further work on innovation for sustainability. Finally, the results were compared to the Smart Specialisation priority domains identified earlier in the process. The following discussion in the EDP working groups allowed the design of an SDG-oriented action plan accompanying the Smart Specialisation Strategy, increase inter-ministerial cooperation and raise the awareness of sustainability issues among the S3 stakeholders.

*For full description of the methodology check: <https://publications.jrc.ec.europa.eu/repository/handle/JRC126846>.*

*The description of Serbia experience can be found here: <https://sdgs.un.org/documents/policy-brief-7-enhancing-sustainable-development-component-action-plan-sti-sdgs-roadmap>*

7 AFFORDABLE AND CLEAN ENERGY



## Goal 7. Affordable and Clean Energy

**MEDIUM**  
priority challenge

Analysis of Serbian SDG-related assessments and policy documents

9th

**MODERATELY**  
indicated goal

Analysis of Serbian SDG-related assessments and policy documents

8th

**MEDIUM-SIZED**  
gap with leading  
EU countries

### Goal 7 rank and share in the STI analysis

This table presents the rank of Goal 7-related STI activities in relation to the rest of the goals. For publications and H2020 projects, the share vs the EU-27 provides a notion of relative specialisation.

Publications (out of 16 goals)		Horizon 2020 (out of 14 goals)		Innovation Fund (out of 11 goals)		Patents (out of 10 goals)	
<b>2nd</b>	<b>2nd</b>	<b>2nd</b>	<b>1st</b>	<b>2nd</b>	<b>1st</b>		
3.2% Serbia	3.8% EU-27	13.3% Serbia	12.2% EU-27	9.3% Serbia	9.0% Serbia		

### Scientific impact of Goal 7-related publications

% of publications in TOP10% journals

**24.0 %**

Serbian average = 10.2%

Normalised citation impact (vs Serbian pubs.)

**1.4**

Serbia = 1

### Active organisations in Goal 7-related STI activities

This table presents the number of organisations engaged in Goal 7-related STI activities, providing a notion of critical mass and international linkages.

No. of organisations in publications		No. of organisations in Horizon 2020		No. of organisations in Innovation Fund		No. of organisations in patents	
<b>103</b>	<b>330</b>	<b>25</b>	<b>377</b>	<b>18</b>	<b>4</b>		
National	International	National	International	National	National		

### Relationship with other goals and Smart Specialisation

MOST CLOSELY RELATED GOALS



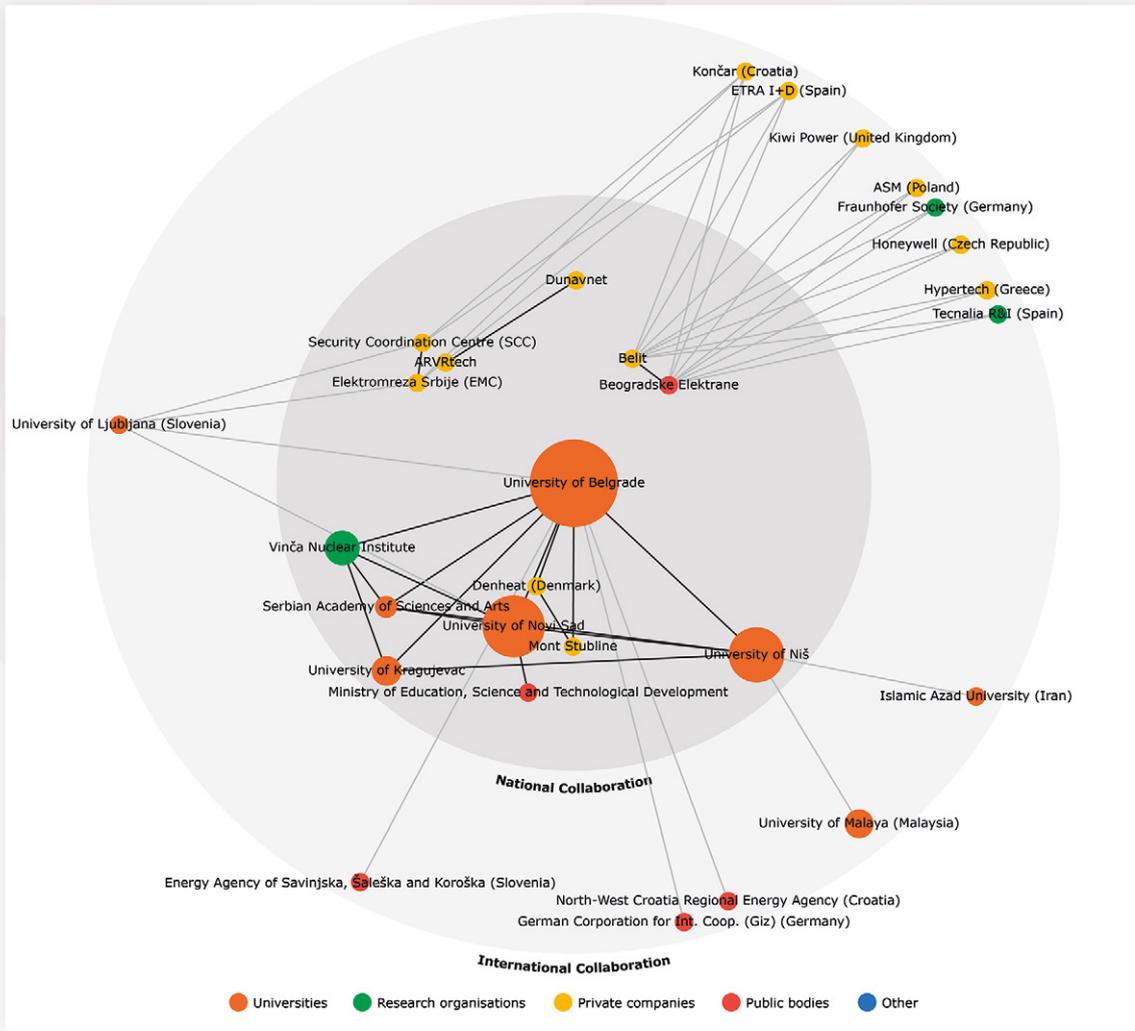
**14%**  
Similarity



**11%**  
Similarity

MOST CLOSELY RELATED SMART SPECIALISATION PRIORITY DOMAINS

**Energy Efficient and Eco-Smart Solutions**  
**Food for Future**  
**Key Enabling Technologies**



## BOX 4

***Combining transitions with relatedness analysis in Northern Netherlands, the Netherlands***

Parts of the evidence base for the Smart Specialisation strategy for the Northern Netherlands is based on an assessment of the region's diversification potential conducted by Associate Professor Pierre-Alexandra Balland and Prof. Ron Boschma from Utrecht University. The estimation of diversification opportunities has been established by calculating, for each technology and sector, to what extent they can build on existing relevant knowledge (i.e. related knowledge) in the region, and to what extent these activities are also complex. The estimation of promising activities has been carried out for technologies and sectors. Technologies have been analysed using patent data. This provided insight into the extent and nature of new technological knowledge development in a region, and where possible opportunities exist for developing new technological knowledge. In addition to patents, sectors were also analysed. After all, it is not certain whether new technological knowledge is also translated and converted into new companies and sectors. The advantage of sector analysis is that all sectors in an economy are included, while patents mainly occur in high-tech sectors, especially in industry and in some knowledge-intensive service activities.

Promising activities have been mapped out in two ways. Firstly, the Northern Netherlands Alliance itself has indicated that it is interested in estimating its own opportunities for six key technologies (green chemistry, water technology, hydrogen, big data, sensor technology and 'augmented reality/virtual reality') and two top sectors (agri-food and life sciences and health). Secondly, all possible technologies and all possible sectors have been examined across the board, and the extent to which the Northern Netherlands offers opportunities in certain technologies and sectors.

The analysis shows that there are opportunities for the Northern Netherlands in key technologies such as green chemistry, water technology and hydrogen. The Northern Netherlands scores relatively high on these three key technologies, because the region itself has relevant (related) knowledge and technologies on which these three key technologies could build. As far as technologies in general are concerned, the Northern Netherlands, for example, seems to have promising opportunities in medical technology. Medical technology is complex and still relatively underdeveloped in the Northern Netherlands, but the region has a number of related technologies. Another promising candidate appears to be food chemistry, a complex technology that has been on the rise in the Northern Netherlands over the past 10 years. On the other hand, very complex technologies such as digital communication, computer technology and telecommunications do not seem to have much chance. In addition, the analyses show that the Northern Netherlands also has development potential in some sub-sectors within the agro-food and life sciences/health top sectors. This is especially the case in complex activities such as pharmaceuticals and medical devices. By contrast, the most complex sub-sector - life sciences/health - is relatively under-represented, and the Northern Netherlands appears to have little chance of excelling in this area.

This identification of development potential based on quantitative analysis is an important first step to arrive at evidence-based choices in S3 policy in the Northern Netherlands. But it is only a first step. Ultimately, the final prioritisation will have to be established in the region itself, in consultation with local stakeholders (companies, the public, experts, academics, universities, administrators, politicians, interest groups, etc.), and not purely on the basis of quantitative analysis. This is also



the entire philosophy on which S3 policy is based: the final choices must ultimately be made via the entrepreneurial discovery process. Data analysis provides insights that can be fed into this entrepreneurial discovery process. It offers tools for making well-founded choices, and may also set limits. After all, S3 policy must be prevented from being aimed at activities about which a region does not have any relevant in-house knowledge. In other words, selection of promising activities should in the first place be made by local stakeholders themselves. This is an ongoing process that does not stop at writing a policy plan, but which must be constantly monitored, evaluated and adjusted where necessary, in consultation with local stakeholders. The local government will have to play an initiating and coordinating role in this regard.

*Source: Balland, P-A., Boschma, R. (2020) Ontwikkelingspotenties in Noord-Nederland. Rapport voor SNN Noord Nederland*

More information: <https://www.snn.nl/en/smart-specialisation>

### 3.2.3. Selected reading and learning resources

#### *Methodologies for grouping and analysing inter-linkages between SDGs*

- Joint Research Centre (JRC): KnowSDGs platform: <https://knowsdgs.jrc.ec.europa.eu/>
- United Nations Development Programme: rapid integrated assessments (RIA) for SDGs: <https://www.undp.org/publications/rapid-integrated-assessment>
- International Science Council (ISC): <https://council.science/publications/a-guide-to-sdg-interactions-from-science-to-implementation/>
- Institute for Global Environmental Strategies (IGES): <https://www.iges.or.jp/en/sdgs/index.html> and IGES visualisation tool: <https://sdginterlinkages.iges.jp/visualisationtool.html>
- The World in 2050 project (TWI2050) led by the International Institute for Applied Systems Analysis (IIASA): <http://www.iiasa.ac.at/web/home/research/twi/TWI2050.html>
- UNDP's SDG Accelerator and Bottleneck Assessment: <https://www.undp.org/publications/sdg-accelerator-and-bottleneck-assessment>

### 3.3. Governance: Setting out the process and governance of S3 to address the SDGs

#### Questions to guide reflection and self-assessment

- Do the design, implementation and monitoring of S3 ensure a broad, inclusive and continuous participation of stakeholders relevant to the sustainability transformation of your region or country?
- What are the specific arrangements for identifying and addressing the risk of capture of the process by dominant incumbents who impose their perspectives on sustainability transition or are less concerned with sustainability objectives?
- Are there governance mechanisms within and across public and private sectors that allow the identification and generation of inter-institutional synergies between policies, instruments and budgets?

#### 3.3.1. Key challenges and implications for S3 governance

Smart Specialisation leans explicitly on inclusive and participatory governance. This approach has a long tradition and goes back to good practice models associated with well-functioning innovation systems and innovation-led development (Cooke and Morgan, 1999). Hence, Smart Specialisation is associated with triple and quadruple helix frameworks (Carayannis et al., 2010) emphasising cross-sector and trans-institutional collaboration between private sector, public sector, academia and civil society. Research has found that despite its ambition and potential benefits several ‘heroic assumptions’ may exist about the applicability of these models in practice and that institutional capacity building remains an important but overlooked aspect in S3 (Marques and Morgan, 2018; Veldhuizen and Coenen, 2022).

Another characteristic feature in the governance of Smart Specialisation lies in its focus on failure to justify policy action. This has its origins in traditional rationale for innovation policy, either recognising and addressing market failure or, in later iterations, (innovation) system failures (Coenen et al., 2018). This focus requires active and regular coordination across stakeholders and well-developed capacities and resources to ensure robust policy intelligence to accurately diagnose the region and its innovation and development potential. Mazzucato (2018) has criticised this pre-occupation with failures for lack of ambition and vision to achieve development in line with the SDGs and for relegating too much responsibility to the market and private sector actors. In her view, mission and challenge-driven innovation policy pre-supposes an entrepreneurial state. How such an entrepreneurial state is organised in different territorial and institutional contexts and across tiers of government remains, however, less clear (Coenen and Morgan, 2020).

Finally, Smart Specialisation should be recognised for its experimentalist features and principles of subsidiarity (Morgan and Sabel, 2019; Wanzenböck and Frenken, 2020). Pragmatically Smart Specialisation for the SDGs requires a blend of top-down directionality and bottom-up deliberation (Nakicenovic et al., 2021). The top-down direction comes with a broader political strategy such as Agenda 2030 and is based on an international scientific consensus, but where bottom-up deliberation and experimentation are crucial to situate these priorities in a local context and build local commitment and shared ownership of strategies.

Following the notion of democratic experimentalism, the following principles could be considered for designing governance mechanisms and processes (Barca, 2009; Coenen and Morgan, 2020):

- a clear identification of objectives and standards, measured by validated indicators, which can be compared with what happens elsewhere and which are open to monitoring and public debate;
- a permanent mobilisation of all interested parties, stimulated by exogenous activities, by the injection of information on measures and results;

- an experimental approach through which local actors are given an opportunity to experiment with solutions while exercising mutual monitoring, and alternative measures are tried and compared through a systematic learning process, in which the results are used to design new activities.

Orienting Smart Specialisation towards sustainability implies that experimentation becomes a central aspect of S3 governance. Some may even argue that experimentation may require a reconfiguration of the EDP geared towards initiating, supporting and evaluating social, technological and institutional experiments to design, test and learn from innovation in real-time in order to respond to particular societal, economic and environmental issues. This also requires greater attention to the mechanisms by which experiments can lead to large scale and permanent change (Turnheim et al., 2018).

Orientating S3 towards the SDGs has major implications and challenges for governance:

- Many regions and countries require institutional capacity building to ensure inclusive and participatory governance across public, private and third sector, including specifically for the EDP;
- Exploring and experimenting with new roles and responsibilities for the state;
- Increasing inter-agency and inter-governmental cooperation,
- Reflecting and recalibrating principles of directionality and subsidiarity.

### 3.3.2. Existing approaches and lessons from S3 practitioners

A recurrent theme in many if not all territories has been how to include civil society in S3 governance. This is particularly important to maintain support and legitimacy for a challenge-led policy approach such as S3. It has been largely unproblematic to keep the usual “suspects”, such as universities, businesses, clusters and other traditional actors

and institutions in the innovation eco-system, on board and engaged in the move towards sustainability. In the EU, this is partly because of the clear and explicit political direction and resource mobilisation taking place at European level through the Green Deal. But without bottom-up engagement, sustainability challenges run the risk of remaining abstract and suffering from a democratic deficit. They may be captured by the rent-seeking interests of incumbents and the elite.

Some territories have drawn on institutionalized practices and regulated guidelines set out by government on ‘how to do’ citizen engagement (e.g. Vestland) while others need to organize public deliberation and consultation processes in a more ad-hoc fashion. It is particularly challenging to keep civil society engaged throughout the steps of the policy cycle. This can in fact be challenging for all stakeholders in S3 but here some regions (e.g. Northern Netherlands, Gippsland, Pomorskie) have shown the value of not only investing in building relationships with stakeholders but also maintaining these. This is critical for upholding problem-solving creativity and tapping into a diverse pool of knowledge and expertise. Engaging the public appears to be most straightforward with regard to the implementation of innovation projects as the stakes and impact for the public are more tangible and visible.

