IQ-Net

Improving the quality of Structural Funds management

IMPLEMENTING INNOVATION: SMARTER & GREENER ACTIONS

Heidi Vironen, Rona Michie, Liliana Fonseca

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Stichting EPRC Delft
Faculty of Architecture and the Built Environment,
Technische Universiteit Delft
Julianalaan 134
2628 Delft
Netherlands

T: +44-141-548-3908
E: info@eprcdelft.eu
W: https://eprc-strath.org/eu/

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PREFACE

The IQ-Net Network promotes exchange of experience on the management and implementation of Structural Funds programmes among managing authorities and intermediate bodies. The network is managed by the European Policies Research Centre Delft under the direction of Professor John Bachtler and Heidi Vironen. The research for this report was undertaken by EPRC in preparation for the 53rd IQ-Net Conference on 7-9 December 2022. The report was written by Heidi Vironen, Rona Michie and Liliana Fonseca.

The report is the product of desk research and fieldwork visits during Autumn 2022 to national and regional authorities in the countries of the IQ-Net Consortium. The field research team comprised:

- Stefan Kah (Austria)
- Dr Arno van der Zwet (Belgium)
- Odilia van der Valk (the Netherlands)
- Dr Marie Feřtrová (Czechia)
- Professor Henrik Halkier (Denmark)
- Heidi Vironen (Finland)
- Dr Eleftherios Antonopoulos (Greece)
- Fabian Gal (Hungary)
- Dr Liliana Fonseca (Ireland)
- Dr Irene McMaster (Ireland)
- Dr Martin Ferry (Poland)
- Viktoriya Dozhdeva (Portugal)
- Dr Carlos Mendez (Spain)
- Rona Michie (United Kingdom)

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- Northern & Western Regional Assembly

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Disclaimer

It should be noted that the content and conclusions of this paper do not necessarily represent the views of individual members of the IQ-Net Consortium.

LIST OF ABBREVIATIONS	
AWS	Austrian Labour Market Service
B2B	Business to Business
B2C	Business to Consumer/Customer
C2C	Consumer/Customer to Consumer/Customer
CLLD	Community-led Local Development
CO2	Carbon dioxide
DG	Directorate General
DNSH	Do No Significant Harm
EDP	Entrepreneurial Discovery Process
ELY-Centre	Centres for Economic Development, Transport and the Environment (Finland)
ERDF	European Regional Development Fund
ESF / ESF+	European Social Fund / European Social Fund Plus
ESIF	European Structural and Investment Funds
ETS	Emissions Trading System
FE	Further Education
FTE	Full-time Equivalent
GBER	General Block Exemption Regulation
GINOP+	Economic Development and Innovation Operational Programme Plus (Hungary)
HE	Higher Education
HEIC	Centres for Higher Education and Industry Cooperation
IACW	Innovation Advisory Council for Wales
I3	Interregional Innovation Investment instrument
ICT	Information and Communication Technology
ITI	Integrated Territorial Investment
ITI CIM/AM	Integrated Territorial Investment Inter-Municipal Communities/Metropolitan Areas (Portugal)
JRC	Joint Research Centre
JTF	Just Transition Fund
MA	Managing Authority
MS	Member State
MSCA	Marie Skłodowska-Curie action
OP	Operational Programme
OP JAC	Operational Programme Jan Amos Comenius (Czechia)
OP TAC	Operational Programme Technologies and Applications for Competitiveness (Czechia)
OP Zuid	Operational Programme South (Netherlands)
PA	Partnership Agreement
PO	Policy Objective
R&D	Research and Development
R&D&I	Research, Development and Innovation
R&I	Research and Innovation
RIITS	Regional Innovation and Technology Transfer Strategy
RIS3	Regional Innovation and Smart Specialisation Strategy

ROP	Regional Operational Programme
RRF	Recovery and Resilience Facility
R&T	Research and Technology
RTDI	Research, Technological Development and Innovation
S3	Smart Specialisation Strategy
S4	Smart Specialisation Strategy for Sustainable and Inclusive Growth
SDG	Sustainable Development Goal
SME	Small and medium sized enterprise
SO	Specific Objective
SUD	Sustainable Urban Development
SWOT	Strengths, Weaknesses, Opportunities and Threats
TO	Thematic Objective
TRL	Technological Readiness Level

COUNTRY/PROGRAMME ABBREVIATIONS	
Country	**Abbreviation**
Austria	AT
Belgium (Vlaanderen)	BE (Vla)
Bulgaria	BG
Czechia	CZ
Cyprus	CY
Denmark	DK
Estonia	EE
Finland	FI
France	FR
Greece	EL
Hungary	HU
Ireland	IE
Ireland (Southern Regional Assembly)	IE (SRA)
Ireland (Northern and Western Regional Assembly)	IE (NWRA)
Latvia	LV
Lithuania	LT
Luxembourg	LU
Netherlands	NL
Poland	PL
Poland (Warmińsko-Mazurskie)	PL (W-M)
Portugal	PT
Slovenia	SI
Slovakia	SK
Spain	ES
Spain (Bizkaia, País Vasco)	ES (Biz)
Sweden	SE
United Kingdom	UK
United Kingdom (England)	UK (Eng)
United Kingdom (Scotland)	UK (Sco)
United Kingdom (Wales)	UK (Wal)

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EXECUTIVE SUMMARY

R&I plays an important role in mitigating the impact of 'crisis' situations, contributing to economic growth, and delivering green and digital transitions. Cohesion Policy, especially the Smart Specialisation approach, provides a key instrument for delivering place-based innovation that reflects the strengths and assets of the regions, and addressing the innovation divide in Europe.

While innovative actions have been a key priority under Cohesion Policy in the past, the 2021-27 programme period represents a higher level of ambition with a focus on: (1) market-orientation of R&I activities to produce higher value added and future-oriented activities; (2) applied research and the uptake of new technologies, particularly in relation to societal challenges; and, (3) diffusion of knowledge, technologies and innovation, with a specific focus on the development of skills.

The Policy Objectives (POs), especially PO1 and PO2, and their respective Specific Objectives (SOs) provide a common framework of possible innovative actions for all Member States and regions. However, the choice of investment types varies depending on the level of regional prosperity and maturity of innovation.

The Smart Specialisation approach has informed how R&I has been supported under Cohesion Policy since the 2014-20 programme period. The Smart Specialisation approach to strategy development implies an inclusive process of stakeholder engagement to drive a prioritisation process based on territorial strengths and competitive advantage.

While IQ-Net programmes are implemented in a range of different contexts and hence adopt varied approaches, they have identified several key lessons from 2014-20, especially around the need for: sound governance models to ensure embeddedness; the challenges of ensuring broad stakeholder representation, the need for effective prioritisation; the importance of collaboration and cooperation; capacity issues and the importance of monitoring and results dissemination.

In terms of delivering Smart Specialisation and innovation in the IQ-Net programmes, there is a large degree of continuity from 2014-20. At the same time, the approaches have been evolving and maturing, taking into account lessons learned. Novel elements include new and strengthened initiatives around clusters and cooperation.

IMPLEMENTING INNOVATION: SMARTER & GREENER ACTIONS

1 CONTEXT

Europe is facing deep societal, environmental and economic challenges. The COVID-19 pandemic, the war in Ukraine and subsequent energy crisis, coupled with other longer-term environmental and socio-economic challenges, have created an unprecedented situation in Europe. The COVID-19 pandemic has demonstrated the fragility of current systems and highlighted the need for a transformative recovery to "build back better" – aligning economic growth with sustainability and inclusion. Accompanying this is the pressing challenge of tackling climate change, with ambitious goals and targets at both global and EU levels, as well as heightened demand for energy sufficiency and efficiency in the context of the Russia-Ukraine war. The policy focus in Europe is firmly on societal and economic recovery and growth, resilience and preparedness, while supporting Europe's competitiveness on a global scale. The 2021-27 programme period reflects these challenges and issues, making the green and digital transitions pivotal themes underpinning all EU policies, strategies, and actions.

Science, research and innovation play an important role in mitigating the impact of these crises and guiding the way towards green and digital transitions. R&I has the potential to offer solutions to many challenges in areas such as health, digital technologies, industrial transformation, resilient societies, natural resources, energy, mobility, environment, food, low-carbon economy and security. For example, the COVID-19 pandemic has highlighted the importance of data and digital technologies, and has changed the way many firms and organisations operate. Similarly, striving towards the EU's 2050 net-zero emissions target is closely linked to the development and use of new technologies. More generally, R&I activities are at the centre of European recovery efforts (e.g. R&I is an important component of the Recovery and Resilience Facility (RRF)[1]), promoting economic productivity and competitiveness, supporting job creation , and developing knowledge-intensive sectors.[1]

> ***…R&I are central to build the sustainable and resilient future that Europe needs. The digital and green transitions simply cannot be accomplished without strong research and innovation systems.***
>
> Mariya Gabriel, Commissioner for Innovation, Research, Culture, Education & Youth

[1] For example in the Recovery and Resilience Facility (RRF), the plans developed by Member States include investments supporting the public science base, cooperation between education and business sector, business innovation and the mobilisation of R&I capacities to accelerate business innovation, green and digital transitions and to enhance resilience.