Several regions, such as Centro (Portugal), Basque Country (Spain) and Pomorskie (Poland), emphasise the key role of intermediary organisations, such as clusters or innovation platforms, in providing support in reaching out to stakeholders that are difficult to reach, such as micro enterprises and even SMEs. Intermediaries have the advantage of having established networks and knowledge of the language stakeholders use. The challenge is, however, that many established intermediaries do not prioritise sustainability goals, they limit their outreach to businesses and research, and sometimes lean towards supporting mainly incremental innovations with short-term economic returns. Therefore, several of the territories interviewed provide dedicated support to clusters or platforms with a focus on supporting green technologies

(see *Box 16* on the offshore wind energy cluster in Pomorskie).

Finally, orienting S3 towards sustainability further challenges policy silos as cross-cutting approaches and policy integration move to the front and centre.

High-level political leadership has proven essential to ensure that the directionality is kept. Similarly, collective leadership is instrumental to ensure coordination across the different domains and to avoid capture by specific interests or perspectives.

## BOX 5

### *Extending participation in the EDP in Gippsland, Australia – towards increasing institutional thickness*

An important meta-lesson for Gippsland was that at the heart of Smart Specialisation is the quadruple helix concept of government, industry, research and training, and community aligning and collaborating for the betterment of the region. This has been a hard part of the smart specialisation journey in Gippsland. Collaboration does not come as a given in Australia where often a culture and practice of competition prevails. Many of the policy settings that have been put in place in the past 30 years are grounded in a liberal market-based approach and philosophy. Despite the fact that even in a market-based approach the concept of ‘coopetition’, emphasising that competition and collaboration go hand in hand, is increasingly important, the Australian approach is very much grounded in competition.

It was a conscious approach and part of the design principles developed for the GS3 program to put the quadruple helix at the centre of the work. It is evident in the way in which the Entrepreneurial Discovery Process across the various sectors has been constructed and in the way in which specific project-based Innovation Groups have been formed. This foundation is still fragile and much energy will continue to be needed to make it more solid. This is particularly true for the engagement of the tertiary education sector in the innovation journey. Clearly, deliberate and structured support continues to be needed to integrate this as part of the “institutional thickness”.

If regions exhibit a common, shared understanding of the system of rules, beliefs and conventions, it is assumed policy change processes, such as Smart Specialisation, will be easier to develop and implement. This regional characteristic is described by researchers as “institutional thickness”. The opposite – “institutional thinness” – is where such an understanding is less developed. The core question asked is “Yes, we sort of know the recipe for regional development, but are the basic conditions in place to make it happen?” It is fair to say that Institutional Capability is still thin when it comes to Gippsland. Short term budget lines, political opportunism, the lack of a ‘one government approach’ and constituent dependency play out across the country, as is the case in Victoria and in Gippsland. A more articulated support at State level as to the structural relevance of a Smart Specialisation approach would have benefited the project. As it stands, we have witnessed the opposite process: a new body (LVA) continuously needing to explain and convince its counterparts in government of the value of the approach and the value of the governance model adopted.

*Source: Interview with representatives of the Gippsland region, Australia*

More information: <https://sustainable.unimelb.edu.au/research/research-projects/gippsland-smart-specialisation-strategy>

## BOX 6

***Multi-Stakeholder Forum for Social Transition and the 2030 Agenda in the Basque Country, Spain***

The 'Multi-Stakeholder Forum for Social Transition and the 2030 Agenda' is the body that channels the shared governance of the 2030 Agenda between Basque institutions and social agents. The entities that participate in the Forum are, in addition to the President (the Lehendakari), all the Ministers of the Basque Government, the three Provincial Councils, EUDEL (Association of Basque Municipalities) and the City Councils of the capitals, the three Basque universities, a representation of the entities of the third sector, and representatives of business and research public-private collaboration. Regulated by Decree 166/2021, the main objectives of the Multi-Stakeholder Forum include contributing to establishing directives and strategic guidelines for the implementation of the Sustainable Development Goals in the Basque Country. In the current unprecedented context, a strictly sectoral approach to policy making is insufficient. Rather a comprehensive and more cross-cutting approach is necessary.

The 2030 Agenda involves and challenges all institutions, departments, social and economic players, and public policies in the region. That is why we launched the Multi-Stakeholder Forum. We need to strengthen a culture based on the concept of a social contract. We believe that the 2030 Agenda and the Forum can be both the foundation and the core for the renewal of the new Basque social contract.

The Euskadi Basque Country 2030 Agenda was published in 2017. That agreement sought to promote a transformative synergy and collaboration, which today has crystallised in so many different examples in the region, including the 2050 Climate Change Strategy, the Basque Platform against Food Waste, the Basque Urban Agenda Bultzatu 2050, the local 2030 Agenda Udalsarea, the Euskadi Open Government Partnership.

*Source: Communication with Jonan Fernandez, General Secretary for Social Transition and 2030 Agenda. Basque Government*

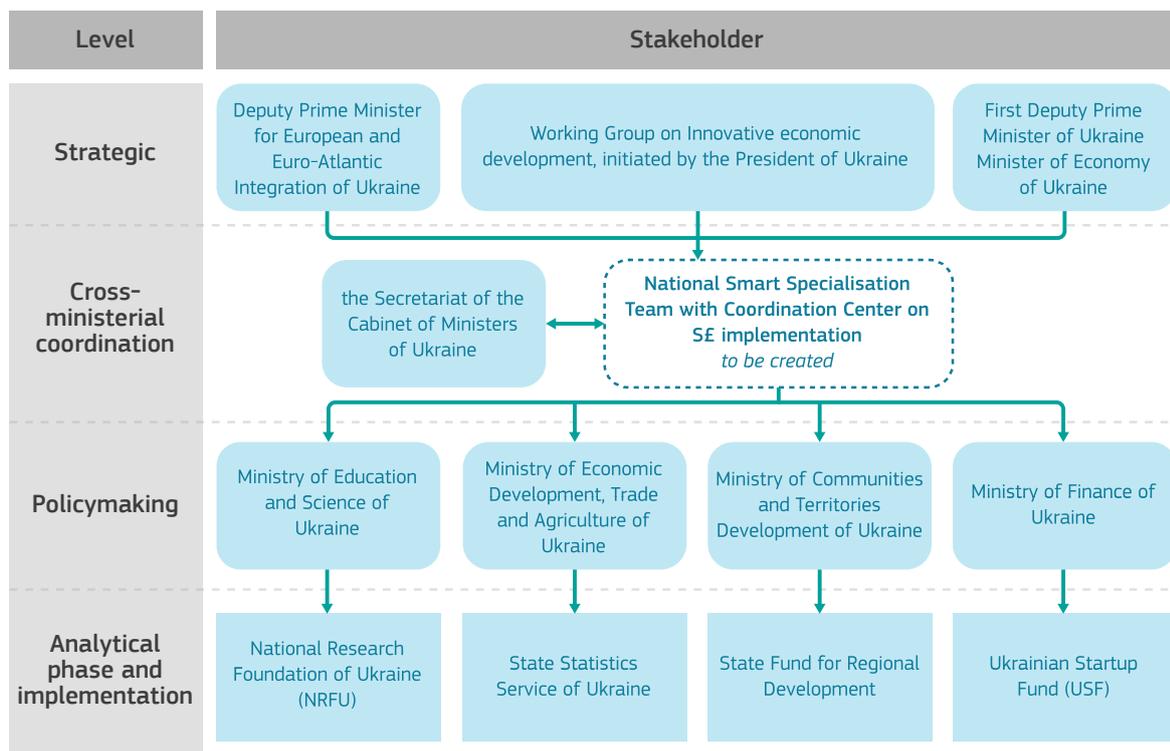
*More information: <https://www.euskadi.eus/gobierno-vasco/transicion-social-agenda-2030/>*

BOX 7

Setting up governance of Smart Specialisation in Ukraine

Ukraine applies the Smart Specialisation approach at two levels: regional, where all the Ukrainian regions develop Smart Specialisation as a part of their regional development strategies; and national where Smart Specialisation provides a methodology to develop national research and innovation strategy for sustainability (STI for SDGs Roadmap). This multi-level approach and interdisciplinary character resulting from the focus on SDGs, requires new policy coordination mechanisms.

Following analytical mapping of the existing policy frameworks, the national roadmap (under development) will be placed at the intersection of the STI policy, SDGs framework and Smart Specialisation strategy. With the aim of having a strong governance and effective implementation, this multidisciplinary policy will be reflected in the institutional set-up that is put in place for the strategy's development and implementation. The proposed institutional setup of the main governmental agencies and bodies involved can be seen below.



To ensure effective interaction and coordination at both the development and implementation stages, the structure offers a multi-level institutional set-up: strategic, coordination, policymaking and implementation levels. As for the strategic level, high-level representation is envisaged with three leading bodies: the First Deputy Prime Minister of Ukraine, responsible for strategic planning and smart specialisation; the Deputy Prime Minister for European and Euro-Atlantic Integration, responsible for the SDGs; and the Working Group on Innovative economic development under the President of Ukraine, supporting strategic STI policymaking. This configuration with three entities is intended

to take into account the multi-stakeholder specificity of the Ukrainian framework and provide a certain degree of flexibility.

In terms of cross-ministerial coordination, the National Smart Specialisation Team includes several ministries and liaises with the Secretariat of the Cabinet of Ministers. The Smart Specialisation Team is established in the form of a Coordination Centre. The Ministry of Education and Science undertook to lead the Roadmap development in coordination with a wide range of other ministries. As the policies connected to the Roadmap are placed under the responsibility of different Ministries, different public stakeholders need to be involved during the design process.

As the policymaking process requires the additional integration of private and public stakeholders from the public sector, academia, business, civil society and development organisations, the Entrepreneurial Discovery Process (EDP) will be used to provide a framework for stakeholder engagement. As EDP is a continuous process, it will allow stakeholder engagement during the design, implementation and monitoring phases of the Roadmap.

Finally, although the Roadmap is designed at national level, it is crucial to establish synergies with the regional smart specialisation strategies that Ukraine has been developing since 2017. For this purpose, Ukraine has developed a Multi-Level Smart Specialisation policy framework that will allow multi-level governance based on synergies between the National STI for the SDG Roadmap and the regional Smart Specialisation Strategies in the country.

Source: Matusiak et al (2022) available at <https://sdgs.un.org/sites/default/files/2022-05/1.2.7-6-Matusiak-Ukraine%20roadmap.pdf>

### 3.3.3. Selected reading and learning resources

*Broadening stakeholder representation to include difficult to reach and vulnerable communities*

- <http://www.honeybee.org/>
- <https://grassrootsinnovations.wordpress.com/>
- <https://inclusiveinnovation.org/>
- <https://socialinnovation.typepad.com/silk/>

### *Multi-level governance*

- CEMR-CCRE, & Platforma. (2020). The 2030 Agenda through the eyes of the local and regional government associations: <https://platforma-dev.eu/>

### 3.4. Vision: Shared vision for sustainability transition

#### Questions to guide reflection and self-assessment

- What is the importance of sustainability challenges and the SDGs in the S3 vision and visions underpinning other relevant development strategies of your region or country?
- How is desirable future portrayed in the S3 vision? What is the relative importance of economic, social and environmental dimensions in the vision?
- Is the vision known and shared by the key stakeholders?
- Does S3 include a reflection on alternative development scenarios and transition pathways to explore the role of research and innovation in achieving sustainability goals? Does the reflection on alternative pathways consider their potential economic, social and environmental impacts?

#### 3.4.1. Key implications for developing shared vision and deciding on pathways to achieve it

Shifting Smart Specialisation towards sustainability goals has significant implications and poses challenges for deliberating on visions and developing pathways for sustainability transitions:

- The vision on how to mobilise science, technology and innovation for sustainability requires broader and more inclusive stakeholder dialogue based on a broader evidence base. The vision and the S3 goals should be based on a wide, knowledge-based consensus and collaborative learning.
- There are important decisions to make about whom to involve in vision-building and how to make the process more inclusive to prevent it from being captured by incumbent players with

vested interests, undermining the legitimacy of the process and leading to a loss of momentum in the transition. Stakeholder groups potentially affected by the implementation of the strategy should be involved in the process.

- A more experimental approach to policy learning and reflexive governance is needed to reflect on how to discontinue innovation trajectories (exnovation) and associated policy initiatives when these turn out to be supporting innovations detrimental to sustainable goals or less promising than initially expected.
- It may be helpful to consider alternative pathways to achieve the S3 objectives. Methods such as participatory foresight exercises, technology assessments, and roadmaps can help create shared expectations, enable open coordination and define joint agendas for developing a desired future vision and setting collective priorities. Likewise, scenarios can be used to develop a shared narrative on the desired transition pathways of regions and countries.

Developing a desired future vision that promotes economic development that is socially inclusive and environmentally sustainable is a critical step in reorienting S3 towards addressing sustainability. Broadening the vision-building process to consider a wider range of societal and environmental goals in addition to economic competitiveness is likely to bring attention to alternative transition pathways and spur ideas on how innovation activities can address sustainability challenges facing regions.

Different transition pathways can be explored, requiring attention to new governance approaches that enhance linkages between territorial development and innovation agendas and localised sustainability objectives. At the same time, developing a desirable future vision means not only opening up to a greater variety of transition pathways but also eventually closing down exploration to concentrate resources, skills, and capabilities to support significantly new directions of innovation (Stirling 2008).

To embed sustainability-oriented directionality in Smart Specialisation, there is a need to collec-

tively coordinate and reach consensus about the overall direction of change. Practitioners should deliberate on the uncertainties and risks faced by the territory and reflect on the wider societal and environmental impacts of alternative pathways. Making sustainability the guiding principle of Smart Specialisation requires strong political commitment and leadership to mobilise collective action across all levels of governance. The ‘directionality’ or ambition for change when a shared (sustainability) problem arises should drive experimentation with practical ‘local’ solutions.

Deliberative approaches can help engage stakeholders in careful deliberation over the values and interests of regions and collaboratively exploring a diversity of innovation options while remaining careful not to let regime incumbents and vested interests undermine the legitimacy of the process.

### 3.4.2. Lessons and advice from S3 practitioners

From the interviews, it is evident that regions and countries have integrated sustainability into the core of their S3 and are making a significant contribution to tackling sustainability challenges. It is also clear that regions are moving beyond a supply-side focus on innovation to considering social and behavioural changes in established habits and lifestyles that are necessary to deal with local sustainability challenges. For instance, the vision of Gippsland explicitly considers the broader social and economic repercussions associated with transitioning away from carbon-intensive activities for achieving a social and just transition (**Box 9**). Likewise, the vision of the Basque Country embraces the 2030 Agenda for Sustainable Development and aligns with several of the SDGs, thereby providing a basis for addressing key societal challenges of sustainability facing the region (**Box 8**).

BOX 8

*Basque Country: Euskadi 2030 Science, Technology and Innovation Plan– Envisioning a more sustainable future*

The “Euskadi 2030 Science, Technology and Innovation Plan” (2030 STIP) contributes to the vision of the Basque Country that “Euskadi should take its place among the most advanced regions of Europe in innovation in 2030, with a high standard of living and quality of employment”. The 2030 STIP was developed in the midst of the pandemic, at a time that signalled the start of the decade and, above all, a new phase. The pandemic raised many emergencies, but it also left us with several lessons learned. One of them was the need to strengthen investment in research and innovation in a sustained manner over time from a perspective of cooperation. We considered the crisis as an opportunity to join forces and work together to promote an in-depth transformation and the future of our economy and society, undertaking the triple transition: technological-digital, energy-climate and health and social.

The 2030 STIP was part of a country strategy oriented towards Sustainable Human Development and committed to the Sustainable Development Goals of the United Nations. This commitment led us to incorporate the improvement of our people’s standard of living and the quality of their jobs into our Vision for the future. We also explicitly stated that the 2030 STIP had to contribute to solving five societal challenges in the Basque Country (energy and climate change, health, employment, digital transformation and gender equality) and seven SDGs very closely related to these (3- Good health and well-being, 5- Gender equality, 7- Affordable and clean energy, 8- Decent work and economic growth, 9- Industry, innovation and infrastructure, 11- Sustainable cities and communities and 13-Climate action).

Next, we established three strategic pillars aligned with Horizon Europe: I- Scientific Excellence, II- Industrial Technological Leadership and III- Open Innovation, with Talent as the necessary central element. Considering the results of the evaluation of the previous plan, we deployed the pillars into objectives and goals that constituted the executive dashboard, which will allow us to monitor and evaluate the 2030 STIP over time.