The challenges are complex but shared, and therefore better addressed together. Foresight, experimentation, co-creation, and participatory approaches can bring new ideas to policy making and challenge the existing thinking. Citizen engagement is another important avenue, not least to strengthen trust in science and facilitate the innovation process and its uptake. Fairness is also a key aspect – the uptake of new and green technologies needs to consider the 'Just Transition' aspect, so that for example workers are supported in the transition process through reskilling and other support measures.[2]

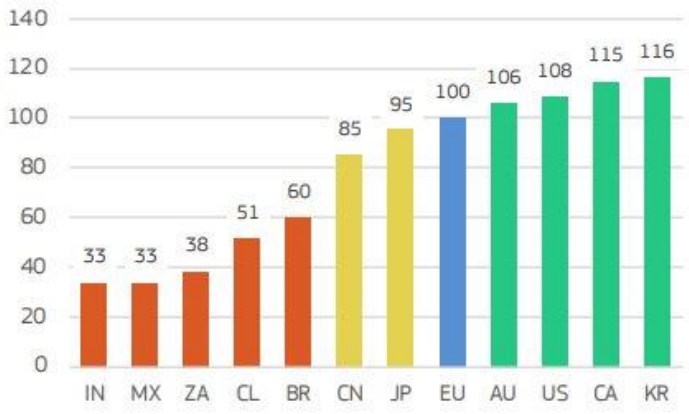
1.1 Innovation in Europe

Innovation is continuously evolving and the new wave of deep tech innovation has the potential to deliver transformative solutions in the face of global challenges.[3] Europe has a long history in innovation and **is in a position to lead the way on new deep tech innovation**.[4]

1.1.1 Innovation performance – EU in a global context

In the global context, the EU is performing well (see Figure 1), and performance (overall) has improved over the past years, although it varies depending on the dimensions and indicators used.[5] EU is home to c. six percent of the world population, but responsible for one fifth of all top-quality global research publications, acting as a 'powerhouse in knowledge production' and deep-tech innovation.[6] Many companies are world leaders on high-value green patents in energy intensive industries. Nonetheless, evidence shows a persisting innovation divide in Europe, with well-performing innovation systems in some Member States and regions while others lag behind in terms of their R&I investments, capacity and performance.[7] As the global demand for environmental technologies, eco-friendly products and services, and sustainable design ideas increases, EU Member States are being encouraged to seize these opportunities and promote green and innovative investments.[8] By leading on innovation – and particularly challenge- or mission-led innovation – Europe expects to reinforce its central role in shaping the green and digital transitions, with far-reaching benefits in multiple sectors (e.g. mobility, health, energy).[9]

Figure 1: EU's innovation performance globally



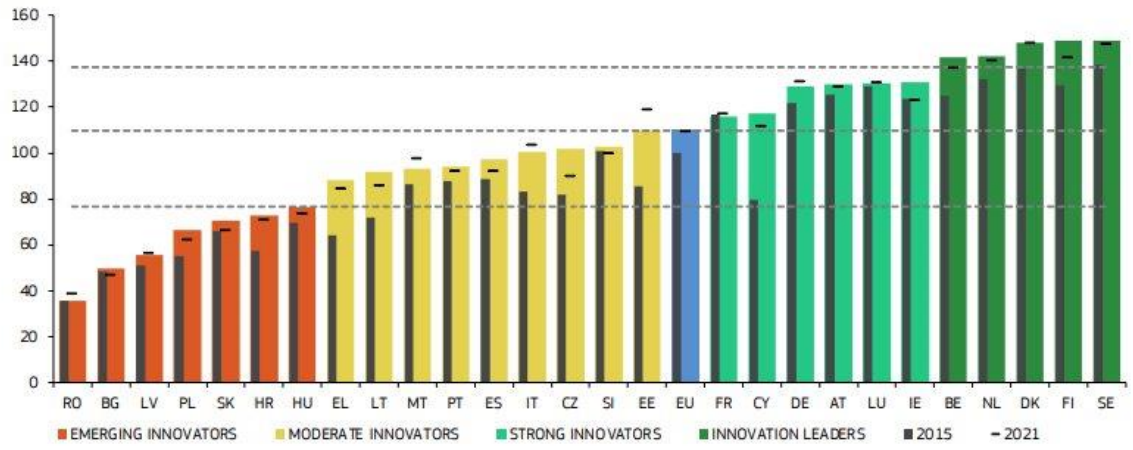
Source: European Commission (2022) European Innovation Scoreboard 2022

1.1.2 *Innovation performance – country comparison*

There is a strong geographical divide in innovation performance among EU countries. The European Innovation Scoreboard 2022[10] categorises Member States into four groups according to their innovation performance (see Figure 2 and Map 1). The groups have a strong geographical concentration, with 'Innovation Leaders' and many 'Strong Innovators' located in Northern and Western Europe, while most of the 'Moderate' and 'Emerging Innovators' are in Southern and Eastern Europe: [11]

- **Innovation Leaders** (125 percent of EU average): **BE**, **DK**, **FI**, **NL**, **SE**
- **Strong Innovators** (100-125 percent of EU average): **AT**, **CY**, **EE**, **FR**, **DE**, **IE**, **LU** (+ **UK**)
- **Moderate Innovators** (70-100 percent of EU average): **CZ**, **EL**, **IT**, **LT**, **MT**, **PT**, **SI**, **ES**
- **Emerging Innovators** (below 70 percent of EU average): **BG**, **HR**, **HU**, **LV**, **PL**, **RO**, **SK**

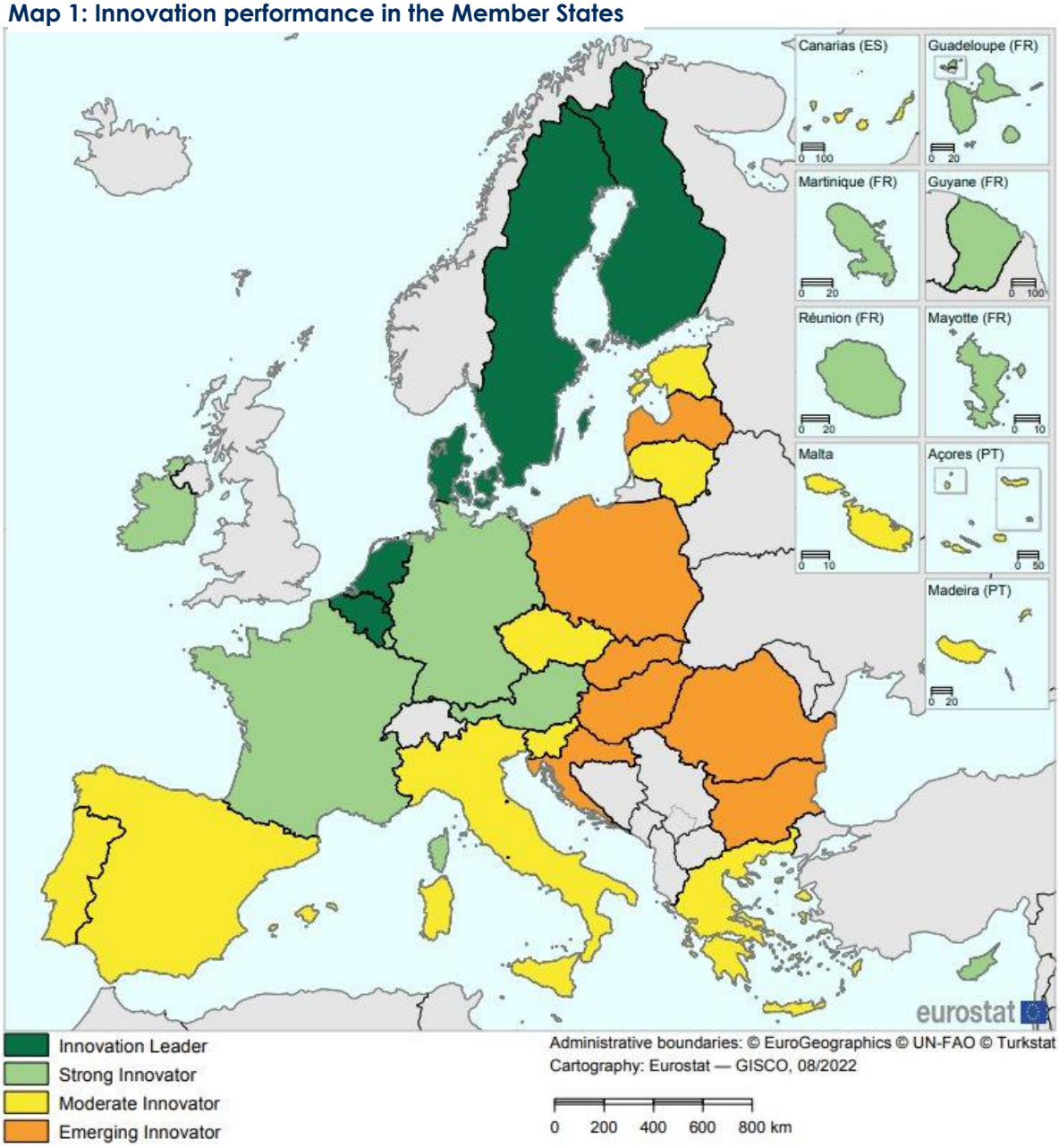
Figure 2: Innovation performance in the EU Member States



Source: European Commission (2022) European Innovation Scoreboard 2022; Notes: **Coloured columns** show performance in 2022, using the most recent data for 32 indicators, relative to that of the EU in 2015. **The horizontal hyphens** show performance in 2021, using the next most recent data, relative to that of the EU in 2015. **Grey columns** show performance in 2015 relative to that of the EU in 2015. **The dashed lines** show the threshold values between the performance groups, where the threshold values of 70%, 100%, and 125% have been adjusted upward to reflect the performance increase of the EU between 2015-22.

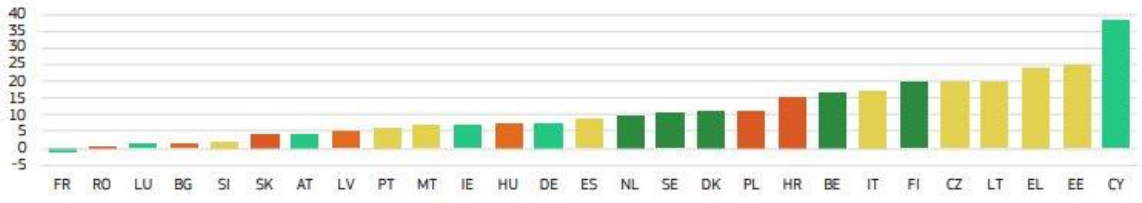
Differences in innovation performance between Member States have declined over the period of 2015-22, but this has been largely driven by reduced performance differences within the group of 'Innovation Leaders', 'Strong Innovators' and 'Moderate Innovators', and the improvement of some 'Strong' and 'Moderate Innovators' (e.g. CY, EE, EL, MT). At the same time, the lowest performing group, 'Emerging Innovators', is lagging behind, and in some cases the gap has been increasing (e.g. BG, RO) (See).[12]

Map 1: Innovation performance in the Member States



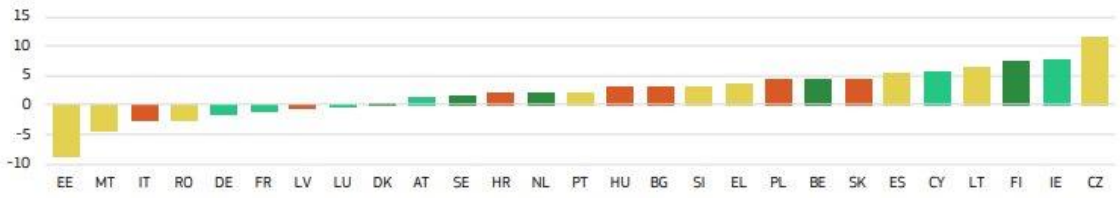
Source: European Commission (2022) European Innovation Scoreboard 2022

Figure 3: Innovation performance – change in 2015-22



Looking at performance change over 2021 to 2022, there has been an improvement in 19 Member States (most strongly in CZ, followed by IE and FI), and decline in eight Member States (see Figure 4).[13]

Figure 4: Innovation performance – change in 2021-22



Sources: European Commission (2022) European Innovation Scoreboard 2022. Notes: In Figure 3, performance change is measured as the difference between the 2022 and 2015 scores, and in Figure 4 between the 2022 and 2021 scores in relation to EU in 2015.

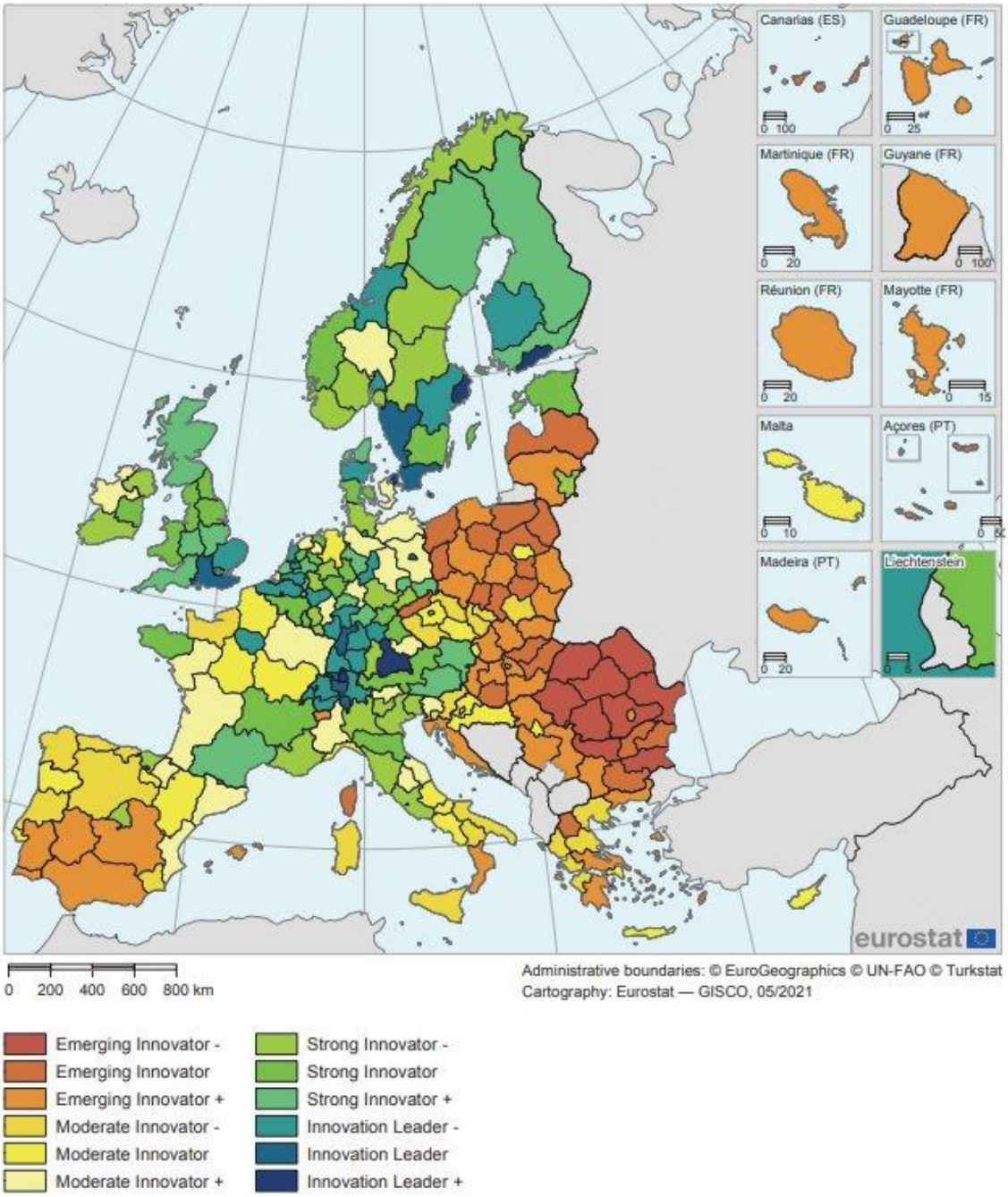
1.1.3 Innovation performance – regional comparison

At the regional level, a similar approach is used to group regions according to their innovation performance[2], see Map 2.

- **Innovation Leaders** (125 percent of EU average): **38 regions**
- **Strong Innovators** (100-125 percent of EU average): **67 regions**
- **Moderate Innovators** (70-100 percent of EU average): **68 regions**
- **Emerging Innovators** (below 70 percent of EU average): **67 regions**

[2] A more detailed breakdown is provided by dividing each group into sub-groups, with the best performing sub-group assigned (+), and the worse performing sub-group (-) as indicated in the Figure 5.

Map 2: Innovation performance in the EU regions

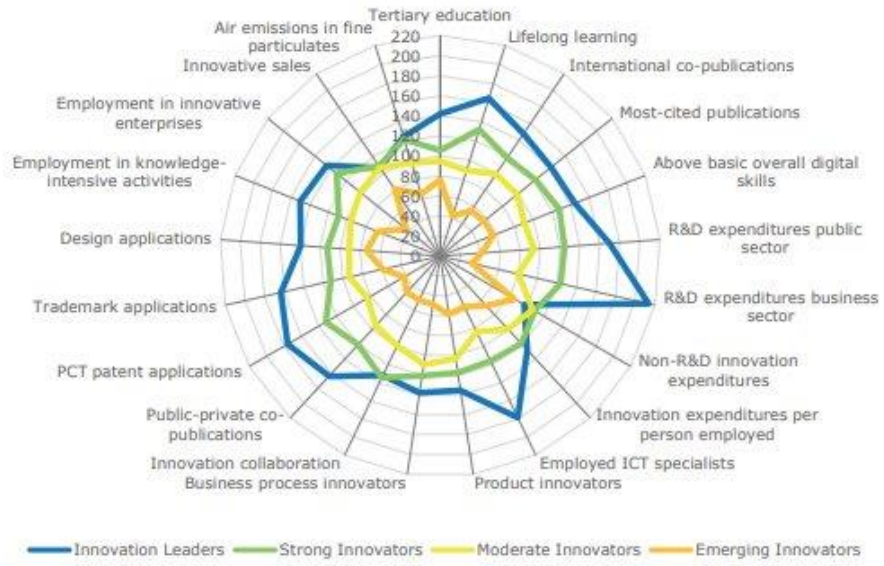


Source: European Commission (2021) Regional Innovation Scoreboard 2021. Note: Innovation performance is measured using a composite indicator – the Summary Innovation Index – which summarises the performance based on 32 indicators. These indicators are grouped into four main types – Framework conditions, Investments, Innovation activities, and Impacts – and 12 innovation dimensions.

The most innovative regions are located in the most innovative countries (see Map 2)**.** All 'regional Innovation Leaders' are in countries identified as 'Innovation Leaders' or 'Strong Innovators' (i.e. in Northern and Western Europe), while most 'regional 'Moderate Innovators' and 'Emerging Innovators' are in countries identified as 'Moderate' and 'Emerging Innovators' (i.e. in Eastern and Southern Europe) (data based on the 2021 European Innovation Scoreboard). There of course some exceptions to this. For example, in Ireland, most regions are categorised as 'Strong' or 'Innovation Leaders', while the North and West is a 'Moderate Innovator'. The region is facing severe economic challenges, and is now categorised as a 'Region in Transition' in 2021-27, as opposed to a 'More Developed Region' in 2014-20. Nonetheless, in the face of these challenges, innovation is seen as key to building and maintaining competitiveness in the region and sustaining employment and growth.

The group 'regional Innovation Leaders' perform best on almost all indicators, especially those measuring research systems and business innovation (see Figure 5). The most innovative region in the EU is **Stockholm** (**SE**), followed by **Helsinki-Uusimaa** (**FI**), **Oberbayern** (**DE**), and **Hovedstaden** (**DK**). However, there are also some 'pockets of excellence' in Member States which are grouped as 'Moderate Innovators', including: Praha (CZ), Attiki and Kriti (EL), País Vasco and Comunidad de Madrid (ES), and Emilia-Romagna (IT); and in Member States grouped as 'Emerging Innovators', including: Budapest (HU), Warszawski stoleczny (PL) and Bratislavský kraj (SK). Looking at the top-10 regions in Europe overall, three regions each are from Germany and Switzerland, two from Sweden, and one each from Denmark, Finland and the United Kingdom.[14]

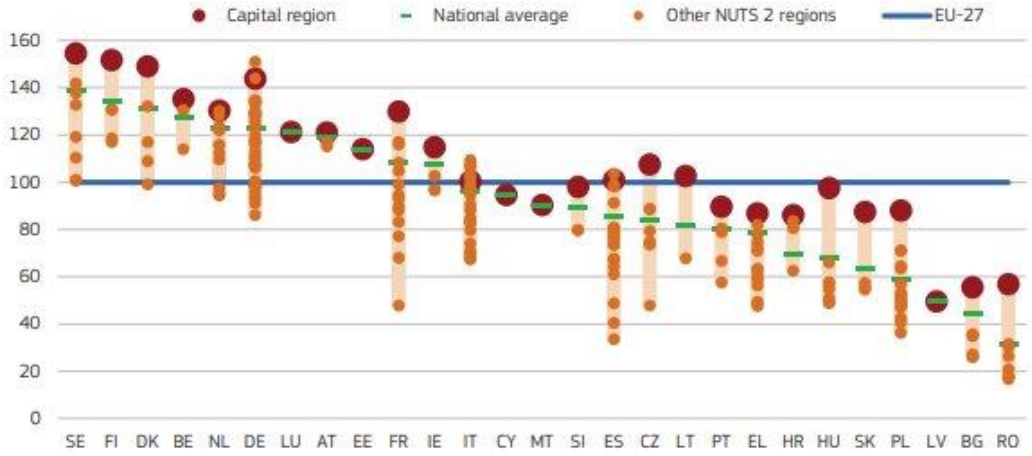
Figure 5: Average indicator scores in the regional innovation groups



Source: Regional Innovation Scoreboard 2021.