Finally, we evolved and deepened our Smart Specialization strategy, reviewing the priority areas and opportunity spaces. To accentuate its social orientation and intensify collaboration between the S3 areas of specialisation, we incorporated the “Cross-cutting Tractor-effect Initiatives”. The objective is to identify new collaborative driving projects in specific strategic domains related to the three areas of transition (technological-digital, energy-climate and health and social), whose results will have an impact on Basque society. We are currently launching three of these initiatives in “Healthy Ageing”, “Electric Mobility” and “Circular Economy”. This involves establishing the governance model, defining the thematic scope and designing new support instruments.

*Source: Communication with Cristina Uriarte, Commissioner for Science, Technology and Innovation, Basque Government*

*More information: <https://www.euskadi.eus/pcti-2030/web01-a2pcti30/es/>*

## BOX 9

*Vision-building in Gippsland, Australia – Towards a social and just transition*

The Gippsland experience with S3 has been shaped by the context in which it was introduced. In 2016, the French company, Engie, decided to close the Hazelwood coal mining and electricity generation business in the Latrobe Valley of Victoria, Australia. While a specific corporate decision, it was seen to foreshadow the closure of the three other coal-fired power producers in the Valley over the next 2-3 decades, recognising the climate crisis and the need to replace fossil fuels. Latrobe Valley had been the principal source of electricity for south-eastern Australia for 100 years, and the means to a livelihood for generations of families.

The Victorian Government established the Latrobe Valley Authority to support workers affected immediately by redundancy, as well as to stimulate short-term demand in the Latrobe Valley. Its longer-term mission was the restructuring of the regional economy in Gippsland, the territory in which the Valley is located. It chose Smart Specialisation as a means of implementing a systemic and sustainable approach to diversifying and revitalising the regional economy, and by implication, its social and cultural foundations.

From the outset, the implementation of S3 was shaped by the imperative of achieving Just Transitions for individuals, families and communities, and the challenge of generating renewable energy sources that would meet south-eastern Australia's energy needs while being sustainable in themselves.

The second important contextual factor was the relative dispersion of people and resources across Gippsland. There is no regional city, rather a number of towns with between 10-20,000 residents, and many very small communities, many of which had a very limited energy and telecommunications infrastructure.

This meant that from the outset, a strict focus on knowledge assets and science/technology resources was very limiting. The exploration of regional assets and opportunities for competitive advantage had to embrace social and environmental innovation opportunities. Initially a sectoral approach was chosen to facilitate engagement with industry, and this led to propositions, which encompassed new organisational forms of ownership and growing interest in local cross-sectoral circular economy initiatives. Similarly, Smart Specialisation supported exploration of a range of new community energy approaches, in which small communities have been supported to take control of their energy usage and to develop systems for supporting local industry while working towards zero emissions.

In contrast to the sectoral emphasis in the Gippsland-wide implementation of GS3, the Future of Orbost and District project took a much more strongly place-based approach. This town was confronted by a Government decision to end the harvesting of old forest timber, thus threatening the employment of logging contractors and mill operatives and by implication, the future of the town itself. Again, the challenge of Just Transitions for the individuals and families was important but also the future sustainability of the community itself.

With 2,000 inhabitants and a remote location, the challenge of sustainability was even more sharply defined than in wider Gippsland. With a limited availability of data, the regional context analysis came to depend deeply on conversations with community members and other key stakeholders.



Insistence on the importance of a quadruple helix perspective meant that a broad cross-section of people became involved in contributing quite detailed insights into specific knowledge and natural assets in the district, culminating in a report that identified nine innovation opportunities, albeit some of which were defined rather generally.

Because of the proximity of unspoilt forest and coastal assets, questions of environmental protection as well as enhanced economic opportunities were a central theme. A focus on enabling an economic future that would support livelihoods for community members was a key theme of the Entrepreneurial Discovery Process, but the innovation opportunities themselves were linked with new forms of social organisation as well as effective environmental management.

For example, forest management will be a serious issue for the district, especially in the wake of massive bushfires in 2019–20. Enabling the healthy regrowth of the forest will draw on a mix of science and indigenous knowledge, while also using the expertise of experienced foresters and providing learning opportunities for young workers. The outputs of new processes could well support the use of forest waste in the production of new construction materials. The immediate challenge is to bring together quadruple helix participants in the community (and beyond, where necessary) to engage the expertise necessary to realise the opportunity.

*Source: Interview with representatives of Gippsland, Australia*

More information: <https://sustainable.unimelb.edu.au/research/research-projects/gippsland-smart-specialisation-strategy>

### 3.4.3. Selected reading and learning resources

#### METHODOLOGIES, FRAMEWORK TOOLS USEFUL FOR VISION AND SCENARIO BUILDING

##### *Foresight (scenarios)*

- “Scenario Exploration System” developed by the JRC is a future simulation tool to explore possible paths towards the future, in relation to a certain topic. Available at [https://knowledge4policy.ec.europa.eu/foresight/tool/scenario-exploration-system-ses\\_en](https://knowledge4policy.ec.europa.eu/foresight/tool/scenario-exploration-system-ses_en)
- “Megatrends implications assessment tool” is a workshop tool on anticipatory thinking and foresight for policy makers and various

stakeholders, developed by the JRC. Available at: [https://knowledge4policy.ec.europa.eu/foresight/megatrends-implications-assessment-tool\\_en](https://knowledge4policy.ec.europa.eu/foresight/megatrends-implications-assessment-tool_en)

##### *Transition pathways*

- “Visual toolbox for system innovation” developed by EIT Climate-KIC is a comprehensive resource book for practitioners to map, analyse and facilitate systemic change. Available at: <https://www.climate-kic.org/insights/visual-toolbox-for-system-innovation/>
- “X-curve: A sense-making tool to foster collective narratives on system change” is a visual aid developed by the Dutch Research Institute For Transitions (DRIFT) that can help with this challenge, allowing individuals to map transition

dynamics and create a setting where activities for transformative change can be co-created. Available at: <https://drift.eur.nl/publications/x-curve-a-sense-making-tool-to-foster-collective-narratives-on-system-change/>

### **Impact pathways**

- “A short guide to assessing environmental impacts of research and innovation policy” developed by the European Commission Directorate for Research and Innovation provides an original framework and methodological advice on how to identify, scope and assess the environmental pressures and impact of research and innovation. Available at: <https://op.europa.eu/en/publication-detail/-/publication/00f04c38-5171-46a0-9f95-a5f-36b58a04b>

- “Pathways for sustainability” developed by STEPS (Social, Technological and Environmental Pathways to Sustainability) Centre at the University of Sussex provides examples, case studies and resources on methods for pathways to sustainability. Available at: <https://steps-centre.org/methods/>

### **Transition management**

- “Transition management in urban context: Guidance Manual” developed by DRIFT presents a governance approach aimed at creating space for new paradigms and practices, to address climate change at the local level. Available at: <https://drift.eur.nl/>

- “A Transformative Theory of Change” developed by EIT Climate-KIC is a tool that can help you design, implement, and evaluate projects aimed at transformative system change. Available at: <https://transitionsHub.climate-kic.org/publications/motion-handbook-developing-a-transformative-theory-of-change/>

- “Challenge-led system mapping approach” is a methodology developed by EIT Climate-KIC responding to the need to improve the practitioner’s capacity to move towards transformational system change by providing mechanisms for working more horizontally with challenge own-

ers and other stakeholders. Available at: <https://transitionsHub.climate-kic.org>

### 3.5. Priorities: Towards challenge-led EDP and S3 priority areas

#### Questions to guide reflection and self-assessment

- Were societal challenges taken into account in the definition of your S3 priority domains? If yes, how do they address sustainability challenges and the SDGs?
- What are the incentives, drivers and barriers for including sustainability-related specialisation areas and objectives, including the SDGs, in the S3 priorities?
- How do you balance top-down goals and bottom-up perspectives in selecting and shaping your priority domains? What is the role of EDP in this context?
- Do any of the selected S3 priorities focus on existing or emerging niches with a potential to experiment, demonstrate or scale transformative innovation with an ambition to address sustainability challenges and the SDGs in your region or country?

#### 3.5.1. Key challenges and implications for selecting strategic priorities

Priority areas have traditionally been selected based on territorial competitive advantages. Orienting S3 towards sustainability and extending the focus on structural change to foster sustainability transitions make the logic underpinning the EDP more heterogeneous and complex:

- Conventional technocratic approaches are inadequate for addressing the open-ended and tentative nature of sustainability challenges and call for more adaptive, anticipatory modes of governance.
- The perceived role of governments considerably shifts from acting as a 'pilot', with the knowledge and tools to steer society towards sustainability, to one as an 'enabler' of system-wide innovation.

- The original logic of balancing a top-down identification of priority areas with bottom-up entrepreneurial discovery is relevant, but experimentation and social learning involving a broader and more diverse set of actors are critical for situating sustainability objectives in the local context and ensuring that S3 priorities are shared and owned by regional stakeholders.

- The logic of concentration to develop 'critical mass' to address sustainability challenges is relevant but must be more nuanced to ensure variety for building regional resilience.

- Challenge-led or mission-oriented approaches, setting a clear direction for research and innovation activities, can be used to set S3 priorities to address sustainability challenges but they should be combined with a bottom-up process of co-creating possible responses and solutions.

Embedding sustainability challenges in the EDP makes it open to political debates and stakeholder interests weighing different sustainability dimensions (Skjølsvold and Coenen 2021). The systemic and integrated nature of sustainability challenges means that regions should identify key sustainability objectives and select pathways to achieve them.

There is an awareness of the limitations of established governance approaches and a recognition that new types of challenge-led innovation policy approaches are needed to drive S3 to comprehensively address the nature and complexity of sustainability challenges. These approaches should be directional and explicitly challenge-led, thus promoting experimentation, innovation, and learning. The combined top-down/bottom up approach, where the directionality of shared values is met with a co-creation process during the bottom-up EDP involving a broader and more diverse set of stakeholders, leads to more effective solutions that can be scaled up, thereby providing a more targeted approach to addressing sustainability challenges facing territories. This is particularly evident in the context of the Horizon Europe programme with missions seeking to bridge overarching EU-policy objectives with bottom-up

experimentation and learning at national and sub-national levels (see [Box 1](#)).

A shift to a challenge-led scoping of S3 priorities has to reconcile and comprehensively address the multiple dimensions of sustainability (economic, social, environmental), meaning that trade-offs have to be carefully weighed and managed. To enhance linkages between local agendas and global sustainability objectives, there is a need to find a balance between prioritising sustainability-oriented niche innovations and transforming established specialisation areas. To this end, regions can act as living laboratories for transformative initiatives where experimentation with different kinds of innovation is highly visible and usable in practice since these are applied in real-life settings.

Acknowledging the mutual relationships, multiple synergies, and possible trade-offs in addressing the heterogeneity and intersectionality of the SDGs, a more systemic and integrated policy approach to innovation is needed to guide and consolidate the direction of transformative change. Policymakers are challenged to rethink S3 priority areas around entire functional domains (energy, mobility, food etc.) rather than focusing purely on singular technological solutions. This opens up the possibility of the EDP to address local sustainability challenges from a perspective of transformational change, where innovation serves as a cross-cutting catalyst for addressing the SDGs.

### 3.5.2. Lessons and advice from S3 practitioners

#### *Challenge-led approach to EDP*

Sustainability challenges represent external stimuli that may take the form of societal, economic and environmental needs and threats that need to be revisited but at the same time produce opportunities and conditions for innovative solutions, including social and technological innovations. Several regions across Europe and beyond have started experimenting with a challenge-led EDP to embed sustainability challenges into their S3.

A key characteristic of such challenge-oriented policy approaches is an emphasis on the role that major societal challenges can play in creating new markets (both local and global) and in supporting national and regional competitiveness. For instance, Czechia is experimenting with mission-oriented policy approaches to identify priorities and guide entrepreneurial discovery processes ([Box 10](#)). Likewise, Wallonia has redesigned its strategy and adopted a challenge-led approach to defining S3 priority areas ([Box 11](#)).

#### *Extending participation in EDP*

Ensuring participation from the quadruple helix is critical for ensuring shared ownership and legitimacy of the EDP process and gives room to demand-side considerations by directing attention away from a singular focus on the supply-side actors of innovation (firms, knowledge institutes, and governments) to interactions in networks comprised of a broader and more diverse set of actors. Regions, such as Northern Romania (see [Box 13](#)), deliberately involve civil society by identifying broader societal and environmental challenges facing the region and how these can be addressed through research and innovation activities to collectively prioritise, coordinate, and consolidate the direction of transformative change.

#### *Continuous EDP as a learning process*

Interestingly, when integrating sustainably challenges into the core of S3, several regions (e.g. Hauts-de-France) describe the EDP as a deliberate and continuous learning process organised in successive cycles more than a clearly delineated step. Designing EDP as a continuous learning experience not only opens up new possibilities for coordinating the multiple determinants and feedback loops of innovation between and across different S3 priorities but also allows policymakers and practitioners to explore new ways of managing multi-level governance processes between interrelated spatial scales.

BOX 10

*Pilot mission “Reducing the material and energy intensity of the economy” in Czechia*

The orientation of research and innovation activities towards sustainability and major societal challenges is considered in the new smart specialisation strategy of Czechia as an important opportunity for the diversification of the economy and for strengthening its resilience and self-sufficiency. A new element in the implementation of the smart specialisation strategy in Czechia is the S3 missions, through which it will be possible to respond to societal challenges and thus contribute to the implementation of the UN Sustainable Development Goals (SDGs). The development of S3 missions has been supported by JRC experts in the EU STI Roadmaps for SDGs pilot project and by the Technology Centre of the Czech Academy of Sciences.

For the purpose of piloting the mission-oriented approach, the mission on “Reducing the material and energy intensity of the economy” has been selected as the most significant challenge in terms of need and urgency. The aim of this mission is to direct research and innovation activities toward reducing the dependencies of the Czech economy and society on external resources (especially materials and energy) and optimising production processes. The pilot mission is a specific response to the societal challenge of limiting the use of natural resources and reducing the negative impact of climate change. The mission will be implemented using several research and innovation support programmes that contain research and innovation topics consistent with the focus of the pilot mission. These will be mainly operational programmes co-financed by EU funds and national programmes whose managing authorities are committed to financially supporting the R&I topics of the pilot mission.

In terms of governance, we have chosen a top-down approach for the pilot mission. The National RIS3 team drafted proposals to partners on the focus and implementation of the mission and the objectives the mission should achieve. The partners then declared interest and willingness to finance and cooperate within the framework of the support programmes they manage. A bottom-up approach was chosen as a complementary approach, namely by engaging the regional RIS3 teams in a debate on the pilot mission, with the aim of finding intersections in the priorities of each region with the topics of the pilot mission and opportunities to support the achievement of their objectives.

The pilot mission contributes to the transformation of the Czech economy and addresses the twin transition of digital and green transformation. Both aspects go hand in hand across all activities directed at industry, agriculture, transport and other segments. Research and innovation will be directed towards the development of new green technologies that help to protect the climate and reduce emissions, but also increase recycling, use materials more efficiently, and reduce energy consumption. Digital transformation can then contribute to sustainability goals and enable the changes needed for a just ecological transition. These two complementary principles will also be the main driving forces in the implementation of this pilot mission.

Although the Czech S3 experience with the integration of a mission-oriented approach is still relatively brief, we can share the following experiences with this process. During the preparation, we found that it is very important to:

- Choose the scope and focus of the mission well (not too broad, not too narrow).



- Gain political support and mandate for the mission-oriented approach.
- Engage funders in the early stages and ensure their interest in participating in funding the implementation of the mission.
- Appropriately combine a top-down approach to define areas for mission focus with a bottom-up approach to find suitable solutions and tools for mission implementation.
- Ensure sufficient time for broader EDP discussions on mission focus and related tools.

*Source: Communication with Tomáš Holinka, Head of S3 Strategy Unit at Digital Economy and Smart Specialisation Department, Ministry of Industry and Trade; Dagmar Vránová, RIS3 Analyst at Digital Economy and Smart Specialisation Department, Ministry of Industry and Trade; and Michal Pazour, Head of Department of Strategic Studies, Technology Centre of the Czech Academy of Sciences*

BOX 11

*Mobilising innovation stakeholders around Strategic Innovation Initiatives in Wallonia, Belgium*

Wallonia has recently adopted a totally revamped Smart Specialisation Strategy (S3) based on a challenge-led approach. The starting point for defining the five Strategic Innovation Areas was the most pressing and relevant societal challenges for Wallonia: Optimisation of resources, Energy transition, Climate and biodiversity crisis, Health and nutrition, Inclusive society, Economy of the future. On the basis of a co-creation process, the five strategic areas selected are: Circular materials, Innovation for enhanced health, Agile and safe design and production methods, Sustainable energy systems and buildings, Agro-food chains of the future and innovative environmental management. Digital and green transition are embedded across those domains.