Within countries, there are large disparities in innovation (see Figure 6). The differences between regions is particularly notable in larger countries such as Germany, France and Spain. Moreover, in some of the highly developed Member States, such as the Netherlands, Germany and France, there is more than one region which has a performance below the EU average.[15]

Figure 6: Innovation performance in the regions, 2021



Source: Regional Innovation Scoreboard 2021. Notes: Innovation performance at NUTS2 level, relative to the EU average. Performance is measured by a composite index calculated by the Regional Innovation Scoreboard. The vertical bar shows the range of regional performances per Member State.

Urban and capital regions perform best. Innovation tends to be higher in the more urbanised regions, especially in the capital regions (e.g. due to closer distances which facilitate knowledge diffusion; concentration of government and educational services; better training opportunities; concentration of skills etc.). In nearly all Member States, innovation performance is highest in the capital region. This is not the case in only Germany, Italy and Spain. In these countries, higher performance is noted in Oberbayern (DE), in Emilia Romagna (IT), and in País Vasco (ES), although even in these countries the capital regions perform well in relation to the national average (see Figure 6).[16]

While most regions have improved their innovation performance over time, the regional innovation divide in Europe has grown. While some have made significant progress in catching up, many regions, including those located in the more developed Member States, continue to lag behind.

2 COHESION POLICY: DELIVERING INNOVATIVE ACTIONS

The concept of regional innovation systems has become one of the important EU policy measures for promoting sustainable economic growth of regions. For the past 20 years it has influenced Cohesion Policy on the basis of the argument that basic innovation carried out by firms provides the basis for long-term economic growth, and that therefore regional growth is stimulated by the existence of innovative industries in the territory. The reinforcement of links between enterprises and knowledge and research organisations facilitates the dynamics of the regional innovation system, as well as increased investment in R&D and encouragement of the take-up of new technologies. A collaborative interface of exchange and learning between different organisations in a region therefore stimulates innovation and regional competitiveness. Studies[17] have continuously emphasised the regional level as a key for innovation and growth, with regions and cities playing an important role in developing innovation by housing industrial clusters, incubators, and many other types of formal and informal innovation spaces. It is also a manageable scale for policy intervention.[18] These findings and concepts have formed the basis of EU innovation policy, especially regional innovation policy delivered through Cohesion Policy.[19]

2.1 2014-20 programme period

In the 2014-20 programme period, **the ERDF regulation defined strengthening research, technological development and innovation as one of the eleven Thematic Objectives (TO1) for Cohesion Policy**.[20] More than €52.5 billion has been allocated across the different intervention fields to projects aiming to strengthen the research, technological development and innovation (RTDI) of the regions. ERDF support for RTDI has focused in particular on research and innovation (R&I) in enterprises, public research centres and higher education institutions. In addition, support has also been provided to public infrastructure for R&I and to technological transfers between universities and SMEs, including on the theme of low carbon economy. To a lesser degree, support has also been provided to private R&I infrastructure.[21]

In 2014-20, ERDF investments in innovation have been used to support the implementation of the over 180 Smart Specialisation Strategies (S3) to have a greater and more sustainable impact on jobs and growth in the different regions (see Section 3).[22]

2.2 2021-27 programme period

Innovation continues to be a key feature of Cohesion Policy programmes in 2021-27, with the development of Smart Specialisation strategies continuing as the enabling condition for ERDF funding. The innovation policy focus has changed towards a market-orientation of R&I activities with the aim of supporting industrial transition for higher value-added and future-oriented activities. Support therefore focuses on applied research and the uptake of new

technologies by firms, public organisations, and citizens, particularly in relation to societal challenges. In the 2021-27 period, ERDF investments will focus on five Policy Objectives (POs):

- **PO1:** A Smarter Europe by promoting innovative and smart economic transformation and regional ICT connectivity.
- **PO2:** A Greener, low-carbon Europe investing in energy transition, renewables and the fight against climate change.
- **PO3:** A More Connected Europe by enhancing mobility.
- **PO4:** A More Social Europe delivering on the European Pillar of Social Rights and supporting quality employment, education, skills, social inclusion and equal access to healthcare.
- **PO5:** A Europe Closer to Citizens by supporting locally-led development strategies and sustainable urban development across the EU.

All regions and Member States will **focus most of their ERDF support on PO1 and PO2** in accordance with their level of development (see Table 1).

Table 1: ERDF thematic concentration under PO1 and PO2

Member State	PO1 (minimum %)	PO2 (minimum %)
GNI below 75 percent	25 percent	30 percent
GNI 75-100 percent	40 percent	30 percent
GNI above 100 percent	85 percent for PO1 and PO2	30 percent

Source: European Commission, https://ec.europa.eu/regional_policy/en/funding/erdf/

The dual green and digital transition is strongly emphasised. The eighth Cohesion Report highlights that the green and digital transitions will be key drivers for EU growth and notes that that Cohesion Policy has helped to narrow territorial and social disparities and has evolved to address emerging challenges. Nonetheless, it also points to the growth of the regional innovation divide in Europe. A lack of investment in R&D and weaknesses in the regional innovation ecosystem are suggested as potential causes for this, with the report arguing for better innovation diffusion at national and regional level to help less developed and transition regions in particular. Smart Specialisation strategies are highlighted as a potential tool to help address this divide, but these need to be adapted to the new challenging context. The report further suggests that Cohesion Policy in the 2021-27 period should focus on embedding innovation in all regions, encouraging broad-based innovation and the adoption of new ideas and technologies. Complementarity between nationwide structural policies and place-based policies should also be sought for increased efficiency, with Smart Specialisation as a vehicle to build on local assets and strengthen the regional innovation ecosystem.[23]

Innovative actions are primarily implemented under PO1 and PO2, which have the highest ERDF earmarking requirements of the five POs.

i Innovation activity under Policy Objective 1 (PO1)

PO1 on "A smarter Europe: innovative & smart economic transformation" is the Policy Objective where most research and innovation actions are financed. It includes the following Specific Objectives (SOs):

- **SO 1.1:** Enhancing **research and innovation capacities** and the uptake of advanced technologies;
- **SO 1.2:** Reaping the benefits of **digitisation** for citizens, companies and governments;
- **SO 1.3:** Enhancing growth and competitiveness of **SMEs**;
- **SO 1.4:** Developing **skills** for smart specialisation, industrial transition, and entrepreneurship.
- **SO 1.5:** Enhancing **digital connectivity**

ERDF is the main funding source for PO1, and its scope can include investments in infrastructure, access to services, in SMEs and in large firms that cooperate with SMEs, technical assistance, training and education activities, sharing of facilities and human resources, soft investments, and investments in equipment, software and intangible assets.

In 2021-27, more emphasis is placed on the market orientation of R&I activities, with the aim of supporting industrial transition to higher value-added and future-oriented activities. Support therefore focuses on applied research and the uptake of new technologies by firms, public organisations, and citizens, particularly in relation to societal challenges such as climate change, digitalisation and health.[24] Thus, under PO1, ERDF supports applied R&I activities, including industrial research, experimental development, and feasibility studies. For example, investments can support living labs and other test-beds, digitalisation of services, industrial cluster development and capacity-building in higher education to increase knowledge commercialisation.[25]

The enabling condition under PO1 focuses on "Good governance of national or regional smart specialisation strategy", composed of seven fulfilment criteria that cover the main success factors of these strategies with respect to design, implementation, monitoring and evaluation.

ii Innovation activity under Policy Objective 2 (PO2)

PO2 on "A greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe" is the second policy objective which can include innovative actions and investments. It involves the promotion of a clean and fair energy transition via investments in the green and blue economy, the circular economy, climate change mitigation and adaptation and risk prevention and management, and sustainable mobility. It includes the following Specific Objectives (SOs):

- **SO 2.1**: Promoting energy efficiency measures and reducing greenhouse gas emissions;

- **SO 2.2**: Promoting renewable energy in accordance with Renewable Energy Directive (EU) 2018/2001;
- **SO 2.3**: Developing smart energy systems, grids and storage outside TEN-E;
- **SO 2.4**: Promoting climate change adaptation and disaster risk prevention, resilience, taking into account eco-system based approaches;
- **SO 2.5**: Promoting access to water and sustainable water management;
- **SO 2.6**: Promoting the transition to a circular and resource efficient economy;
- **SO 2.7**: Enhancing protection and preservation of nature, biodiversity and green infrastructure, including in urban areas, and reducing all forms of pollution;
- **SO 2.8**: Promoting sustainable multimodal urban mobility, as part of transition to a net zero carbon economy.

Contributions to 2030 and 2050 climate targets are expected under PO2, meaning innovative actions should focus on technology, systems, measures and skills that can promote energy efficiency, climate change adaptation, prevention and resilience for the sustainable transition.

3 SMART SPECIALISATION: KEY FRAMEWORK FOR INNOVATION

…regional Smart Specialisation Strategies (are) a cornerstone of EU policies, from the post-pandemic recovery plans to the delivery of the European Green Deal, digital transition and the Sustainable Development Goals.[26]

3.1 Smart Specialisation in 2021-24

Smart Specialisation is a concept developed in 2008,[27] and an approach which has informed EU Cohesion Policy since the 2014-20 programme period.[28] Based on this approach, the Smart Specialisation strategies (S3) developed in the regions and/or countries are intended to create capacity to deliver innovation effectively for economic development by focusing on strategic areas of uniqueness and strength. The S3 framework has arguably transformed innovation policy[29] through the following aspects:

1) The place-based and strategic investment approach;
2) The interconnection between related but varied domains to foster new ideas and economic pathways;[30]

3) The adoption of the framework as an 'ex-ante' conditionality for access to ERDF;

4) The emphasis on the regional economic governance role of higher education institutions;[31] and,

5) The promotion of collaborative and bottom-up methodologies through its Entrepreneurial Development Process (EDP).[32]

In the latter (i.e. EDP), regional or national authorities implementing an S3 approach support diverse regional stakeholders and entrepreneurs to come together, discuss and prioritise public and private interventions and resources on a limited number of priorities, based on territorial areas of strength and for competitive advantage.

The S3 policy framework is now over a decade old, transforming since its early stages from a sectoral to a place-based concept[33]and one which is integrated into Cohesion Policy, and has become the cornerstone of regional innovation policy in Europe. The budget for Smart Specialisation in the 2014-20 period was over €80 billion and, given the ex-ante conditionality for access to funds, more than 120 regions have developed and implemented the S3 in what is considered the "largest innovation policy experiment in the world".[34] The framework continues a tradition of over 20 years in EU regional innovation policy inspired by the regional innovation system concept, with its predecessors including Regional Innovation Strategy (RIS) and Regional Innovation and Technology Transfer Strategy (RITTS) initiatives in the 1990s. While S3 has developed these approaches and ultimately introduced new methodologies (e.g. EDP), there are still issues regarding implementation gaps and the assessment of the output or performance indicators of the process, leading to mostly conservative decision-making about programmes, measures and policy tools. Furthermore, studies[35] suggest there are dimensions of S3 that are still neglected and could be developed, namely:

- **Internationalisation, extra-regional collaboration or the positioning of regions in a national and global context** when developing S3. According to a 2021 survey,[36] S3 implementation has been more difficult in less-developed regions, hinting at the importance of capacity-building and institutional capabilities.

- **Policy implementation, with implementation gaps deriving from institutional factors** such as the capacity of actors and local governance systems and leading to inconsistency between policy aspirations and the implementation of appropriate instruments;

- **Demand-side innovation, or a supply-side and linear bias in regional innovation strategies** which lead to generation of new technologies but often at the expense of deployment and diffusion.

Alongside lessons on what could be improved, S3 has created or reinforced regional innovation capacity. Good practices in S3 have been collected, for example, by the Interreg Europe HIGHER project, which highlighted cases of S3 implementation in regions in Greece, Portugal, Spain and Sweden.[37] Similarly, the Joint Research Centre has conducted comparative work on S3, developing a report[38] on good practices for Smart Specialisation in the energy sector which included the notable examples of the Basque Country (ES) with the

Bidelek Sareak advanced smart-grid; North Karelia's (FI) joint solar power purchase initiative; the support instruments promoting synergies for S3 and energy in northern Netherlands; and Alentejo's (PT) bioenergy and business incubator. These initiatives have in common the implementation of decentralised energy solutions and public-private partnerships to improve the electricity grid and the efficiency of existing resources, by also combining existing resources and skills in an innovative way.

In general, good practices point to the following lessons:[39]

- ✓ **A broad stakeholder process** has been applied in the majority of Member States/regions, with a dedicated governance structure proving to be important although difficult to implement in the light of lack of resources.
- ✓ **A continuous EDP** could not be established in many regions, but formal continuity was higher in less developed regions, possibly due to the stronger ties in those regions, but also to the involvement of clusters to maintain private sector involvement.

Ultimately, each region and country will have their own approach to S3 implementation (e.g. in terms of the methodology, policy or organisational and delivery structure) and this is essentially one of the key desired aspects of the S3 framework. Nonetheless, across Europe there are common S3 themes, including energy, life science, ICT, environment, agro-food, tourism, and new materials.

The challenge for programme authorities in the 2021-27 Cohesion Policy period, in which Smart Specialisation will still be the innovation policy framework at play, is learning from a narrow period in which the outcomes of many strategies are not yet evident and deciding what changes to introduce.

3.2 IQ-Net: Learning from experience in 2014-20

IQ-Net programme authorities report a number of lessons learned from implementation of S3 approaches in 2014-20. As noted earlier, it is important to keep in mind that a wide range of approaches have been adopted in the programmes, which are implemented in varying contexts. The key lessons learned fall within the themes of:

- ✓ structures to enhance the **embeddedness** of S3 approaches
- ✓ facilitating **broad stakeholder engagement**
- ✓ effective **prioritisation** of S3
- ✓ active engagement in **cooperation activity**
- ✓ ensuring **sufficient capacity** to implement S3 strategies, and
- ✓ undertaking **monitoring** and **dissemination**.

i Improving embeddedness: setting up structures to support S3 approaches

A sound governance model is an important condition for the effective implementation of S3, to support a high level of continued stakeholder involvement, and to promote synergies and embeddedness of strategies across public administrations, agencies and government levels. Research shows that S3 has contributed towards a more inclusive governance of innovation policy and of the decision-making process overall.[40] Organisations such as coordination bodies, thematic working groups, platforms or clusters are strengthening network arrangements and cooperation modalities. The Smart Specialisation approach (and supporting innovation more widely) require long-term approaches with consistent supporting governance structures. Related, reported lessons from IQ-Net programmes include:

- ✓ **National and regional platforms and fora** have worked well to bring relevant representatives together and to promote cooperation and joint working (e.g. R&D&I forums in **Satakunta** (FI), thematic platforms and regional fora for entrepreneurial discovery in **Portugal**, and the *Bundesländerdialog* in **Austria**, which is a platform exchange of information in science and research between national and *Land* governments, as well as science, research and innovation agencies. In **Wales**, the creation of a Horizon 2020 Unit within the MA has worked well to foster a culture of thinking beyond ERDF to other sources of funding.

ii Improving engagement with under-represented actors

A key aspect of the Smart Specialisation framework is a bottom-up and inclusive approach to stakeholder mobilisation and involvement in implementation. IQ-Net programmes have found that some groups have been more challenging to engage, including businesses and universities.

- ✓ In **Finland**, **developing stronger business partnerships is a key, yet a challenging task.** While businesses cannot be funded directly, they can be involved as part of wider innovative cooperation projects. However, an ongoing challenge is to engage businesses (especially SMEs) in regional development activities. The regional authorities have actively looked into measures which would facilitate the participation of SMEs. In the ELY-Centres, which deal with business funding, the S3 has been included as part of their funding calls, which has **improved awareness and understanding of S3 amongst businesses**. In **Greece**, a lesson has been that the S3 strategy should cover SMEs' issues and focus on investments, not just research projects. In **Scotland**, ERDF-supported engagement work has helped to build awareness across a wide range of SMEs, and a combination of grant and advisory support has helped to encourage SMEs to invest in innovation, while allowing enterprise agencies to develop a stronger relationship with businesses.

- ✓ In Pais Vasco/**Bizkaia**, there has been a **long and successful tradition of partnership** between the universities, government and other stakeholders as a central driver of S3 implementation and innovation. **Extensive capacity building** was carried out in the technological universities in **Ireland** (SRA), as well as with the university sector more widely, and within the regional innovation ecosystem. In **Scotland**, universities were under-represented in the 2014-20 programme, with many (reportedly) preferring to focus efforts on less administratively demanding Horizon 2020 funding to support innovation and knowledge exchange activities.

iii Prioritisation and focus – when less is more?

The S3 approach involves a prioritisation exercise which aims to help stakeholders to identify the domains, areas and economic activities where regions or countries have the potential to generate knowledge-driven growth, and to target investment and resources on these themes. The number and nature of these priorities will vary between regions.

- ✓ IQ-Net programme authorities report lessons learned about the **need for greater prioritisation** and a more targeted approach (**DK**, **PT**).

- ✓ At the same time, in some regions the very focused nature of 2014-20 ERDF programmes lacked flexibility and may have constrained innovation (**Sco**, **Vla**).

iv Encouraging cooperation and collaboration

Cooperation and collaboration are at the heart of how Member States and regions hope to amplify national and regional gains from Smart Specialisation and innovation. This involves cooperation across a range of domains – working cross-sectorally, bringing together disciplines and themes, between national and regional levels, across borders/internationally, between different funding sources and between different types of stakeholder. Lessons from IQ-Net programmes include:

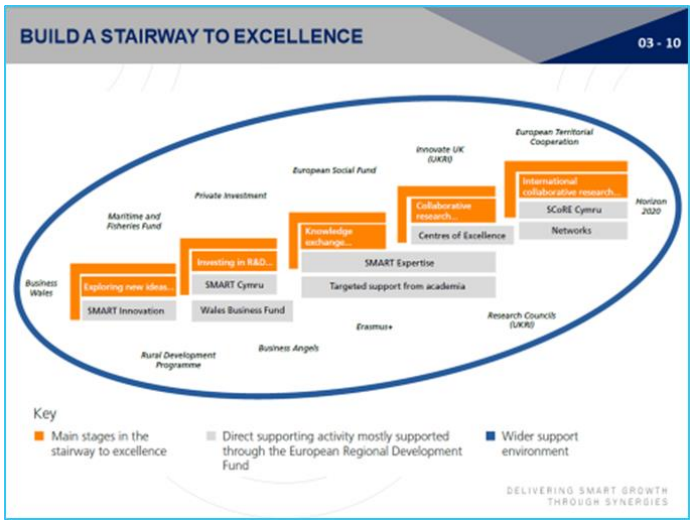
- ✓ **Silo-based approaches hinder innovation**. In the region of **Helsinki-Uusimaa** (FI), one of the lessons learned when implementing their S3 strategy was that it is difficult to tie new development to a single priority. Rather, "*new innovations emerge from the interfaces*". The new strategy aims to support the development of new combinations and technologies, and avoid narrow assumptions on how markets or technologies will develop. Cross-sectoral cooperation and projects are therefore encouraged.

- ✓ **Cross-sectoral cooperation may need re-balancing**. In the **Netherlands** (South), where there has been a focus on cross-overs between Top Sectors (the main domestic innovation policy tool) and on multi-disciplinary projects, targeted calls are being introduced to address the challenge of stronger sectors dominating project applications. Calls will be launched specifically for developing sectors, to help maintain a balance between developing and strong sectors.