To implement those priorities, new governance methods were adopted. For each of the five priorities a strategic roadmap was developed, in collaboration with key stakeholders. These define Wallonia's ambitions and strategic areas for action. The Walloon S3 aims to achieve greater impact both on the socio-economic side and in tackling key societal challenges, by developing and commercialising innovative solutions to those challenges, and key priorities in various policy fields.

Inspired by existing experience in Nordic European countries, the Region has launched a call for expression of interest directed at regional stakeholders, with the objective of selecting Strategic Innovation Initiatives, e.g. flagship initiatives aiming to implement the regional ambitions in one or several strategic areas. The objective of this call was to initiate a dynamic for collaboration among stakeholders of the quadruple helix, develop critical numbers of actors and projects along the value chains to achieve common ambitions as reflected in our S3 roadmaps. Despite the fact that no budget was attached to the call, it aroused considerable interest among the stakeholders: 31 proposals were submitted, and 20 selected.

The selection criteria were: Implementation plan and modalities, Strength of the partnership and involvement of quadruple helix, Value creation and impact, European ambition and Innovative character. Three initiatives were directly selected and will now be implemented, 17 have still to improve their proposal before a definitive selection. They will receive support to further develop their initiative, from the administration and our Competitive Clusters. The initiatives touch upon various topics, for example Water value chain, Plant proteins, digital and bio solutions for reducing pesticide use, circular economy for metals, minerals and plastics value chains, plant solutions for landfill rehabilitation, wood industry, building renovation, energy communities, decarbonised mobility, green hydrogen, gene and cell therapy, cybersecurity.

These initiatives will now engage in a strategic dialogue with regional authorities to facilitate the implementation of their action plan, boost synergies between policy tools at regional level and with European policies, accelerate innovation and impact. With these flagship initiatives, regional administrations now have a compass to fix the priorities for investment and develop horizontal collaborations, and linkages between different kinds of projects fitting in a clear strategy: research and innovation projects, training, investment.



The process is still under co-development and will have to be further refined to ensure the long term engagement of all stakeholders and to develop innovation ecosystems around our innovation initiatives. However, the first results are promising with strong commitment and ownership from different regional administrations, a good response from the ground, and a strong strategic background for the selection of projects in upcoming calls, notably under ERDF.

*Source: Communication with Florence Hennart, Senior advisor at the Economic Policy Department of the Public Service of Wallonia - Economy, Employment and Research, Wallonia*

*More information: Smart Specialisation and <https://economie.wallonie.be/content/s3-wallonne-20-initiatives-dinnovation-strat%C3%A9giques-sont-s%C3%A9lectionn%C3%A9es>*

BOX 12

*Challenge-led S3 prioritisation in the Northern Netherlands, the Netherlands*

The Northern-Netherlands (NNLs) have put societal challenges at the core of the smart specialisation strategy (RIS3) in '2014-2020' and will continue doing so in the next programming period. Recent studies (e.g. McCann&Soete 2020) suggest making "sustainable development an overriding strategic priority" for RIS3. The NNLs have taken a slightly different perspective in the sense that the region has integrated sustainable development into its priority areas.

In the strategy for 2021-2027, the region has taken four transitions, one being the transition to renewable energy, another the transition towards circularity, as the actual priority choices. The transitions are defined as the outer boundaries of an area within which it expects new specialisation opportunities to arise. Key to the approach is the creation of a climate in which actors within the innovation ecosystem are encouraged to search for and capitalise on opportunities arising out of the transitions, through actual projects, initiatives, experiments.

This process is essential to the strategy, and also to the EU-funding programmes, in particular ERDF and JTF, designed in a coordinated effort, to be full implementation programmes of the RIS3.

The process of designing these programmes started in 2020 and has featured an extensive stakeholder involvement. Partly due to the COVID-restrictions, a change was made from rather large meetings and workshops to a smaller, more tailored, series of meetings, that turned out to be highly effective in creating useful input and feedback. Groups have emerged from these meetings, focussed on specific themes, and societal impact, and will continue to be involved during the implementation.

The region aims for innovative, more tailored support measures that effectively foster the objectives of programmes and RIS3. The region has been experimenting with innovative support measures for several years now, for instance with ERDF-calls designed as open challenges.

For the new period the approach is to capitalise on the stakeholder involvement created during the design phase, to create what has been called 'continuous lines of talk' with groups of stakeholders working on the RIS3-transitions. The idea is to challenge these groups to come up with a 5-7 year vision, to translate the vision (as a continuous effort) into investment paths and identify possible funding needs along the way. If the vision and paths align with the RIS3 and programme objectives, specific ERDF-calls will be created to remove 'funding obstacles' and facilitate the groups in achieving the objectives.

*Source: Communication with Luc Hulsman, project manager, Northern Netherlands Alliance*

*More information: <https://www.snn.nl/en/smart-specialisation>*

## BOX 13

***Reflections from Northern Romania, Romania on incorporating sustainability in S3***

The design of the first Research and Innovation Strategy for Smart Specialisation (RIS3) of the North West Development Region from Romania started in the midst of the 2014-2020 programming period, and was finalised in 2018. In the context of a centralised approach towards programming, regional RIS3s were not initially regarded as a contribution to the ex-ante conditions for Thematic Objective 1 but considered necessary later, for the country to meet all the fulfilment criteria. During strategy development the region received assistance from the Joint Research Centre (JRC) as part of the “Targeted support for lagging regions” project, financed by the European Parliament. Support for the effective functioning of the entrepreneurial discovery process was part of this project. By the time RIS3 started to be elaborated, the region already had a Regional Development Strategy in place for 2014-2020 adopted by the Regional Development Council.

Given the late adoption of the regional RIS3, the most important parts of the document have undergone only a smaller revision as part of the preparations for the region to fulfil the specific subset of criteria required under the enabling condition for Policy Objective 1 linked to the decentralised North West Regional Operational Programme 2021-2027. Smart specialisation priority areas remained the same, organised under three pillars with general objectives being only slightly reformulated, similar to the overall vision and strategic objectives. Revision focused more on the reinforcement and completion of the so-called smart specialisation niches previously identified and reflecting the mid-grained granularity level, as well as on an update of the policy mix, action plan and that of the monitoring and evaluation system.

In explaining how and why both RIS3s are sustainability driven even though there was no particular focus on their alignment with the SDGs, this background and context are quite important, as is the methodological approach adopted. In the latter case, besides carefully mixing and balancing top-down and bottom-up methods emphasis was placed on the application of a challenge-driven perspective. Part of the top-down process was firstly a strategic decision to align the objectives of the RIS3 with the objectives of the already adopted Regional Development Strategy. Among other aims, this emphasised the wellbeing and quality of life of the people, mitigating the effects of climate change and the sustainable use of resources, as well as the adoption of circularity principles in the economy in line with the overall European and national strategic context, e.g. National Sustainable Development Strategy 2020. Secondly, an effective contribution of the RIS3 to solving regional social and economic challenges was sought. Such challenges, already identified in the Regional Development Strategy 2014-2020, have been interlinked with the societal challenges identified at EU level, as well as with global challenges. Thirdly, an overall directionality was sought through the analysis of megatrends and economic development tendencies in the economic domains that were identified as having potential to become smart specialisation priority areas. The entrepreneurial discovery focus groups, as the most important parts of the bottom-up approach have also been driven by the social and economic challenges proposed by key actors representing all nodes of the quadruple helix. Based on the methodological approach developed with the support of the JRC, these focus groups started with the identification and prioritisation of social and economic, as well as innovation system-related challenges.



They then proceeded to generate ideas and proposals suitable for addressing these challenges through research and innovation activities, as well as measures supporting interaction and connectiveness within the regional innovation system.

Niches, as the third layer of the strategy, representing the mid-grained granularity level resulted from proposals from stakeholders participating in entrepreneurial discovery focus groups, that: a) had the potential to gather a critical number of actors around them and, b) were aligned with the overall strategic considerations (as part of the top-down approach). In practice, through an approach driven by the social and economic challenges faced by the region, the alignment between bottom-up proposals and top-down results came quite naturally. This was also supported by the orientation of regional stakeholders towards social, economic, and technological trends and development tendencies. Such an orientation was also characteristic for RIS3 Steering Group members. Gathering a wide variety of actors, the higher-level governance body played a strategic advisory role in the whole process, encouraging stakeholders to follow the same direction. This particular mix of methods and approaches led to the strategy's strong focus on social and economic sustainability, without particularly considering direct alignment with the SDGs. However, in the future, the policy responsible organisation will seek to address SDGs more specifically and will try to further correlate the strategy with these global objectives, together with key regional stakeholders.

*Source: Communication with Petra Szávics, Babeş-Bolyai University of Cluj-Napoca, Romania, formerly North-West Regional Development Agency*

### 3.5.3. Selected reading and learning resources

- *“Localising the Sustainable Development Goals”*, an initiative developed by URBAN 2030 under the Joint Research Centre of the European Commission provides tools and insight on definition, implementation and monitoring of strategies at local level, which is essential for achieving the 2030 Agenda for Sustainable Development. Available at: <https://urban.jrc.ec.europa.eu/sdgs/en>
- *“Mission Playbook: A design-driven approach to launching and driving missions”* developed by the Danish Design Centre is a playbook that describes how design can help you operationalise and maintain missions that have lasting and sustainable impact. Available at: <https://ddc.dk/tools/missions-playbook-a-design-driven-approach-to-launching-and-driving-missions/>
- *“Mission-Oriented Innovation policies online toolkit”* developed by the Organisation for Economic Co-operation and Development is a guide designed to help policy makers design and implement Mission-oriented innovation policies. Available at: <https://stip.oecd.org/moip/>

## 3.6. Action plan: Roadmap and policy mix to implement the strategy

### Questions to guide reflection and self-assessment

- Would you describe your S3 as challenge-led or mission-oriented? Has the inclusion of sustainability challenges in S3 resulted in introducing specific objectives or targets and led to changes in the selection and design of policy instruments and supported activities?
- Does the action plan include instruments designed to support experimental and transformative innovation focused on sustainability challenges?
- What are the barriers and drivers to developing and implementing instruments supporting sustainable innovation in your region and country? How can you introduce them without disrupting parts of the innovation ecosystem that have proven to work well?
- Does the S3 action plan include coordination mechanisms to ensure internal coherence of S3 and external synergies between S3 and other relevant policy areas? Is there a wider framework in your region or country to support policy coherence and directionality towards sustainability goals?
- Is the action plan and policy mix designed to ensure corrective measures are taken to adjust the action plan and instrument design based on the continuous process of entrepreneurial discovery and insights from monitoring and evaluation?

### 3.6.1. Key challenges and implications for Smart Specialisation action plans

Developing an action plan or roadmap to guide the implementation of Smart Specialisation has been an integral element of S3 since its conception. Shifting to challenge-led or mission-oriented action plans poses several new challenges for policy makers and practitioners to consider:

- Being open to policy experimentation: Introducing challenge-led and mission-oriented approaches to S3 policy portfolios and programmes. S3 is relatively new, and there are few concrete examples of what works.
- Understanding and managing risk: Programmes supporting experimentation and niche innovations are challenging to design and implement because of the perceived high risk of failure.
- Considering new policy instruments as a part of Smart Specialisation: Enlarging policy mixes beyond instruments typically mobilised by research-innovation strategies, such as technology support programmes, innovation support for SMEs or clusters, is a challenge for policy makers dealing with S3 as it requires cross-departmental collaboration and innovative programme design.

How is refocusing Smart Specialisation towards societal challenges and sustainability goals changing the way countries and regions draft and implement their action plans?

First, shifting the focus of S3 towards sustainability requires that the strategy embraces a wider variety of innovations, including green and social innovations. It should also support experimentation and the demonstration of transformative innovations with a potential to respond to the scale and gravity of societal challenges.

Second, to achieve transformative outcomes, Smart Specialisation action plans need to mobilise a variety of support measures and try innovative instruments and programme designs to support different types of innovation. Fostering energy transition, circular economy or sustainable

mobility systems all require such comprehensive and bold public support. One approach could be to consider instruments, which by design encourage experimentation and learning, such as various forms of living labs and regulatory sandboxes. Furthermore, rather than only fostering novelty creation per se or bringing innovation rapidly to market, Smart Specialisation for SDGs could mobilise policy instruments, which create demand and shape markets for environmentally sustainable and socially responsible innovations. Demand for green innovations can be created, for example, through public procurement, developing and testing new standards or engaging the public by awareness-raising or promotional campaigns.

Third, the new generation of challenge-led and mission-oriented policy approaches requires new ways of designing, implementing, and coordinating policy portfolios and instruments. Importantly, Smart Specialisation is in many respects well suited to fostering challenge-oriented policies, especially in its focus on establishing priorities, developing transformative activity within priority areas, and appreciating the importance of experimentation (Foray, 2018). However, there is a need to strengthen the directionality of policy mix mobilised by Smart Specialisation.

Policy roadmaps, for example, could serve as a systemic instrument providing a framework bridging the design, implementation, and evaluation of Smart Specialisation and become a mechanism ensuring that a common direction of travel is translated into the selection, design, and implementation of support instruments. Roadmaps can support challenge-led innovation policies to address sustainability challenges and SDGs (UN IATT and European Commission, 2021; Miedzinski et al., 2019). In their design and implementation, however, roadmaps should acknowledge the complexity of societal challenges and embrace the diversity and uncertainty of transition pathways while catering for diverse interests, experimentation, and the capacities of various actors (Miedzinski et al., 2022).

### 3.6.2. Existing approaches and lessons from S3 practitioners

#### *Introducing societal challenges in the S3 action plans and policy mixes*

Many regions and countries focused their Smart Specialisation strategies on societal challenges and sustainability transitions to emphasise their overall directionality towards addressing sustainability goals.

In the EU, most regions align their S3 with the green and digital transitions of the EGD. However, many go beyond the focus on twin transitions and emphasise the importance of the social dimension of transitions. The recent revisions of S3 in Centro in Portugal, for example, emphasise three mutually dependent transitions – social, digital, and green – to link their strategies to global challenges. Similarly, the Basque Country added three transitions – technological-digital, energy-climate, and social health – to S3 to give an overall direction to the design and implementation of programmes. Lapland, Finland, also has a strong emphasis on social economy and social innovation.

In the view shared by most of the policy makers interviewed, S3 addressing sustainability goals remains a part of research and innovation policy. However, it now strives to provide a contribution to other policy areas, such as reducing GHG emissions or limiting social exclusion. Smart Specialisation aimed at fostering sustainability transitions does not replace wider regional or national thematic strategies but complements them by mobilising place-based innovation eco-systems to tackle societal challenges.

Regional and national policy makers are changing the design of programmes and policy portfolios to align them with societal challenges. On the one hand, the new programme designs need internal reflection and may require new knowledge and internal capacities. On the other hand, they are likely to challenge the usual beneficiaries who are used to the conventional scopes and designs of support programmes. As a result, new design features (e.g., challenge-oriented goals, new selection

and award criteria for projects) may not initially be welcomed by all regional stakeholders. But in the experience of interviewed practitioners, refocusing calls for proposals towards societal challenges has had positive outcomes. It has opened the support programmes to new stakeholders who felt encouraged by the more open formulation of calls. The new design of calls made “usual suspects” seek new cross-sectoral collaborations.

Policy makers emphasise that the ground for such a redesign must be prepared during the earlier steps of the S3 deliberation when the challenges are localised and Smart Specialisation priorities

selected. Most importantly, conducting an inclusive EDP helps to ensure that all stakeholders, new and old, feel ownership of the strategy and recognise the challenges selected are important for the region and their work (see sections on Governance and EDP). In practical terms, it also helps those stakeholders who are new to Smart Specialisation and innovation policy in many territories, such as civil society groups, environmental researchers, or NGOs, to get to know the Smart Specialisation processes and jargon used in the research and innovation policy. The latter makes it likelier that they show interest, take part in the process and later respond to the calls for proposals.

#### BOX 14

#### *Action Plan for Smart Specialisation Strategy in Serbia: STI for SDGs Roadmap*

Serbia decided to implement its Smart Specialisation Strategy through dedicated 2-year Action Plans: STI for SDGs Roadmaps with a strong sustainability component and SDG orientation. The roadmap is an operationalised document indicating the planned policy actions and instruments, their financing and monitoring and evaluation indicators. The document aims to implement Smart Specialisation Strategy according to the coherent logic of intervention: starting from Smart Specialisation priority domains, with strategic goals and objectives, to dedicated policy measures.