- ✓ **Collaboration between projects is difficult to foster and maintain**. In **Wales**, a key challenge has been facilitating and maintaining positive collaborations between organisations. The MA has worked hard to foster collaboration, by facilitating meetings between project promoters/researchers and supporting them to discuss and resolve any issues. Doing this before project approval worked well and has resulted in 'camaraderie as opposed to competitiveness'. Sharing best practices was also difficult but has worked well and helped to reduce silos of expertise.

- ✓ **A portfolio approach helps manage projects to fill strategic or funding gaps**. In **Wales**, the MA operates a portfolio approach to its operations. The ERDF R&I portfolio consists of a mix of core strategic operations complemented by a range of innovative and niche approaches. Key investments and financial support are aligned along a 'Stairway to Excellence' (see Figure 7), so there is support available from various sources for projects at different stages, from capacity building to commercialisation. The 'stairway' approach aims to fill the funding gaps between those projects which can be funded by ESIF, and those which can compete for funding from Horizon 2020-type programmes. A portfolio approach is also used in **Helsinki-Uusimaa** (FI), to encourage cooperation and more networked and interlinked projects.

Figure 7: Stairway to Excellence approach to R&I in Wales *(Source: WEFO)*



- ✓ **An integrated approach to innovation requires better alignment of national and regional strategies**. In **Portugal**, a lack of demarcation between national and regional level innovation strategies gave rise to overlaps and contradictions. A more integrated approach, including greater coordination between the National Innovation Agency (coordinating the national dimension of S3) and the Regional Coordination and Development Commissions (responsible for the regional strategies), has helped to achieve better coherence between sectoral and territory-specific priorities/greater coordination between the national and regional dimensions of S3. Overall, interaction has been improved; the national and regional strategies are better aligned with more internal coherence. In **Spain**, 'Complementary Plans' are a new tool for coordination and co-governance of the programming of the national and regional levels in research and innovation policy. This involves dialogue to identify common interests and complementary capabilities. The Monitoring Committee of the national research and

innovation strategy and the research and innovation network will continue to support the coordination of the regional and national S3.

v Capacity issues, including skilled labour

Capacity building efforts may be required where critical mass or capacity is lacking at national or regional level. Within the current context, capacity issues are also being highlighted within regional labour forces:

- ✓ In **Czechia**, the national RIS3 coordinator highlights that a thorough approach to designing and implementing S3 requires **adequate personnel capacity** that was not sufficient for the RIS3 strategy for the period 2014-20 (four persons at national level in total). For the new period, capacity has been increased for 10-12 FTEs.

- ✓ In **Ireland** (SRA), the experience with residential energy retrofit in 2014-20 has influenced the focus of PO2 activity within the 2021-27 programme, leaving an activity (incentivising homeowners who are not in energy poverty to retrofit their homes) to be funded domestically. This has been challenging to set up and establish due to a **lack of skilled workers** in the sector to deliver.

- ✓ The independent Innovation Advisory Council for Wales (IACW) set up by Welsh Government contributed capacity and provided the **Wales** MA with an **external and unbiased view** on R&I proposals. The IACW includes representatives from science, the private sector, the Development Bank for Wales, and international links. Their involvement during the development of the MA's portfolio approach was important to ensure emerging and existing areas of Smart Specialisation were included along a 'Stairway to Excellence' approach. The IACW were familiar with Welsh Government's key 'backbone projects' and helped identify complementary projects.

Discussion item: How do programmes plan to address key capacity and resource issues?

vi The need for better monitoring and dissemination of results

A key lesson from 2014-20 was that monitoring activity should be strengthened, and that results should be made more visible (e.g. **FI**, **HU**, **NL** West, **PT**).

- ✓ In 2014-20, the **Netherlands** (West) had used the innovation monitoring report from Statistics Netherlands. This report proved to be insufficient, especially since it monitored innovations at a national rather than regional level. For 2021-27, programme authorities have added **monitoring based on academic research** on the region's innovation potential. Further, in response to the previous lack of follow-up after the initial

consultation process, the MA will now **share monitoring reports with the economic boards**, which include all relevant stakeholders.

- ✓ A novel methodology for the assessment of clusters (**phenomena-based assessment** – still under development) has been found to a useful approach in the region of **Satakunta** (FI West). This is one element making up their monitoring process, which is carried out by looking at the development of R&D&I activities, businesses, and the impact of project activity. Statistical data and other qualitative sources are used (e.g. feedback from stakeholder cooperation, issues related to challenges and development potentials). When examining the dynamism of growth sectors, the regional authority will also carry out the phenomena assessment, using the phenomena mapping method, for the clusters.

3.3 Smart Specialisation in 2021-27 – S3 version 2.0

The 2021-27 programme period will continue delivering innovation in the Smart Specialisation framework. At the same time, the approach to S3 is being updated, based on lessons learned. Specifically, S3 is expected to include further analysis of **bottlenecks for innovation diffusion and digitalisation** in 2021-27, as well as more emphasis on **governance**. This includes an emphasis on the ongoing or continuous aspect of EDP, and the designation of a competent institution or body responsible for S3 management. An improvement of national or regional R&I systems is also foreseen, with further impacts on industrial transition, international collaboration, and measured performance towards the objectives of the strategy.[41]

Another consideration in the post-2020 period is the inclusion of the sustainability dimension. The European Green Deal is seen[42] as a broader European or supra-national 'specialisation' on sustainability, decarbonisation, and the just transition agenda.[43] A sustainable and inclusive component has been promoted within the Smart Specialisation framework, in the form of **Smart Specialisation Strategies for Sustainable and Inclusive Growth (S4)**.[44] S4 is not limited to sustainability but emphasises the need for Smart Specialisation to be **challenge- or mission-oriented**, with increased responsibility for addressing just transition and societal challenges.[45]

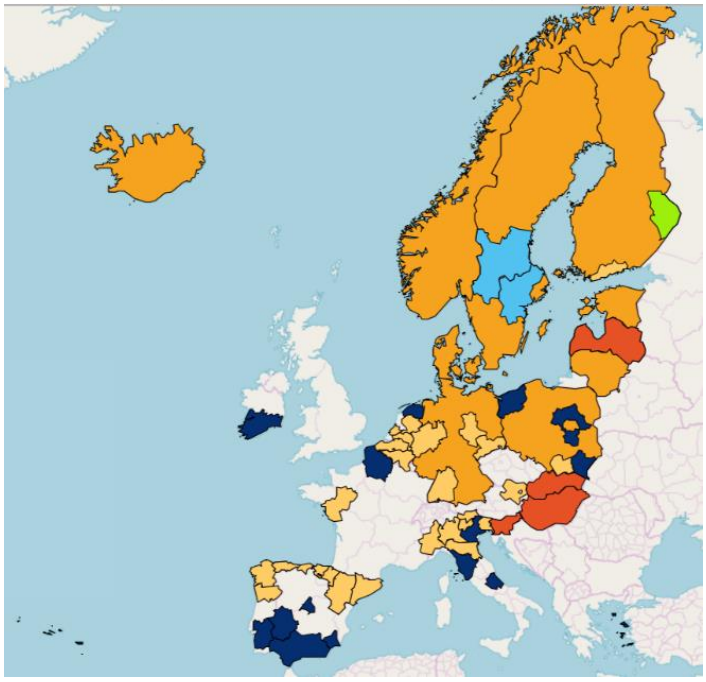
While the S4 approach further promotes innovation for green transformation in 2021-27, **many regions already designed their original S3 with a strong green focus**, notably related to the circular economy.[46] The second generation of Smart Specialisation will continue to further this, as not just a focus of R&I and policy, but also by integrating a sustainable and inclusive focus in the methodological approach. For the time being, S4 is still an optional approach for Member States and regions. Nonetheless, in the new period, Smart Specialisation in some form (S3, S4 or S4+) is expected to continue to play a major role in regional development.

A **new thematic enabling condition** for 2021-27 focuses on "Good governance of national or regional smart specialisation strategy", composed of seven fulfilment criteria that cover the main success factors of these strategies with respect to design, implementation, monitoring

and evaluation. Smart Specialisation's potential value-added is emphasised in boosting innovation-led growth in EU industrial transition regions, particularly in fostering eco-innovation processes that respond to global environmental and societal challenges.[47]

Discussion item: How are programmes preparing to continuously fulfil the enabling conditions related to Smart Specialisation throughout the 2021-27 period?

Additionally, new initiatives are being launched with the basis on the S3 work that has been conducted. The **Partnerships for Regional Innovation**[48] are a recent development and comprise a pilot action developed by the European Commission and the Committee of the Regions. They are a complementary approach which builds on positive experience with S3. Participants in the pilot project (63 regions, seven cities, 23 Member States) will test policy tools included in the '**Partnerships for Regional Innovation Playbook**', a guidance document published by the Joint Research Centre.[49] Among the IQ-Net partner countries, participants include Hungary, País Vasco (ES), Alentejo and Norte (PT), North Aegean region (EL), Northern Netherlands, Flanders (BE), Lower Austria (AT), and regions in Finland.



Source: https://s3platform.jrc.ec.europa.eu/pri-map

The **Interregional Innovation Investment instrument** (I3) has also been launched for the 2021-27 period by the European Commission as part of the ERDF. It comprises €570 million to support the **commercialisation and scaling-up of interregional innovation projects** in shared smart specialisation priority areas. It seeks to encourage the development of European value chains, but has a strong cohesion dimension with at least half its budget dedicated to less developed regions. Calls for projects are divided in two strands, with the first on financial and advisory support for investments, and the second for financial and advisory support to the development of value chains in less developed regions.[50]

3.4 IQ-Net: Opportunities and challenges for 2021-27

The current global context, characterised by successive crises and ongoing uncertainty, brings both potential opportunities for S3 approaches, along with anticipated constraints. IQ-Net

programme authorities have identified a range of opportunities and challenges facing their programmes in the pursuit of Smart Specialisation activity and innovation in 2021-27.