The selected priority domains include: Food for the Future, Future machines and manufacturing systems, Energy-efficient and eco-smart solutions, ICT, Creative industries and Key Enabling Technologies. The priorities have been mapped, looking at their interlinkages and synergies, including direct and indirect impacts on selected SDGs. Within these priorities, some specific projects with a strong sustainability dimension have already been launched: **1** the Smarticity – Energy management platform based on Artificial Intelligence project, aimed at completely automating the search for optimal patterns in energy consumption and production connected with renewable energy sources and energy storage capabilities; **2** Increased sustainability of plant protection by innovative approaches in Bacillus-based biological plant disease and pest control **3** Navsteer project - autonomous and easy to install autopilot system with cloud data analytics for farmers, **4** the Strawberry Smart Board project, which moves beyond traditional outdoor seating infrastructure through the creation of sustainable digital furniture.

The Serbian Smart Specialisation priority domains were selected in a wide Entrepreneurial Discovery Process that is also continued during the implementation of the strategy. At the moment, preparations are ongoing for the revised version of the Action Plan for the next 2-year period. The funding mobilised for the implementation of the first Roadmap amounts to 150 million euro.

More information: [https://sdgs.un.org/sites/default/files/2022-06/7th%20Policy%20Brief%20on%20Serbia\\_STI%20Roadmaps\\_fin.pdf](https://sdgs.un.org/sites/default/files/2022-06/7th%20Policy%20Brief%20on%20Serbia_STI%20Roadmaps_fin.pdf); <https://s3platform.jrc.ec.europa.eu/pilot-methodology> and <https://publications.jrc.ec.europa.eu/repository/handle/JRC126846>

### ***Mission-oriented approaches as ways to re-orient Smart Specialisation policy portfolios towards sustainability goals***

Mission-oriented policies are also becoming increasingly popular at regional and local level (see chapter on prioritisation and EDP above). Regions

(e.g., **Box 15** on Northern Netherlands) and countries (e.g., **Box 10** on Czechia) consider introducing missions to their S3 and programme design to give a stronger directionality to policy portfolios and programmes.

#### **BOX 15**

### ***Reflections on integrating a mission-oriented approach in S3 in Northern Netherlands, the Netherlands***

Missions can be a way to operationalise a challenge-led strategy. There were three reasons why we chose societal challenges and now transitions to frame our S3. First, we believed they would contribute to a sense of urgency about challenges such as climate crisis. Second, we hoped they would foster commitment among our stakeholders. Finally, we believed that by not choosing sectors or even technology areas, we would be more likely to have an inclusive strategy as no one needed to be excluded in advance.

Defining and using missions could be the next step for us as this could contribute to all three elements. When incorporating missions into programmes, for instance Operational Programmes, it is important to define the missions in such a way that they relate to the players the missions are aimed at. In my opinion that means that the missions should be specific (or smart), they should be understandable, and they should have a relatively short time span, about five or seven years.

In this way it is most likely that the mission will result in actual action. I know many missions these days look a lot further ahead into the future. For instance, the EU aims to be climate neutral by 2050. I understand that and I think at EU-level a mission like this could work. But at local level, I think for many people a mission with an objective so far ahead in the future will be difficult to apprehend, and it may not trigger changes in their behaviour. What could work is to take missions such as those defined by the EU, as a sort of overriding mission, which can then be operationalised into strategies, and especially programmes, in a sort of sub-mission. These sub-missions would be more down to earth: more specific goals with a shorter time span and easier for people to understand.

In Northern Netherlands we are seriously considering operationalising our innovation strategy by defining missions and using them as a basis for calls for tenders and challenges. The tenders can be seen as a concrete invitation to contribute and take part in achieving the missions' goals. Public money is available to assist them.

*Source: Communication with Luc Hulsman, project manager, Northern Netherlands Alliance (November 2021)*

*More information: <https://www.snn.nl/en/smart-specialisation>*

### *Supporting environmental and social innovations in S3 initiatives and projects*

Probably the most common way to use Smart Specialisation to contribute to sustainability goals is to promote research and innovation projects and initiatives that promise synergies between economic, environmental and, less often, social benefits. Most regions and countries choose S3 priority areas and design instruments that support innovative green products and technologies.

The inclusion of priority areas with a strong focus on sustainability in Smart Specialisation reflects the growing recognition of the importance of this topic. There are two mutually supportive ways in which sustainability objectives are introduced in the action plans and later in the design of support programmes implementing Smart Specialisation.

The first is to introduce environmental and social sustainability criteria to their programmes, which are used in the selection and evaluation of projects. In relation to environmental sustainability, these criteria may include, for example, GHG emission reduction potential, energy and material efficiency and savings, reduced emissions and use of toxic and harmful substances, or the use of recycled materials. In relation to social sustainability, the focus may be on promoting local high-quality jobs, improved accessibility to public services, inclusion of disadvantaged groups such as immigrants or the elderly in local life, etc. Our interviews suggest that developing practical approaches to embedding sustainability in the design of instruments and implementation is one of the main challenges faced by policy makers. Many territories are in the process of redesigning their monitoring and evaluation systems to align them with the EGD and sustainability goals. Some are engaged in projects to develop and test these criteria (see [Box 20](#) on piloting and implementing circular economy criteria in programme design in Centro, Portugal).

A second broader way to refocus the Smart Specialisation policy mix on sustainability is to design programmes and, often experimental initiatives which are fully dedicated to supporting sustain-

able innovation. Examples include, for example, a R&D programme supporting eco-innovation in the Basque Country, support to business and research actors operating in the supply chain of offshore wind energy in Pomorskie in Poland (see [Box 16](#)), building green hubs for industrial symbiosis in Vestland, Norway (see [Box 17](#)), experimental approaches to stimulating social entrepreneurship for ecological transition in Haute-de-France (see [Box 18](#)) or supporting community astrotourism in Hidalgo, Mexico (see [Box 19](#)).

Introducing dedicated initiatives plays an important role in demonstrating specific sustainability projects to a wider group of stakeholders and fostering a broader discussion about the role of research and innovation for addressing sustainability challenges. For example, in the Pomorskie region, the cluster has become an important arena for the regional stakeholders to deliberate a shared research agenda and discuss the place-based dimension of the energy transition.

## BOX 16

*The Pomeranian Offshore Cluster: harnessing regional innovation to foster energy transition in Pomorskie, Poland*

The development of offshore wind energy is a huge opportunity to make the Polish power sector less dependent on fossil fuels and to foster the green transition towards a sustainable circular economy. A study prepared by the Polish Wind Energy Association estimates that offshore wind farms in the Baltic will have a total capacity of 10 GW by the end of 2030. The Pomeranian Voivodeship has a significant potential for generating energy from renewable sources, notably offshore wind and, in the future, hydrogen. The main competences and policy decisions in the field of offshore wind farm development in Poland are at national level, however, regional, and local authorities have an opportunity to support energy transition by supporting bottom-up initiatives.

Developing renewable energy is among the key strategic priorities of the Pomorskie region. It is one of the main priorities of the regional development strategy and Smart Specialisation strategy. Two priority areas of S3 support energy transition: **1** Offshore and port and logistics technologies and **2** Eco-efficiency in production, transmission, distribution and consumption of energy and fuels, and construction.

The key regional initiative in the areas of research and innovation is the Pomeranian Offshore Cluster called “Pomeranian Platform for the Development of Offshore Wind Energy in the Baltic Sea”. The cluster places an emphasis on exploiting the regional research and development potential, strengthening competences and skills, and informing entrepreneurs and the public about the scale of investments in the sector. The cluster supports networking activities, facilitates the exchange of experience and good practices between companies active in the offshore wind farm sector in the Baltic Sea. There are also educational activities in primary and secondary schools.

The Pomeranian Offshore Cluster has more than 100 members. Most of the members are companies, including foreign developers and investors, working directly or indirectly across the entire wind energy supply chain. The cluster also engages regional and local governments, and universities and the research sector. Three working groups were established in the following areas: Competences (labour market, education); Industry (potential of companies, local content, R&D) and Sustainable management of the Baltic Sea (institutional cooperation, education and culture of communication, and risk management).

The experience of the cluster so far has made many of its members aware of the importance of cooperation and openness. Engaging in collaboration on offshore wind is seen as a unique opportunity for Polish research and development organisations to be part of the global development of an innovative supply chain for offshore wind energy. The Industry Working Group of the cluster has developed a research agenda in cooperation with the Pomeranian research centres. The agenda defines the areas in which Pomeranian actors will be able to develop European projects using their potential and experience (e.g., designing and constructing floating wind farm foundations, maintenance of offshore wind farms).



Developing skills to meet a growing demand for skilled specialists in the sector are one of the key activities of the cluster. The Pomeranian Competence Centre for Offshore Renewable Energy was set up to develop training activities for the offshore renewable energy sector. The Competence Centre works in close cooperation with maritime companies and regional secondary and higher technical schools to support the training of technical staff for the offshore sector. The Centre also promotes educational initiatives aimed at the international transfer of knowledge and experience and supports the development of training facilities for training in the field of occupational safety on offshore wind farms.

*Source: Communication with Karolina Lipińska, Marshall Office of the Pomorskie Voivodeship*

*More information: [https://rigp.pl/images/ISP\\_folder\\_EN.pdf](https://rigp.pl/images/ISP_folder_EN.pdf)*

## BOX 17

***Building world-leading green hubs through industrial symbiosis in Vestland, Norway***

Vestland County was created on 1 January 2020, as a result of a merger between Hordaland and Sogn og Fjordane county. The merger allowed the new county to re-evaluate the planning methodologies and added Smart Specialisation principles in strategies and plans. The process focussed on the UN Sustainable Development Goals. The county conducted an Entrepreneurial Discovery Process from May to November 2021, and the EDP revealed the following main findings:

- 1 We are currently an oil-driven region to be transformed into a green powerhouse. In a few years, we must deliver strong growth in new export areas.
- 2 The EU, our main market, demands solutions that Vestland is in a position to develop.
- 3 Vestland now has a roadmap with the key projects for success.
- 4 We have eight years to complete the projects that will ensure value and job creation and reduce our emissions by 55% – we will focus our efforts wherever we produce the largest effect.
- 5 The analysis indicates that building “green hubs” and industrial symbiosis will create and scale up the new green value chains. This gives us significant regional and national ripple effects.
- 6 We are not equipped to realise the opportunities identified in Vestland’s portfolio and regional portfolios. We have critical value creation and green workplaces on hold. These can quickly disappear out of Norway and Vestland if we fail to pick up the pace.
- 7 We must build green infrastructure to succeed. We need to establish a joint effort to accelerate, implement priorities and realise Vestland’s portfolio – we need to build Vestland together.
- 8 We must think big – we need to scale up the major opportunities across the county and Europe – we need to put together a comprehensive puzzle to succeed towards 2030.

***Building world-leading green hubs through industrial symbiosis***

Green hubs are paramount for the transition from fossil to renewable energy, and they will draw major investment. Ports play a central role in the green shift, both by facilitating new green industries and by ensuring that a larger share of maritime transport helps reduce climate emissions. There will be a transition where supply bases will become diversified industrial parks, and a trend where new industrial developments are budding in connection with the county’s processing industry. Industrial biotechnology will ensure the scaling up of by-products from industries. Bio-economic projects will provide great opportunities for industrial circular economy and reduced emissions. To follow-up the building of the green hubs Vestland has agreed on a co-operation rig, where both private and public organisation are represented. This rig is further described below under Public involvement.

***Innovation in the energy system and green infrastructure***

We must increase the production of renewable energy and strengthen grid capacity to conduct major transformation projects. Accordingly, the pressure on the grid will grow exponentially in the green areas. Over the past two years, the list of projects and value creation on hold in the hubs has dramatically increased. Without binding commitments, these undertakings are at risk of disappearing



from the county and the country. The co-operation rig will also work strategically and systematically on these issues. Several major infrastructure projects are planned in the region. Vestland can use public procurement to ensure innovation and regional delivery models in these projects through a green vendor development programme. Vestland has strong clusters and professional communities in all disciplines of building and construction that need large projects over time to implement major green innovations. For example: development of green concrete and green asphalt will equip the industry for the future and increase the likelihood of regional value creation in these projects.

***Public involvement - increase pace through prioritisation and good organisation for cooperation***

A survey launched during the EDP indicates that we fail to support regional projects holistically as much as we should, for example, with an overall hydrogen plan or an overall bio-plan. Over half of the effects surveyed arise through industrial symbiosis and infrastructure innovation, where multiple actors are achieving circular synergies across sectors. Shifting the focus from piloting to scaling towards 2030 requires the prioritisation of new infrastructure, concession treatments, regulations, local processes across locations and industries, as well as extensive collaboration and public involvement. A holistic approach to projects developed within green value chains must be ensured to match supply and demand and realise value chains. This means, among other things, connecting what happens at a given location regarding transportation to and from other locations. To succeed in initiating and realising prioritised projects and the infrastructure that binds projects together, the partnership must develop and agree on a common master plan.

Vestland has agreed to establish a co-operation rig, where both private and public organisation are represented; Vestland County Municipality, Innovation Norway and representatives from business organisations. In addition, the rig will ensure coordination and collaboration with forums, organisations, municipalities etc., that are already established and working on these issues. The overriding goal is to gather all good forces in the region and ensure that we pull in the same direction towards a common green goal, with the use of all available remedies and influence. We will use the public and private “muscles” in a strategic and coherent direction.

*Source: Communication with Lasse Kolbjørn Anke Hansen, Project manager/Senior Advisor and Anne Stine Hovland, Senior Advisor at Section for Research, Skills Policy and Internationalisation, Department for Innovation and Business Development, Vestland County Council. Text is also based on “Vestlandsporteføljen” (The Vestland Portfolio), report prepared for the region by Ernst&Young (2021)*

### ***Supporting experimentation and learning from pilot projects***

Different territories emphasise the importance of experimentation and learning to be able to scale pilot and demonstration projects. In some of them, S3 include support programmes focused on emerging niches of specialisation, which are more experimental. Policy makers in the Basque Country found it easier to support new forms of innovation, such as social innovation, and to engage with civil society when designing and implementing programmes focused on cross-cutting topics such as

eco-innovation and sustainable cities. The Basque Country is also an excellent example of how a comprehensive evaluation system can become a mechanism of policy learning, allowing improvement of programme design.

Given the complexity of sustainability challenges, support for ongoing EDP and experimentation with new types of innovation, such as social innovation, needs to go hand in hand with the development of a monitoring and evaluation system that allows learning from these new approaches.

#### **BOX 18**

### ***Supporting social innovation in Haute-de-France, France***

TILT is an innovative approach to experimentation complementing the S3 vision of building local and regional resilience in Hauts-de-France is TILT. TILT is an ecological transition cooperative launched in May 2019 in the City of Grande-Synthe. Founded on the principles of ecological transition income, TILT provides financial support to social entrepreneurs in return for economic activities with an ecological impact. Originally developed by the philosopher and economist, Sophie Watson, the concept of ecological transition income is firmly rooted in environmental ethics and a model of social entrepreneurship that promotes interdependence and cooperation based on democratic deliberation.

TILT provides financial support and training programmes to entrepreneurs and start-ups with a strong social dimension and provides a platform and testbed for developing their businesses and networks. TILT has supported a wide range of transition experiments in the region, including renewable energy projects, sustainable tourism initiatives, and circular economy solutions to address local sustainability challenges facing the region. The profits generated from TILT activities are reinvested into the cooperative, allowing other projects to receive funding and support. TILT received initial funding from the regional council in Hauts-de-France and is financially supported by the ZOIEN Foundation (a Swiss NGO).

*Source: Communication with Sylvie Depraetere of the Regional Council in Hauts-de-France*

*More information: <https://www.tilt.coop/>*

BOX 19

*Dark Sky project at Peña del Aire in Hidalgo, Mexico*

The Smart Specialisation process in Hidalgo has promoted sustainable development and community inclusion through the Dark Sky project in Ejido de San Sebastián in the Peña del Aire (Huasca de Ocampo, Hidalgo, Mexico). The idea to support astrotourism emerged during the entrepreneurial discovery process. Star tourism (or astrotourism) offers visitors the opportunity of stargazing in remote areas with none or minimal light pollution. It is a new business opportunity for the local community with positive effects on the local natural ecosystem as the reduction of light pollution has benefits for the nocturnal wildlife.