The crises (e.g. climate, energy, agricultural) may provide an opportunity to develop innovative projects pursuing **societal change** (e.g. **NL** South). However, positioning the role of ESIF in this type of project is difficult, as is introducing innovative activity into large-budget multi-actor projects of this type. At the same time, new sources of targeted funding in this field (e.g. the Just Transition Fund) could be viewed as either a competing threat to successful ESIF programme implementation, or an opportunity to cooperate. Related to **climate change**, the concept of missions and incorporation of SDGs into Smart Specialisation are seen as an opportunity for ESIF programmes, but also as major challenges, as the concepts are new in the European context and there is a lack of practical implementation experience to draw on (**CZ** – see Box 1). On the other hand, the strong focus on climate change and its mitigation, with associated targets and ring-fencing, is found to constrain support for innovative activity in other areas (e.g. **FI** South, **NL** West, **W-M**) and brings added complexities e.g. around delivery of the DNSH principle (e.g. **Biz**).

Box 1: Societal missions in the Czechia RIS3

In **Czechia**, the national S3 specifies, inter alia, two societal missions:

1) energetic-climate mission and decrease of energy demand of the economy;

2) security mission, including resilience of the economy or digital agenda and cyber-security.

The aim of the national S3 is (i) to pilot the tool of mission on a small sample, and then (ii) to prepare a robust methodology in cooperation with the JRC and its experts, and if interest and response on the side of funds providers exists (iii) to spread the policy practice of missions.

In the post-COVID context, the focus on **health** may provide opportunities for new areas of specialisation. For example, the EDP process undertaken as part of planning the **Warmińsko-Mazurskie** 2030 Strategy has led to the adoption of a new area of specialisation for the region – 'Healthy Life', which concerns industries related to medicine, medical services and quality of life. Similarly, in **Wales**, the new draft innovation strategy highlights the need for greater innovation support in health and social care delivery. At the same time, the general climate of uncertainty post-COVID and during the energy crisis have led to a focus on '**survival' rather than 'future-oriented'** activity by businesses (**PT**, **W-M**) and intensified the need to support general entrepreneurship (**EL**), thus constraining the focus on research and innovation.

Wider national and regional policy changes present opportunities for S3 and innovation activity within ESIF programmes. In **Greece**, opportunities will be explored arising from synergies between the national RIS and the National Strategy for Industry, which is expected to bring improvements in financing of industry, quality of investments, green and digital transitions, and

the export orientation of businesses. In Ireland, the ESIF programmes perceive an opportunity to enhance the regional dimension to innovation activity, by reflecting the needs of regional, spatial and economic strategies, including through the selection of operations.

Building on progress made during 2014-20 and further embedding S3 processes is identified as an area of opportunity (CZ, PT, Vla). This includes ongoing coordination and analytical work, established stakeholders' discussion platforms and further developing the **building of trust** (CZ, PT) and a continued focus on **valorisation of innovation** (Vla). At the same time, some adjustment to practical implementation of S3 can provide opportunities for more intensive co-creation work with funders (CZ) and simplification of processes (PT), while the stronger focus on internationalisation and networks also provides new opportunities (FI - Helsinki-Uusimaa).

In terms of **anticipated constraints**, **capacity issues** are frequently mentioned, including in the higher education (HE) and further education (FE) sectors, in terms of ensuring capacity and take up (IE-NWA), and in terms of the recruitment and retention of staff (IE-SRA). For **Ireland** (SRA), funding under PO1 is being directed towards beneficiaries in the HE sector, who will have to apply for funding and deliver on tight timescales. This presents a major challenge for delivery and capacity. A similar challenge is faced under PO2, where there are ambitious targets and potential challenges in terms of access to skilled workers in the sector to deliver. More generally, a shortened time period to deliver on programme implementation due to delays in programme adoption and implementation puts a strain on capacity. Retaining expertise may also be an issue in **Wales** (although now outside the framework of EU Cohesion policy).

The wider challenges presented by the recent and ongoing crises to ESIF programme implementation in IQ-Net programme areas has been discussed in recent IQ-Net Review Papers.[51] Programme authorities in **Warmińsko-Mazurskie** highlight that these new risks exist alongside the **long-term barriers to innovation** experienced in less-developed regions, which can include low levels of entrepreneurship rates, few high-quality jobs, low awareness of digital technologies and underdeveloped management of technological competences, labour force deficits, shortages of specialized staff for enterprises, poor digital competences (including in administration) and passive attitudes towards innovation.

Discussion item: How do programmes manage the balance between addressing current challenges and preparing for the future? How do they "undertake a paradigm shift ….to prepare against future shocks"?[52]

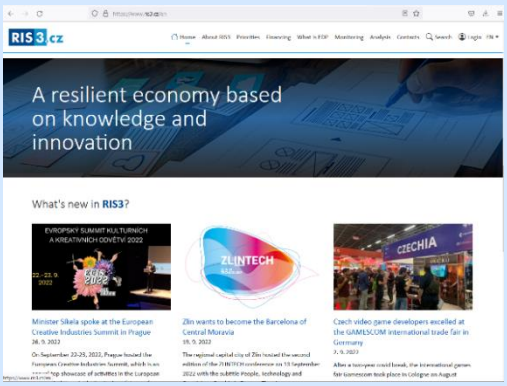
3.5 IQ-Net: Key changes planned to S3 approaches

Among IQ-Net programmes, there is evidence of **continuity** in terms of priorities, governance and implementation of S3, especially where the approaches are long-established and firmly

embedded (AT, VIa). However, many programmes are also **evolving and maturing** their approaches to take account of lessons learned in 2014-20, as well as the changing economic context. In some cases, strategies now have a **more solid foundation** based on research and studies (e.g. AT, CZ, NL, FI). Some changes are planned in priorities, stakeholder involvement and in the structures set up to coordinate implementation of the strategies. The role of Smart Specialisation is also **more visible/emphasised** (e.g. CZ – see Box 2, FI), and capacity has been strengthened (CZ, PT). The need for **flexibility** was highlighted (e.g. CZ, NL, W-M), especially in terms of the need for ongoing monitoring of regional specialisations.

Box 2: A new web portal for S3 in Czechia

A new web portal has been set up dedicated to the RIS3 agenda in Czechia (www.ris3.cz), including public and non-public sections with communication and training modules. For key stakeholders (members of the national innovation platforms and regional RIS3 teams), this electronic portal enables user-friendly communication (as the whole process and concept of RIS3 has become very robust).



In addition, the website contains relevant data storage that will be further developed. Alongside this, the National S3 Strategy document has been revised and streamlined to make it more concise, clear and understandable.

Image source: https://www.ris3.cz/en

Anticipated changes include:

- **Extending the scope** of S3 to additional programmes or investment areas (EL, HU)
- **Increased targeting** of priorities (Biz, CZ, FI, NL, PT), changes in emphasis and **new areas** of specialisation (Biz, CZ, DK, FI, IE, NL, PT, W-M)
- **Maturation of stakeholder engagement** approaches (CZ, FI, IE, HU, PT, VIa)
- Strengthened **coordination mechanisms** (EL, FI, HU, W-M,) including increased regional-national coordination mechanisms (CZ, PT)

i A broader reach for Smart Specialisation

Several IQ-Net countries have broadened the scope of their S3 approaches in 2021-27. In Hungary, **the S3 strategy has evolved from a stand-alone innovation strategy in 2014-20 to an umbrella strategy,** integrating the strategy with others, such as the SME strategy and the digitalisation strategy. In practical terms this means that the approach has been extended to go beyond RDI funding under the GINOP+ programme to include the SME support priority and

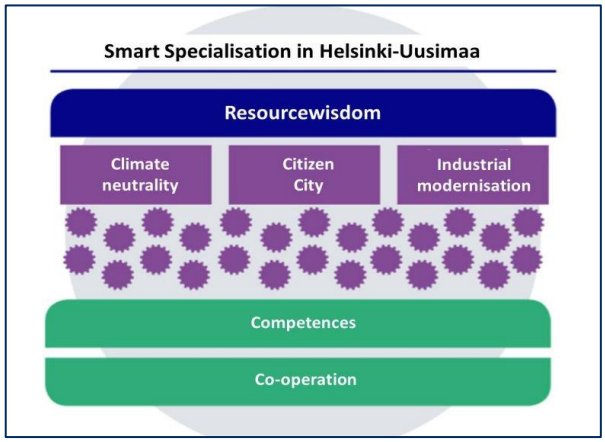
support from the Digitalisation programme. The S3 approach has been similarly broadened in **Greece**, to place greater emphasis on issues relevant to production, investments, entrepreneurship and SMEs, extending the national strategy beyond R&I to also cover parts of SME support priorities.

ii More focused and targeted priority-setting, with new priority areas

The experience with S3 in 2014-20 has led to strategies and programmes adopting **more targeted and focused approaches** in 2021-27:

- At strategy level, research and innovation specialisation domains have been **more clearly defined** in the **Czech** National S3 Strategy, through a process of evidence-based analyses and the EDP. At the same time, **increased flexibility** for adjustment during the programme period is ensured to respond to EDP or other inputs;
- A greater focus on priorities in **Portugal**, and **greater coherence** between national and regional priorities; with a balance between responding to social and territorial challenges and the new opportunities arising from heavy trends or disruptive movements, with an increased emphasis on cooperation and investment promotion networks;
- A **more concentrated** approach in **Bizkaia**, with a focus on fewer POs;
- A stronger emphasis on **all dimensions of sustainable development** in **Helsinki-Uusimaa** (FI South). This includes a strong focus on cooperation and participation in international networks and cooperation projects (see Figure 8).[3]
- **More specific** and updated strategy priorities in the region of **Satakunta** (FI West), with a focus on strengthening key areas of growth and expertise, and a strong emphasis on sustainable development, green transition and growth, as well as digitalisation, while the strategy of **Ostrobothia** (FI West) focuses on **key export sectors** which require high innovation capacity and the application of new technology;

Figure 8 Smart Specialisation priorities: Helsinki-Uusimaa region



- A **greater focus on larger-scale investments** in **Ireland** (NWRA and SRA), with a shift away from microenterprise support (now supported purely through domestic funding)

[3] *Source: Committee of the Regions, Presentation of Markku Markkula on 'Policy objectives and best practice – new S3 strategy of the Helsinki-Uusimaa Region in Finland'* https://errin.eu/system/files/2020-06/2markkula_1.pdf

along with taking up opportunities that come from a more strongly regional perspective on innovation;

- A focus on **growth potential and promising sectors** in the **Netherlands** (West), with **more specific targeting** within the sectors (e.g. regenerative medicine within life sciences), and a new focus on technologies with a high Technology Readiness Level (TRL);

- **New areas of specialisation** have been prioritised, such as health (**W-M** – see Box 3) and there is a greater focus on digitalisation (**Biz**, **CZ**) and societal challenges (**CZ**, **DK**, **NL** South).