The project in Peña del Aire included multiple activities designed to turn the region into a stargazing destination. It combines scientific activities and practical support with building capacities within the local community to engage in sustainable tourism. For example, the geologists from the Institute of Geophysics of the National Autonomous University of Mexico supported the geological inventory of the natural formations of the Ejido San Sebastián. Designing and engineering activities were conducted to adapt lighting on the roads and in the community homes to reduce light pollution. On the other hand, the project engaged with the local community by training the local tourist guides on the unique geological conditions of the region and the opportunities of sustainable tourism. The training addressed topics such as geoheritage, geoparks, geosites and basic astronomy. It included workshops on astrotourism, light pollution reduction as well as a practical course on how to assemble and use telescopes.

The project combines the preservation of the dark sky of the region and stargazing as a sustainable alternative to the mainstream tourism. Currently visitors to Peña del Aire can enjoy night tours and practice astrophotography.

*Source: Communication with the Council of Science, Technology and Innovation of Hidalgo –CITNOVA, José Alonso Huerta Cruz (Director General), Víctor Leonel Pérez López (Director of Scientific and Technological Development and Innovation), Belida Ariana Reyes Mata (Deputy Director of Innovation) and Mauricio Hernández Meneses (Manager of Strategic Projects)*

### 3.6.3. Relevant reading and learning resources

#### *Methodologies and frameworks useful for action plans and policy roadmaps*

- STI for SDGs roadmaps (UN IATT and JRC): <https://sdgs.un.org/documents/guidebook-preparation-sti-sdgs-roadmaps-33019>
- Mission-oriented roadmap: [https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/a\\_framework\\_for\\_mission-oriented\\_policy\\_roadmapping\\_for\\_the\\_sdgs\\_final.pdf](https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/a_framework_for_mission-oriented_policy_roadmapping_for_the_sdgs_final.pdf)

- TFM webpage on STI roadmaps: <https://sustainabledevelopment.un.org/tfm>

- INNO4SD guidebook on policy roadmaps: <https://www.inno4sd.net/sti-roadmaps-sdgs-87>

#### *Frameworks for policy integration*

- OECD's Policy Coherence for Sustainable Development: <https://www.oecd.org/gov/pcsd/> including policy toolkit: <https://www.oecd.org/governance/pcsd/toolkit/#d.en.377019>

## 3.7. Monitoring and evaluation: policy learning and reflexivity

### Questions to guide reflection and self-assessment

- Does the S3 monitoring and evaluation (M&E) system allow you to identify and analyse sustainability outcomes and impacts of research and innovation instruments? Have you considered how such outcomes can be measured?
- Is there evidence of innovation and experimentation supported by S3 in your region or country that created considerable sustainability benefits or unintentionally generated negative social or environmental impacts? What are these impacts and has corrective action been taken?
- Does the M&E system include methods, indicators and processes designed to capture transformative outcomes of supported projects such as social learning effects, behavioural change, or product and technology substitution?
- Do M&E processes encourage continuous policy learning from S3 experiments and implementation? How are lessons from evaluations communicated to and between various departments?
- Does the M&E system ensure continuous participation and feedback from and between key stakeholder groups and civil society? What are the links between M&E processes and the EDP?

### 3.7.1. Challenges and implications for monitoring and evaluation

Including the sustainability dimension in the monitoring and evaluation systems of Smart Specialisation is essential for public authorities and stakeholders to understand whether and how policy support for research and innovation activities in the framework of S3 contributes to wider societal

outcomes. This knowledge is key for understanding the wider impacts of S3 and for drawing lessons for the design and implementation of the new generation of mission-oriented or challenge-led strategies and programmes.

Traditionally, evaluation activities in Smart Specialisation have focused on ex-post evaluation. S3 for SDGs and sustainability would require greater emphasis on process – or ongoing – evaluations that focus on how outcomes are produced. These are often ‘formative evaluations’ as they focus on learning and providing feedback on opportunities for reflection and help to change direction or adjust the ongoing project or policy instrument.

While there are good reasons to include the sustainability dimension in the monitoring and evaluation of public policies, taking into account the sustainability impacts of S3 is challenging for several reasons:

- Evaluating outcomes of S3 and instruments supporting research and innovation, especially at regional level, is conceptually and methodologically challenging, even without considering social and environmental sustainability. To evaluate the wider social and environmental effects of S3, territories will first need to develop capacities to monitor and evaluate the direct outcomes of their research and innovation projects. Since the outset of S3, establishing a well-functioning evaluation system for S3 has proved challenging, especially in places with limited institutional capacities.
- Including social and environmental sustainability dimensions in the monitoring and evaluation systems of S3 and wider regional research and innovation policy mix, requires new evaluation frameworks, metrics (e.g., environmental indicators) and evaluation capacities. Prompted by the European Green Deal many regions have started introducing environmental dimensions in their S3, but these developments are recent.
- Probably the most challenging aspect is evaluating the transformative outcomes of S3 and their contribution to sustainability transitions,

such as energy transition or the shift to circular economy. Capturing the transformative results of S3 requires innovative and experimental approaches in evaluation across governance levels.

Monitoring and evaluation in S3 addressing sustainability challenges need to include methods and indicators allowing evaluation. Where possible, they should measure social and environmental outcomes of S3 programmes as well as reflect on the effects of S3 governance and discovery processes on social learning, institutional capacities, and behavioural changes that contribute to sustainability transitions. A commitment to reflexivity and learning lessons from experiments, and promoting broad-based ownership of the experimentation, will be integral to the success of S3 in promoting sustainability transitions. Magro and Wilson (2019) argue that the usefulness and quality of policy learning depend on whether evaluation is considered legitimate by key actors involved in the design of S3.

### 3.7.2. Existing approaches and lessons from S3 practitioners

#### *Including social and environmental sustainability indicators in the S3 monitoring and evaluation systems*

Following the most recent revisions of S3, countries and regions have started including **environmental and social indicators in the S3 monitoring and evaluation systems**. Lapland, for example, revised its monitoring and evaluation framework to consider the implications of the European Green Deal and included new environmental indicators in their framework. In the Basque Country, the environmental indicators are applied in evaluating programmes with specific environmental and social objectives, such as the eco-innovation programme, while the indicators applied to generic research and innovation support focus on direct research and innovation outcomes.

Recognising the challenges of developing new indicators, regions engage in **research collaborations to co-create and test new indicators**.

Centro in Portugal benefited from the Horizon 2020 and Interreg programme to work with other European regions to develop and test indicators to be used for the selection and evaluation of projects in the area of circular economy (see [Box 20](#)).

#### *SDGs as contextual indicators of territorial development*

SDGs and their targets are not part of the evaluation and monitoring frameworks used to evaluate R&D programmes developed to implement S3. Regional practitioners are cautious in attributing the outcomes and impacts of their R&I programmes, many relatively small, to the SDGs.

However, **the SDGs and their targets are considered useful contextual indicators and a framework to situate outcome indicators of S3 developed for specific priority areas**. In the Basque Country, the SDGs and their targets have become a broader reference framework and “a common universal context” for the entire regional policy mix (see [Box 21](#)).

## BOX 20

***Inclusion of circular economy assessment criteria in a Regional Operational Programme call in Centro, Portugal***

The Regional Operational Programme of the Centro region of Portugal for 2014-2020 (Centro 2020) is particularly oriented towards the reinforcement of companies' competitiveness and job creation, promoting a knowledge-based economy and intensifying the knowledge transfer between the scientific and technological system and the regional economic base. As for Circular Economy (CE), although it is a transversal and broad concept, its development depends on knowledge and innovation activities, which are mainly supported by Thematic Objectives 1 and 3 of Centro 2020.

CCDRC has been actively engaged in promoting the improvement of some of its most relevant policy instruments to support activities in line with the CE transition. In the context of an Interreg Europe project (REPLACE), CCDRC assumed the goal of including CE assessment criteria in the merit evaluation process of a Regional Operational Programme call, within TO1, that was launched in 2021.

In the context of the strategic impact assessment, project promoters were asked to demonstrate their alignment with the regional S3, as well as their contribution to the CE transition, according to a table that was made available as an Annex to the call text. This table was based on the one proposed by SCREEN (an H2020 project in which CCDRC also participated), and contemplated criteria such as Circular design, New production processes using "secondary raw materials", Re-Use, Re-Manufacturing, Refurbishment, Repair, Waste reduction, Net energy balance, among others. From the total number of proposals submitted, the majority were considered to be aligned with at least one relevant criterion for the transition to a CE, thus benefitting from an increase in their overall score.

CCDRC will monitor the implementation of the projects in order to collect insights on what could be improved in the assessment of the projects' contribution to the CE transition (since this was the first time that CE assessment criteria were used for the scoring of project proposals within the overall context of the Portuguese Partnership Agreement). More precisely, CCDRC wishes to draw conclusions on the added value of using CE assessment criteria in the evaluation of the investment project's merit and to deliver insights for the preparation of the programming period 2021-2027 – as CE will continue to be one of the main strategic frameworks for our regional development and our upcoming Regional Operational Programme.

*Source: Communication with the representatives of Centro, Portugal*

BOX 21

*Monitoring Basque Country, Spain's contribution to achieving the SDGs*

The Basque Country embraced the 2030 Agenda and the SDGs by adopting the Euskadi Basque Country 2030 Agenda. The agenda expresses “a Basque model for growth and environmental, economic and social wellbeing” and is considered an overarching action plan for the region. The SDGs are seen as “a common universal context” that helps the region to formulate its own strategic priorities responding to its territorial context. The 17 SDGs were linked to 15 regional objectives and 100 targets associated with commitments of the Basque government. The Euskadi Basque Country 2030 Agenda includes a dashboard of 50 indicators to track progress that are monitored by Eustat, the Basque Statistics Institute. The agenda was designed to be adaptable based on monitoring and assessment of progress.

The Basque government has committed to monitoring contributions of its programmes and the sectoral policies to the SDGs annually from 2017 to 2030. Five annual monitoring reports have been published so far. Each report presents key indicators and information on key policy developments relevant for each SDG and selected targets. The reports list key measures (e.g., investments), planning instruments and legislative initiatives developed by various ministries, including Smart Specialisation. The monitoring reports are tools for monitoring and policy learning helping to improve the overall directionality and coherence of the Basque policy mix.

More information: <https://en.eustat.eus/indicadores/ods.html><https://www.euskadi.eus/agenda-2030/>

Source: Communication with Jonan Fernandez, General Secretary for Social Transition and 2030 Agenda, Basque Government

***Developing formative evaluation and ongoing policy learning about sustainability***

Regional practitioners agree on the importance of conducting formative evaluations and ensuring that lessons from evaluations are discussed and applied in policy design and implementation. This is especially important when tackling the complexity and uncertainty of sustainability challenges, which require bringing in new perspectives and knowledge to the evaluation process. Given these complexities and uncertainties, involving experts and stakeholders in the evaluation process is increasingly more important.

Regional practitioners emphasise the importance of policy learning and knowledge management tools to use findings from evaluation across the

policy cycle, including in the ongoing EDP. The Basque Country has a long tradition of evaluating regional innovation policies. The system is designed so the findings from evaluations inform the design of new programmes.

***New approaches to understand transformative outcomes of S3 governance and projects***

Regions and countries start experimenting with new evaluation methods to identify and measure transformative outcomes of innovation projects. Given that these approaches are new to most policy evaluators, they are often co-created and experimented with in close collaboration with academic researchers - see [Box 22](#) on the experience in developing an approach to evaluate behavioural outcomes of S3 in Gippsland, Australia.

## BOX 22

*Impact log and measuring behavioural outcomes of S3 in Gippsland, Australia*

The Latrobe Valley Authority was established in 2016 in southeast Victoria to lead transition from decades of use of coal in the production and transmission of energy across the state. A key principle of the Authority's activity was to focus on 'what mattered to people' across local society and in the broader context of state-wide ambitions. Along with the importance of achieving traditional quantitative targets associated with economic and societal transformation, winning the hearts, minds and commitment of people to collaborate and innovate was key to impact and success.

The Latrobe Valley Authority utilised a 'Theory of Action' to describe how its work across a number of fields was designed to lead to desired outcomes – from design to delivery to impact. This required a framework that explicitly linked direct interaction and dependency on each stage of the process including the practice of collecting and logging evidence of behavioural change impact. It required the development and practice of applying a range of systems and behaviour change methodologies, use and understanding of consistent language and monitoring and recording methods of impact and associated measurement using a States of Change Model. The Authority explored several approaches to behaviour and system change and the core principles for practice. It identified three core ideas of particular relevance to its work:

- Behavioural and system change aims to bring about lasting change by altering underlying structures and supporting mechanisms, which make the system operate in a particular way.
- The first step to solving a complex social or economic problem is to understand the system in which it sits.
- Understanding systems is critical to enable transformation in the structure and interrelationships of the parts and realise the emergence of new behaviour and functionality.

The Authority has developed a practice and monitoring tool used alongside the design model to understand, manage and monitor the qualitative progress of activities in real time and for summative progress of impact. Having an agreed tool for monitoring and collecting evidence of change for logging impact is an important approach considering the obvious difficulties in measuring behavioural change. The Authority has drawn on the work of Professor Patrick Griffin from the University of Melbourne (Assessment for teaching Patrick Griffin 30 August 2015 - The Psychology of Teaching and Learning) to define the ways in which behavioural change can be monitored and assessed over time. The observation of behavioural and system change is based on the following questions:

**1** What are people ready to learn, and what is the evidence for this in terms of what people do, say, make or write?. Staff use experience in working with people to observe and record change through these five behaviours.

In addition, the following questions assist with monitoring over time and for continuous improvement.

- 2** What are the possible evidence-based interventions and the associated scaffolding processes for each one?
- 3** What is the preferred intervention, and how will it be resourced and implemented?
- 4** What is the expected change impact, and how will this be evaluated?
- 5** What is the outcome, and how can this be interpreted?

The following tool is used to observe over three domains and log examples of change associated with six 'Conditions of Change when influencing Behaviour and Systems'. What people do, say, make or write forms the evidence of change.

The Authority has developed a shared portal for logging the examples observed associated with the stages of change and these conditions. These are then aggregated to identify common themes of impact and measures of success. Checking in with staff on a regular basis assists with sharing examples to celebrate success and to review and adjust activities if evidence of change is not progressing as expected.

DOMAINS OF CHANGE	STAGES OF PROGRESSION	APPROACH	CONDITIONS OF CHANGE WHEN INFLUENCING BEHAVIOUR AND SYSTEM	
Knowledge and Understanding	Awareness Response Participation Support	<ul style="list-style-type: none"> <li>• Build a shared understanding of the opportunity</li> <li>• Examine current context and existing practices</li> <li>• Identify other successful practices</li> <li>• Generate ideas and design potential solutions</li> </ul>	Changes in; <b>Knowledge and Understanding</b>	Change in organisations or persons level of awareness or understanding of the project or LVA.  This included their interest in wanting to support, participate or make the project happen
Application	Activity Agreement Practice Confidence	<ul style="list-style-type: none"> <li>• Test and refine product, service or process</li> <li>• Build capacity to collectively implement</li> </ul>	Changes in; <b>Practice</b>	Shifts in practices, activities, informal shared habits that are related to improving the project or LVA.  The included people or organisations confidence in applying the new practice, service or project.
Behaviour and Belief	Collaborative	<ul style="list-style-type: none"> <li>• Capture learnings and share</li> <li>• Refine and scale</li> <li>• Embed agreed practices into organisational fundamentals</li> </ul>	Changes in; <b>Partnerships</b>	Changes to the connections and communications occurring among the actors in the systems, especially among those with differing perspectives and histories
	Commitment		Changes in; <b>Resources Flows</b>	Changes in how money, people, knowledge, information, and other assets such as infrastructure are allocated and distributed
	Organisational, Structural or Policy Change		Changes in; <b>Organisational, Structures and/or Policy</b>	Changes to rules, regulations, policy and priorities that guide the entity's own or others' actions
	Sentiment attitude		Changes in; <b>Values and Advocacy</b>	People see the value in project/LVA and advocate the benefit

Source: Communication with Karen Cain, Gippsland Authority, April 2022

### 3.7.3. Relevant reading and learning resources

#### *Sources of contextual sustainability indicators for S3*

- United Nations SDG indicators website: <https://unstats.un.org/sdgs/>
- Eurostat's sustainable development indicators: <https://ec.europa.eu/eurostat/web/sdi/indicators>
- European Commission's Transitions Performance Index: [https://research-and-innovation.ec.europa.eu/strategy/support-policy-making/support-national-research-and-innovation-policy-making/transitions-performance-index-tpi\\_en](https://research-and-innovation.ec.europa.eu/strategy/support-policy-making/support-national-research-and-innovation-policy-making/transitions-performance-index-tpi_en)
- JRC's publication overviewing local SDG indicators and data: <https://publications.jrc.ec.europa.eu/repository/handle/JRC124580>

#### *Evaluating sustainability impacts of research and innovation*

- European Commission's publication on assessing environmental impact of research and innovation policy: "A short guide to assessing environmental impacts of research and innovation policy", available at <https://op.europa.eu/en/publication-detail/-/publication/00f04c38-5171-46a0-9f95-a5f-36b58a04b>
- Transformative Innovation Policy Consortium (TIPC): Methodology using theory of change to evaluate transformative outcomes – webpage: <https://www.tipconsortium.net/tipc-methodology-a-formative-evaluation-theory-of-change-for-transformative-outcomes/>

**Table 2** provides an overview of all the questions for reflection and key lessons learned from stakeholder interviews.

**TABLE 2** S3 for SDGs reflection framework in a nutshell

S3 COMPONENTS	CURRENT FOCUS	QUESTIONS TO GUIDE REFLECTION	IMPLICATIONS AND LESSONS FOR ALIGNING S3 WITH THE SDGs
<p><b>DIAGNOSIS:</b> <b>ANALYSING THE INNOVATION POTENTIAL</b></p>	<p>A comprehensive and sound analysis of the economy, society, and innovation structure, aimed at assessing both existing assets and prospects for future development. Three dimensions of diagnosis cover:</p> <ul style="list-style-type: none"> <li>■ Territorial assets, such as technological infrastructures,</li> <li>■ Linkages with the rest of the world and the position of the place within the European and global economy, and</li> <li>■ Dynamics of the entrepreneurial environment.</li> </ul>	<ul style="list-style-type: none"> <li>■ Does the diagnosis include evidence on current and potential future impacts and risks for your region or country associated with global environmental and societal challenges for the economy, society and natural environment?</li> <li>■ Does the analysis of the existing specialisations and competitive assets of your region or country include evidence and reflection on the strengths and weakness of actors, institutions and infrastructures to adapt and innovate to address sustainability challenges and the SDGs?</li> <li>■ How are various types of scientific evidence, qualitative and quantitative research methods and sources of expertise on sustainability challenges and opportunities collected and interpreted to support the design and implementation of Smart Specialisation?</li> <li>■ Does the diagnosis consider diverse perspectives on the societal challenges, including from previously not involved or marginalised groups?</li> </ul>	<ul style="list-style-type: none"> <li>■ Localise SDGs in specific national, regional and local contexts based on a comprehensive analysis of current and potential future impacts and risks of environmental and societal challenges for the economy, society and natural environment. Voluntary Local Reviews provide useful and proven approach to localising SDGs.</li> <li>■ Analyse the STI potential of actors, institutions and infrastructure to adapt and innovate to tackle societal challenges and contribute to the SDGs. The analysis should have a balanced focus on the demand and supply-side of the innovation system</li> <li>■ Make diagnosis robust by applying mixed-method research designs balancing quantitative and qualitative tools, including new methods and data relevant for the sustainability challenges. Alongside scientific evidence, it should use local knowledge and expertise considering diverse stakeholder perspectives on the challenges.</li> </ul>
<p><b>GOVERNANCE:</b> <b>SETTING OUT THE S3 PROCESS AND GOVERNANCE</b></p>	<p>Broad and comprehensive stakeholder participation in the S3 design, including firms and entrepreneurs, research and academia, the public sector as well as innovation users or groups representing consumers and NGOs representing the people and workers. Key features:</p> <ul style="list-style-type: none"> <li>■ Inclusive governance to prevent capture by specific interest groups, powerful lobbies, or major regional stakeholders</li> <li>■ Governance to allow for ‘collaborative leadership’ and shared ownership</li> <li>■ ‘Boundary spanners’ to foster collaboration and manage potential conflicts.</li> </ul>	<ul style="list-style-type: none"> <li>■ Do the design, implementation and monitoring of S3 ensure a broad, inclusive and continuous participation of stakeholders relevant to the sustainability transformation of your region or country?</li> <li>■ What are the specific arrangements for identifying and addressing the risk of capture of the process by dominant incumbents who impose their perspectives on sustainability transition or are less concerned with sustainability objectives?</li> <li>■ Are there governance mechanisms within and across public and private sectors that allow the identification and generation of inter-institutional synergies between policies, instruments and budgets?</li> </ul>	<ul style="list-style-type: none"> <li>■ Broaden participation in S3 governance and processes to engage new actors, including civil society. Broader inclusion is challenging but it is key for ensuring shared ownership and legitimacy of the process and helps to prevent the risk of capture. Engaging new actors can help translate SDGs into specific local (or trans-local) measures and missions.</li> <li>■ Strengthen institutional capacity and build new organisational capabilities of public sector to ensure challenge-led collaborative governance arrangements in S3.</li> <li>■ Reconsider the role of intermediaries in engaging difficult-to-reach groups and previously excluded groups and territories.</li> </ul>
<p><b>VISION:</b> <b>DEVELOPING A SHARED VISION AND SCENARIOS</b></p>	<p>The scenario constitutes the basis for developing a vision about where the territory would like to be in the future, what the main goals to achieve are, and why they are important.</p> <ul style="list-style-type: none"> <li>■ Having a clear and shared vision of territorial development is crucial in order to keep stakeholders engaged in the process;</li> <li>■ During the S3 design and along the process of implementation of the strategy, good communication is crucial as it is key for generating a positive tension in the regional society towards strategic goals, keeping stakeholder engagement and encouraging new stakeholders to join.</li> </ul>	<ul style="list-style-type: none"> <li>■ What is the importance of sustainability challenges and the SDGs in the S3 vision and visions underpinning other relevant development strategies of your region or country?</li> <li>■ How is desirable future portrayed in the S3 vision? What is the relative importance of economic, social and environmental dimensions in the vision?</li> <li>■ Is the vision known and shared by the key stakeholders?</li> <li>■ Does S3 include a reflection on alternative development scenarios and transition pathways to explore the role of research and innovation in achieving sustainability goals? Does the reflection on alternative pathways consider their potential economic, social and environmental impacts?</li> </ul>	<ul style="list-style-type: none"> <li>■ Develop a shared territorial vision based on the systemic reflection on the opportunities, risks and uncertainties of sustainability transitions.</li> <li>■ Focus the vision and scenarios on the role of research and innovation in fostering alternative transition pathways towards the SDGs</li> <li>■ Use foresight tools to deliberate alternative transition pathways considering the role of variety of innovation approaches to tackle sustainability challenges. Scenarios should discuss uncertainties and risks and reflect on social and environmental impacts of pathways.</li> <li>■ Consider developing scenarios and transition pathways for each specialisation (priority domain) of the region. This can create a more active engagement of stakeholders in the process and becomes part of a challenge-led EDP.</li> </ul>

S3 COMPONENTS	CURRENT FOCUS	QUESTIONS TO GUIDE REFLECTION	IMPLICATIONS AND LESSONS FOR ALIGNING S3 WITH THE SDGs
<p><b>PRIORITIES: TOWARDS CHALLENGE-LED EDP AND S3 PRIORITY AREAS</b></p>	<p>Priority setting in the context of S3 entails an effective match between a top-down process of identification of broad objectives aligned with EU and other policies and a bottom-up process of emergence of candidate niches for smart specialisation, areas of experimentation and future development stemming from the discovery activity of entrepreneurs.</p> <p>It is of crucial importance that S3 governance bodies focus on a limited number of innovation and research priorities in line with the potential for smart specialisation detected in the analysis phase that is anchored in entrepreneurial discoveries. These priorities will be the areas where a territory can realistically hope to excel.</p>	<ul style="list-style-type: none"> <li>■ Were societal challenges taken into account in the definition of your S3 priority domains? If yes, how do they address sustainability challenges and the SDGs?</li> <li>■ What are the incentives, drivers and barriers for including sustainability-related specialisation areas and objectives, including the SDGs, in the S3 priorities?</li> <li>■ How do you balance top-down goals and bottom-up perspectives in selecting and shaping your priority domains? What is the role of EDP in this context?</li> <li>■ Do any of the selected S3 priorities focus on existing or emerging niches with a potential to experiment, demonstrate or scale transformative innovation with an ambition to address sustainability challenges and the SDGs in your region or country?</li> </ul>	<ul style="list-style-type: none"> <li>■ Focus priorities around challenge-led functional domains to ensure that S3 mobilises territorial research and innovation potential to respond to sustainability challenges</li> <li>■ Ensure a dynamic balance between top-down identification of priorities with bottom-up entrepreneurial discovery. The bottom-up processes of discovery and social learning are essential for situating broad sustainability goals, including the SDGs, in the regional context.</li> <li>■ Consider adopting a challenge-led or mission-oriented approach to EDP to align it with the directionality towards sustainability challenges and harness variety of bottom-up ideas for transformative innovations and experimentation.</li> <li>■ Place a stronger emphasis on ensuring the inclusiveness and continuity of EDP. EDP can become a transformational process supporting social learning including diverse actors, such as NGOs, civil society, public sector and research organisations.</li> </ul>
<p><b>DEFINING AN ACTION PLAN WITH A COHERENT POLICY MIX</b></p>	<p>Roadmap with an action plan allowing a degree of experimentation through pilot projects.</p> <p>An action plan is a way of detailing and organising all the rules and tools a region needs in order to reach the prioritised goals, and it should provide comprehensive and consistent information about strategic objectives, timeframes for implementation, identification of funding sources, tentative budget allocation.</p> <p>Pilot projects are the main tools for policy experimentation and allow testing innovative mixes of measures at a small scale. They should be coupled with effective evaluation mechanisms leading to sound appraisal of success and feasibility as mainstream S3 projects.</p>	<ul style="list-style-type: none"> <li>■ Would you describe your S3 as challenge-led or mission-oriented? Has the inclusion of sustainability challenges in S3 resulted in specific objectives and led to changes in the selection and design of instruments and supported activities?</li> <li>■ Does the action plan include instruments designed to support experimental and transformative innovation focused on sustainability challenges?</li> <li>■ What are the barriers and drivers to developing and implementing instruments supporting sustainable innovation in your region and country? How can you introduce them without disrupting parts of the innovation eco-system that have proven to work well?</li> <li>■ Does the S3 action plan include coordination mechanisms to ensure internal coherence of S3 and external synergies between S3 and other relevant policy areas? Is there a wider framework in your region or country to support policy coherence and directionality towards sustainability goals?</li> <li>■ Is the action plan and policy mix designed to ensure corrective measures are taken to adjust the action plan and instrument design based on the continuous process of entrepreneurial discovery and insights from M&amp;E?</li> </ul>	<ul style="list-style-type: none"> <li>■ Use action plan to provide a strategic framework and mechanisms for ensuring coherence and directionality of policy mix towards sustainability goals.</li> <li>■ Open policy mix of S3 to new instruments supporting different types of innovation and collaboration with other policy domains relevant for sustainability challenges.</li> <li>■ Use demand-side instruments to create demand for sustainable innovation and shape niche markets to foster and enable transformative innovation (e.g. innovation procurement)</li> <li>■ Support experimentation and demonstration fostering innovation aligned with the selected transition pathways. Include learning from experimentation and acceptance of risk linked to experimentation in the design of instruments.</li> <li>■ Be flexible to allow adjustment of the action plan based on monitoring and evaluation and on the EDP.</li> </ul>

S3 COMPONENTS	CURRENT FOCUS	QUESTIONS TO GUIDE REFLECTION	IMPLICATIONS AND LESSONS FOR ALIGNING S3 WITH THE SDGs
<p><b>MONITORING AND EVALUATION (M&amp;E)</b></p>	<p>Mechanisms for monitoring and evaluation to be integrated in the strategy and its different components from the beginning.</p> <p>A strategy should evolve and adjust to changes in economic and framework conditions, as well as to emergence of new evidence during implementation through evaluation and monitoring activities.</p> <p>Peer review as a key instrument to improve S3.</p>	<ul style="list-style-type: none"> <li>■ Does the S3 monitoring and evaluation (M&amp;E) system allow you to identify and analyse sustainability outcomes and impacts of research and innovation instruments? Have you considered how such outcomes can be measured?</li> <li>■ Is there evidence of innovation and experimentation supported by S3 in your region or country that created considerable sustainability benefits or unintentionally generated negative social or environmental impacts? What are these impacts and has corrective action been taken?</li> <li>■ Do the M&amp;E include methods, indicators and processes designed to capture transformative outcomes of supported projects such as social learning effects, behavioural change, or product and technology substitution?</li> <li>■ Do M&amp;E processes encourage continuous learning from S3 experiments and implementation? How are lessons from evaluation communicated to and between departments?</li> <li>■ Does the M&amp;E system ensure continuous participation and feedback from and between key stakeholder groups and civil society? What are the links between M&amp;E and the EDP?</li> </ul>	<ul style="list-style-type: none"> <li>■ Extend monitoring and evaluation system to include new indicators and evidence to analyse outcomes and impacts of S3 on sustainability challenges and the SDGs</li> <li>■ Place stronger emphasis on formative evaluation focused on policy learning</li> <li>■ Develop dedicated approaches to monitor and learn from experimentation projects</li> <li>■ Experiment with and introduce new methods helping to navigate complexity and analyse systemic change, including understanding place-based interlinkages between sustainability goals</li> <li>■ Build evaluation and policy learning capacities and establish learning mechanisms (e.g. community of practice) and knowledge management tools supporting the on-going EDP.</li> </ul>

Source: Own elaboration. The column introducing the current focus of the S3 framework is based on Foray et al. (2012).

# Key findings and recommendations

# 4.

This report introduces the results of testing a reflection framework for regions and countries willing to strengthen the sustainability dimension of their Smart Specialisation strategies. The updated framework has been co-created in collaboration with more than 30 policy practitioners from 12 regions and countries in Europe and beyond. The ambition guiding this exercise was to make the tool accessible and useful for policy makers in all interested regions and countries.

The prototype of the reflection framework was first drafted based on a comprehensive literature review on theories and concepts with a potential to align Smart Specialisation with sustainability transitions and the SDGs (Miedzinski et al., 2021). Consultations and numerous exchanges with policy practitioners and experts helped us to significantly rework the framework and illustrate it with many practical examples of how sustainability challenges and the SDGs have been integrated in Smart Specialisation in practice, from design to monitoring and evaluation, in different territories.

## KEY FINDINGS

The empirical research and co-creation process allows us to draw several general lessons shared between most consulted policymakers and practitioners engaged in Smart Specialisation. First, the overall sustainability orientation is now broadly accepted and considered relevant for Smart Spe-

cialisation across diverse territories. This is partly because of the overall strategic direction given by policy (e.g. the European Green Deal in the EU) but also because of a growing understanding of the necessity and urgency to act to address sustainability challenges at regional and local levels.

Second, the SDGs and the 2030 Agenda are considered important for providing a broad directionality and context of sustainability transitions; however, the main aim was to develop approaches to translate and localise sustainability challenges and goals into regional and local realities. Our respondents considered these processes of translating and situating sustainable development challenges in S3 processes, notably in EDP and programming, particularly challenging and pertinent.

Third, our respondents welcomed the idea of a reflection framework, but were unanimous in their plea to translate it into a language understandable by policymakers and make it as practical as possible. The new concepts and vocabulary focusing on sustainability and transitions risk creating an unintended communication gap between theory and practice. Many practitioners admitted they face similar challenges in their own work, especially when engaging with SMEs and local stakeholders. In our attempt to address this concern, we tried to simplify the language and, most importantly, opened the possibility for our respondents to express the challenges they face in their own words.

This is why most of the boxes with examples and reflections were prepared in consultation with S3 practitioners.

## **IMPLICATIONS AND CHALLENGES OF EMBEDDING SUSTAINABILITY IN S3 STEPS**

### *Diagnosis*

Granular knowledge about innovation capabilities and science and technology-based innovation remains an important cornerstone for Smart Specialisation strategies. Regions and countries can continue to build on and benefit from the strategic intelligence about their innovation systems, also when directing Smart Specialisation strategies toward sustainability challenges. After all, this constitutes the foundation for the unique, place-based solution space of a territory and constitutes the opportunity space for processes of diversification.

Following the turn towards challenge-oriented approaches, such as missions, regions and countries have extended the analytical focus towards capabilities, resources and assets that contribute to societal problem-solving in a more profound and fundamental way than in previous iterations of Smart Specialisation strategies. This shift puts new demands on extending the diagnosis of the innovation systems that are more explicitly geared to broader, more capacious forms of innovation, including grassroots and social innovation. It also implies that there are potentially many more innovators and agents of change in the innovation system than previous analyses and observations may have suggested.

The diagnostic shift requires continuous investment in new diagnostic capacities and methods, including quantitative and qualitative data used to assess research and innovation capacity to address societal challenges and the SDGs. This should include a specific focus on analysing policy and governance capacities based on coordination capabilities and social capital. Traditional diagnostics of regional innovation capacity have become highly refined and well-integrated into the policy-making process. They are however, primarily geared to the supply-side of innovation.

Smart specialisation strategies for sustainability challenges require greater rigour and granularity when it comes to demand factors of innovation as well as the interface and intermediation between societal challenges and their solutions.

Finally, sustainability challenges put an even greater focus on transparency and co-creation with different stakeholders on the analytical backbone of Smart Specialisation strategies, considering that degrees of contestation and importance of legitimacy have further increased.

### *Governance*

From the beginning, participatory governance across public, private, academic and civil sectors has been a cornerstone of the institutional design that underpins Smart Specialisation strategies. This institutionally hybrid, cross-sectoral approach has been conducive to generating legitimacy and broad support for the visions and priorities that are brought forward by Smart Specialisation strategies but also generative in sourcing local knowledge about the capabilities and challenges in the territory. These governance qualities potentially have greater relevance and purchase when directing Smart Specialisation strategies toward sustainability goals. In spite of the diversity of contexts and capacities, all countries and regions committed to orient their development ambitions towards 'universal' sustainable development goals. The key question was 'how' to do it.

Mobilising place-based capacity for ambitious sustainability goals requires exactly the kind of associative and deliberative interaction and engagement across the quadruple helix that resides at the core of Smart Specialisation governance. The orientation towards sustainability gives new meaning to the principle of subsidiarity and challenges governments with the responsibility of not only helping empower local agents of change, innovators and entrepreneurs but also animating processes of negotiation, contestation and collaboration so that challenge-oriented cross-sectoral partnerships are created and maintained.

While the institutional capacity to orchestrate such processes and partnerships is variable across regions and nations, Smart Specialisation strategies have proven to be promising starting points though not necessarily “quickfixes”. Further investment in institutional capacity building is even more in demand when directing Smart Specialisation towards sustainability goals, especially when it comes to the elusive question of how to engage ‘the people into processes of innovation and experimentations towards sustainability.

### *Vision*

Sustainability challenges and societal missions have proven to be highly instrumental in helping to set out long-term and transformative visions for Smart Specialisation strategies. Here, deliberative methods, foresight and scenario development around sustainability challenges can be used to identify specific needs and challenges. These are calibrated and aligned with often already existing roadmaps for industry and technology pathways that have been set out in previous and existing Smart Specialisation strategies. There is scope for even more comprehensive and integrated future orientation and directionality for territorial development.

A key challenge in vision-building processes is to ground and localise the global future scenarios into local, place-based conditions and opportunities. This requires active consultation and strategic dialogue with key stakeholders in the country and regions. A wide range of tools and techniques are available to organise vision-building processes.

However, orchestrating such exercises also involves craftsmanship, strong networks and relationships and, often, investment in capacity development and continuous learning by programme managers. Opening up vision-building processes to include considerations and trends vis-a-vis sustainability by default invites conflict and contestation around environmental and social challenges, making the process more ‘political’. Balancing different interests and world-views, finding compromise and managing robust deliberations is, however, endemic to ‘healthy’ democratic norms and values. It is unlikely that regions and countries are able

to arrive at one singular, homogenous vision to inform Smart Specialisation Strategies for addressing sustainability challenges.

Another challenge in vision building concerns the use of expert knowledge. On the one hand, expert knowledge is critical to secure quality and rigour in the evidence base and factual underpinning that guide vision building. On the other hand, expert knowledge could be conflated with elite and/or vested interests. That is why the facilitation of vision-building processes requires careful curation and process support.

### *Priority setting and EDP*

The EDP has been a seminal feature of Smart Specialisation since its inception and reflects its dynamic, open and adaptive approach to development. The purpose of EDP in Smart Specialisation to address sustainability challenges is manifold. First, it seeks to accelerate transformative outcomes by pooling resources and capabilities that expedite innovation and lead to new development paths. Second, it facilitates co-creation, experimentation and deliberation between different stakeholders around specific, localised missions. Third, EDP helps to coordinate different policy domains and create coherence towards selected priority areas.

In addressing sustainability challenges, the EDP is at the same time generative and creative but also reflexive and responsive. Here we can witness challenge-led innovation policy frameworks – responsible research and innovation, mission-oriented innovation policy and smart specialisation – converging and being operationalised into place-based innovation eco-systems that strive for sustainable, ethically and socially desirable societal outcomes. Constructing such innovation eco-systems requires entrepreneurship and entrepreneurial learning but not of a kind that is limited to traditional business opportunity or technology-based entrepreneurship. There is a need to design EDP as a collaborative social learning process that localises and builds a shared understanding of sustainability challenges between stakeholders. This shared understanding is a knowledge-based foundation for deliberating key priorities of action.

A broad range of entrepreneurial strategies and mechanisms feed into Smart Specialisation strategies for sustainability challenges, including the latter but also extending towards institutional and social entrepreneurship. This also implies that many more stakeholders can be enrolled in the EDP beyond entrepreneurial firms, including research organisations, policymakers, NGOs and civil society organisations. Notably, EDP for sustainability challenges requires collective and continuous action, keeping stakeholders engaged in ongoing processes of pursuing, implementing and reflecting on priority areas.

### ***Action plans and policy mix***

Re-orienting action plans and policy mixes to address smart specialisation strategies for SDGs and sustainability challenges will require changes in designing, implementing, and coordinating policy instruments and portfolios on all governance levels. Realising changes in the policy mix depends on institutional qualities and, notably, on the quality of multi-level governance.

A major challenge to the action plan and policy mix is constituted by policy layering and path-dependence. Existing policy instruments that have been used and introduced through previous Smart Specialisation strategies are often already familiar to stakeholders in the territory and can be relatively easy recalibrated and adjusted to take account of sustainability imperatives (i.e. low-hanging fruit). On the other hand, these instruments may, often unwittingly, give cause to the extension of unsustainable development paths by emphasising 'shovel-ready' projects and 'picking winners'. This implies that 'policy unlearning' can be an important part of the policy mix for smart specialisation strategies for sustainability challenges as well.

Regarding instrument design, there is a need to ensure that strategic objectives are translated in the design features of programmes and other instruments beyond the direct remit of the public authorities responsible for Smart Specialisation strategies, such as public procurement or planning regulations. Supply-side instruments supporting innovation in countries and regions remain impor-

tant but need to be open to various types of innovation and balanced with other policy instruments, notably on the demand side. Scope and resources to conduct policy labs that test experiments with novel instruments and policy designs are instrumental in generating ambitious, transformative change. However, this requires strategies and policy roadmaps to embed and institutionalise policy experiments within the mainstream repertoire and portfolio of policies that activate Smart Specialisation strategies and may, initially, disrupt policy coherence.

Challenge-led and mission-oriented action plans call for greater policy coherence and alignment with sustainability goals. They ask for new and strengthened capacities to work collaboratively and seek synergies between policy instruments implemented by different ministries and departments and across all levels of governance. There is a need to develop these capacities within the public sector, and in conjunction with the private sector and civil society, to ensure that measures and investments driven by the public and private sector are aligned towards shared sustainability goals. Working on challenges, missions and developing inclusive cross-sector policy agendas require collaborative capacities shared by all key stakeholders.

### ***Monitoring and evaluation***

Parallel to experimentation with novel policy instruments, Smart Specialisation strategies for SDGs and sustainability challenges ask for experimentation with novel arrangements and approaches to monitoring and evaluation. Sustainability not only adds complexity to the way development outcomes are assessed. Critically, it further bolsters the need for formative monitoring and evaluation practices that contribute to continuous policy learning in more substantial ways than ex-post policy evaluation can achieve.

Traditional economic indicators, such as the number of start-ups or patents granted, need to be complimented and integrated with environmental and social indicators in a meaningful way at local and regional level. Here, ongoing work with

SDG indicators provides a logical starting point. However, the challenge lies in going beyond 'SDG accounting' and integrating SDG indicators into project and programme evaluation in such a way that it contributes to policy learning. In this process, feedback is filtered and tempered by factors such as power, status, hierarchy, fear, and ambition. Failure is even more difficult to accommodate as it often spells disaster for managers, policy officers and political leaders in the public sector.

Monitoring and evaluation are still most often seen as low-status activities in S3, facing a risk-averse culture that stymies innovation in the public sector. However, smart specialisation is precisely about policy experimentation that is organised in accordance with a multilevel policy architecture that allows and actively encourages monitoring, evaluating and translating lessons learned from local experiments beyond its own local, territorial context.

## RECOMMENDATIONS

There is a need to develop a policy environment that enables and incentivises regions and countries to experiment with innovative designs of policy portfolios and programmes and to invest in transformative projects. In the context of S3, some possible approaches could be challenge-based prioritisation or place-based missions selected and co-designed during the EDP and implemented in specific localities. They could be a constructive way to foster bottom-up experimentation in EU research and innovation policy.

Policy evaluation and monitoring systems, from local to EU levels, must ensure that lessons learned from policy experiments are considered in policy design and implementation across governance levels. This means investing in specific programmes supporting the development of new governance methods (including public sector innovation), and forming new mission-oriented partnerships and peer-to-peer exchanges between regions and countries supporting place-based missions.

The reflection framework should be seen above all as an invitation to the regions and countries to

reflect on the current Smart Specialisation practices and consider stepping up their efforts to foster sustainability transition in their revamped S3. To be impactful, however, the framework will need to be supported by policy platforms and inter-regional 'communities of practice' where the new approaches can be continuously discussed, co-created and tested in diverse territorial contexts.

One such policy learning environment is now provided by the Pilot Action of the Partnerships for Regional Innovation (PRI) where countries and regions experiment with new approaches to transformative innovation in different territorial contexts.

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## LIST OF ABBREVIATIONS

**CITNOVA** – Council of Science, Technology and Innovation of Hidalgo (Mexico)

**EC** – European Commission

**EDP** – Entrepreneurial Discovery Process

**EGD** – European Green Deal

**ESIF** – European Structural and Investment Funds

**EU** – European Union

**GHG** – Greenhouse gas emissions

**JRC** – Directorate-General Joint Research Centre of the European Commission

**MLP** - Multi-level perspective

**MOIP** - Mission-oriented innovation policy

**OECD** – Organisation for Economic Co-operation and Development

**R&D** – Research and Development

**RRI** - Responsible research and innovation

**S3** - Smart Specialisation Strategies

**SDGs** – Sustainable Development Goals

**SES** - Social-ecological system

**STI** – Science, technology and innovation

**TIP** - Transformative innovation policy

**TM** – Transition Management

**UN** – United Nations

**IATT** – Inter-Agency Task Team

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# Methodological approach

# ANNEX I

This section outlines the overall methodological approach, introduces the analytical procedures, and describes the data collection methods employed to validate the conceptual framework of Smart Specialisation for Sustainable Development Goals.

The methodological approach consisted of three main steps:

- 1** Literature review: Analysing recent academic and technical literature on aligning S3 with sustainability goals.
- 2** Case studies and stakeholder interviews: Collecting primary data through semi-structured interviews with representatives of regions and countries in Europe and beyond to obtain concrete feedback on the relative strengths and weaknesses of the emerging conceptual framework of Smart Specialisation for Sustainable Development Goals. Analysing S3 for 2021-2027 and the results of ongoing JRC pilot applications of S3 for SDGs approach in the selected regions and countries to assess how sustainability-related aspects are included and whether and in what way they address the UN 2030 Agenda for Sustainable Development.
- 3** Co-creating a reflection tool: Analysing primary data gathered during stakeholder interviews to validate the potential of the conceptual framework of Smart Specialisation for Sustainable Development Goals. Collecting inputs and feedback

on the self-assessment reflection framework on how to strengthen sustainability dimension in S3.

### *Literature review*

The report draws mainly on the literature review conducted for the previous JRC report on the conceptual implications of embedding the SDGs in S3 (Miedzinski et al., 2021). However, we conducted an additional review of newer academic literature and technical reports relevant for the topic.

### *Case studies and co-creation sessions*

The report is based on interviews and consultations with regional and national authorities responsible for S3 to discuss and validate the emerging conceptual framework and the reflection tool for Smart Specialisation for Sustainable Development Goals (S3 for SDGs). The team collected primary data through case studies of selected regions and countries that have prepared S3 for the EU programming period 2021-2027. The case studies were informed by semi-structured interviews with representatives of regional authorities, co-creation sessions focused on the reflection questionnaire and document analysis (e.g. previous and current S3).

The aim of the case studies and interviews was twofold. First, they helped us to obtain a better understanding of the practical experiences of regions in preparing S3. Second, they provided an opportu-

nity for interviewees to provide targeted feedback on the relative strengths and weaknesses of the emerging conceptual framework of Smart Specialisation for Sustainable Development Goals.

An interview guide with open-ended questions and covering relevant themes was prepared and followed during the interviews. Interviewees were asked to describe their practical experience when preparing their S3 strategies for the EU programming period 2021-2027, including their experience in discussing and integrating the SDGs and similar goals in S3. The interviews were also an opportunity to delve into innovation and transition aspects of the strategy, notably the assumptions on how the strategy and its implementation can address the SDGs (i.e., theories of change of S3).

The interviews provided an opportunity to directly engage stakeholders in co-creating and improving the emerging conceptual framework of S3 for the SDGs, including the assessment questionnaire. Interviewees received a draft framework and questionnaire in advance and were asked to provide feedback on the framework and make specific suggestions on how it can be improved.

The case studies were selected to ensure comprehensive coverage of diverse types of regions. We considered the following criteria when identifying potential cases:

- Economic profile: service-based, (old) industrial, rural regions; specialised and diversified regions; fast and low growing economies
- Social profile: demographic trends, employment
- Environmental challenges: exposure and vulnerability to climate change and other environmental challenges
- Policy framework: centralised versus decentralised states
- Institutional thickness and capability: institutionally thick versus thin regions; regions with well-developed and limited public sector capabilities
- Geographical location in Europe: West, East,

North, South; metropolitan and peripheral regions

- S3 experience: regions with and without experience in addressing SDGs and similar goals in their strategies.

We consulted and drew on experience of more than 30 policy makers and practitioners from 12 regions and countries:

- Australia, Gippsland
- Belgium, Wallonia
- Czechia
- Finland, Lapland
- France, Hauts-de-France
- Mexico, Hidalgo state
- Netherlands, Northern Netherlands
- Norway, Vestland
- Poland, Pomorskie
- Portugal, Centro
- Romania, North West
- Spain, Basque Country

The pilot co-creation sessions with the representatives of Gippsland, Wallonia and Czechia took place in December 2021. The remaining sessions except for the meeting with Hidalgo (Mexico), were conducted in January-June 2022. The meeting with Hidalgo took place in September 2022. Reference documents and interview notes were reviewed to identify key themes for the emerging conceptual framework and to highlight existing approaches and practices relevant for S3 steps. The transcripts were qualitatively analysed to inform the reflection framework.

### *Preparation of the final report*

The report drew extensively on the empirical and co-creative work. It also benefited from feedback on the draft report and inputs on case studies provided bilaterally by regions and countries involved in the exercise.

The proposed reflection framework and key findings of the report were presented and discussed during the dedicated JRC webinar involving wider audience on 28 April 2022. The webinar drew an audience of above 100. It was held in the framework of JRC eTalk series on STI for the SDGs<sup>20</sup>.

Regarding the underlying theoretical background and concepts, the report was based mainly on the JRC report ‘Towards next generation Smart Specialisation: Theoretical and conceptual extensions for sustainable Smart Specialisation Strategies’ (Miedzinski et al., 2021). However, the report was updated with more recent publications and reports on smart specialisation for sustainable development.

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<sup>20</sup> For the agenda and background note see <https://s3platform.jrc.ec.europa.eu/en/w/e-talks-webinar-smart-specialisation-for-sustainable-development-goals>



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