Box 3: Defining a new area of specialisation in Warmińsko-Mazurskie

The process of planning the **Warmińsko-Mazurskie** 2030 Strategy launched a wide-ranging discussion with scientific, business and business environment institutions about the need to identify new areas of specialisation. Regulations were introduced at the regional level to support the EDP. The procedure encouraged stakeholders to carry out studies themselves (with support from ROP Technical Assistance) to build a case for adopting a new specialisation. This was then assessed by the MA and by a Smart Specialisation Committee comprising representatives of 30 regional organisations. Once supported, the proposal was then submitted to the Regional Board for approval. This new procedure led to the adoption of the fourth "Healthy Life" specialisation.

The original logic of the new specialisation highlighted the R&D dimensions of healthy living. However, support for this would be based on potential rather than existing strengths (although the higher education sector in the region already has relative strengths in medical science). Moreover, the MA sees health tourism (e.g. development of the region's spas and sanatoriums) as a dimension which could build on existing resources.

iii Evolution of stakeholder engagement processes

Stakeholder engagement processes have evolved and matured, learning from experience of the 2014-20 period. This includes a move from triple to quadruple helix representation, a stronger regional dimension, more participatory processes and the use of new tools and models.

The focus has moved to **strengthening the commitment** of different stakeholders to the strategy in **Helsinki-Uusimaa** region (FI), from what was viewed as a learning phase in 2014-20. Tools to help engage actors in the region have included the Regional Council's management and high-level working groups along with seminars related to S3. Work is underway more widely by the Finnish programmes to **improve the engagement of the business sector**.

The revision of regional and national smart specialisation strategies in **Portugal** was based on a **highly participatory process** (combining top-down political coordination with a bottom-up participation model), taking place over about two years, as well as the results of an evaluation and specific studies. Thematic fora and cooperation and coordination processes between

sectoral and regional actors were stimulated, including between the teams responsible for updating the national and regional strategies.

The **evolution from triple to quadruple helix** in **Vlaanderen** has aimed to integrate the societal dimension in projects, by encouraging greater public involvement. For example, in relation to health projects, triple helix partners worked together to develop a project in which patient groups are now also involved. Quadruple helix actors will continue to play a major role in the implementation of the S3 strategy in **Hungary.** The EDP included a **national questionnaire survey** and the creation of a network of (generally) university-run **Territorial Innovation Platforms** (TIPs). The platforms will play a major role in monitoring and evaluating the implementation of the strategy, alongside their main aim of facilitating the creation of local innovation ecosystems.

A **more robust and also more regionalised approach** to stakeholder engagement was undertaken in **Ireland** for 2021-27, while in **Czechia** the role of the EDP has been crucial for building **functional partnerships at the regional level** between local business and public research. The EDP is implemented at the national level through the National Innovation Platforms, and the national RIS3 coordinator provides support to regional RIS3 teams and collects inputs from regional EDP processes. A major effort has been made to take into consideration regional RIS3 priorities and reflect them adequately into national RIS3 priorities. In comparison to 2014-20, more effort has been put into **trust building** among the regional and national actors, as well as into co-creation processes (i.e., so that all actors have the opportunity to influence the national RIS3 strategy. In addition, the fourth generation of the **Smart Accelerator capacity building tool** for the regional RIS3 teams has been launched, to support RIS3 capacity building at regional level and newly also to fund the evaluation of regional RIS3 strategies, as well as staff dedicated to missions at regional level.

iv Strengthened coordination mechanisms

The evolution and maturation of approaches to S3 can also be seen in **strengthened coordination mechanisms**, including working groups, new smart specialisation 'operators' and other dedicated bodies.

New working groups have been introduced in **Finland** (see Box 4), such as the high-level working group in Helsinki-Uusimaa. The group involves R&I experts representing companies, research institutes and educational institutions. The high-level working group functions as the strategy's steering group.[4] **Regional R&D&I working groups** also operate for each S3 priority in the region of Satakunta, to promote and monitor the delivery of the priorities. The groups

[4] Helsinki Smart Region, Uudenmaan älykkään erikoistumisen strategia Resurssiviisas Uusimaa, https://www.uudenmaanliitto.fi/wp-content/uploads/2021/10/Resurssiviisas_Uusimaa_-_Alykkaan_erikoistumisen_strategia.pdf

include representatives of e.g. research and educational organisations, associations, businesses, municipalities, chambers of commerce, and entrepreneurs.

Box 4: Supporting S3 implementation - high-level working group & R&D&I working groups

The implementation of the S3 in Uusimaa (South) is supported by the creation of a **high-level working group** made up of representatives of region's innovation ecosystem. One of the aims is to involve the companies of Uusimaa more closely in the implementation of the strategy. The group met for the first time in April 2022. The group has members from key regional businesses, research institutes and universities. In addition, it includes representatives from nationally-significant research and innovation funding authorities. The activities of the group are future-oriented, aiming to strengthen the cooperation and mutual networking of key research and innovation actors in the region, and to make the strategy better known to other regional actors. A further aim is to increase the share of innovation funding in Uusimaa. The operation of the group is coordinated by the Regional Council of Helsinki-Uusimaa region.[5]

In Satakunta (West), **regional R&DI working groups** have been set up to promote and monitor the S3 priorities, as part of the annual regional forecasting. The working groups have been developed and are coordinated by the Regional Council of Satakunta. Representatives of the working group include: research and educational organisations, associations, businesses, municipalities, chambers of commerce, and entrepreneurs. In addition, funding authorities are invited to ensure synergy of financing. The themes of the working groups are aligned with the priorities of the (domestic) regional strategic programme and with the regional S3. The key is that relevant actors are brought together to discuss topical issues which relate to e.g. to funded projects, and to exchange experience and learning.

Dedicated bodies for steering and monitoring S3 have been introduced in **Hungary**, and new **smart specialisation 'operators'** have been introduced for each smart specialisation area in **Warmińsko-Mazurskie** (see Box 5).

Box 5: Smart Specialisation 'operators' in Warmińsko-Mazurskie

Smart specialisation 'operators' are external bodies selected under public procurement with the task of supporting the regional self-government and the MA in implementation of S3 in 2022-23, by stimulating smart specialisation activities among stakeholders (entrepreneurs, research and scientific institutions, business environment institutions, local government units). The tasks include:

- identification of Smart Specialisation Leaders;
- organisation of workshops and conferences for stakeholders;
- organisation of start-up workshops for people working in universities in the region in order to prepare participants for the incubation of business ideas in the field of S3; preparation of the final report for S3, containing an updated SWOT for a given

[5] https://uudenmaanliitto.fi/uudellamaalla-on-kaikki-edellytykset-vahvistaa-asemaa-euroopan-innovatiivisimpana-alueena/

smart specialisation and recommendations for improving the Smart Specialisation Management System, including the EDP.

For 2021-27, **more systematic cooperation** has been put in place in **Greece** between the three national S3 coordinating secretariats (public investments and the PA, industry, research and innovation) and a new unit has been set up to fill the gap for a **designated body for overall coordination of the strategy**.

Strengthened coordination mechanisms between national and regional levels have been introduced. In **Portugal**, the articulation between the national and regional levels (political and technical coordination, monitoring in terms of the promotion of thematic platforms and the Innovation and Smart Specialisation forum) have been strengthened. In 2021-27, several levels of coordination aim to ensure greater interaction and coherence e.g. political coordination is very important for giving the overall 'push' to the whole system; technical coordination will maintain the monitoring and evaluation system, and support articulation with the governance systems of the regions. The specific financial allocation in SO 1.4 will support these efforts and a greater commitment to coordination overall, and will also help ensure that the governance mechanisms are actually implemented on the ground.

Building on the structures and processes already in place in **Czechia** during 2014-20 (a national RIS3 Steering Committee, a National RIS3 Manager and National RIS3 team and National Innovation Platforms, alongside regional innovation councils and regional innovation platforms for implementing the 14 regional RIS3 strategies), representatives of the national RIS3 team will be present in planning committees of the relevant programmes and to some extent also in their Monitoring Committees. Further, recently an expert group of funds providers (both ESIF and national) has been set up to debate possible models and practicalities of implementation and implementation, while other ad hoc working groups have been established for 'missions'.

4 IQ-NET: INNOVATIVE ACTIONS IN PRACTICE

4.1 Programme priorities for innovative actions

IQ-Net programme authorities implement innovative actions primarily under PO1 and PO2, which albeit separate Policy Objectives, are closely interlinked. Implementation is in many instances still in early stages, and planning is underway to maximise the complementarities and impact of the actions. PO1 represents very much a continuation of the 'more familiar' innovation-related themes implemented in the past programme periods, while PO2 is a new, yet equally prioritised theme in 2021-27. In some countries (especially those with a single / multi-fund programme) the following issues are noted concerning the delivery of innovative actions under PO1 and PO2:

- **Monitoring of project uptake/categorisation under PO1 and PO2**. In **Finland**, the MA (Ministry of Economic Affairs and Employment) has expressed a slight concern that due to the familiarity with PO1 type of actions, more projects may be categorised under PO1 purely 'out of habit'. The implementation of the programme will be monitored, and in the event of challenges, one possible response by the MA is to provide (targeted) guidance to encourage the uptake/categorisation of innovative actions under PO2.

- **Retrospective categorisation of innovative projects**. Programme authorities may also have chosen to categorise PO1/PO2 actions retrospectively. For example in the **Netherlands** (South), the calls for projects are organised per theme and not per PO. Hence, there will not be a specific PO1 or PO2 call. The decision on whether the project falls under PO1 or PO2 will be done retrospectively.

Besides PO1 and PO2, innovative actions can also be funded under other POs (see Table 2), although the innovation focus may be more limited or broader in nature. This applies especially to PO3 and PO5:

- **PO3 More connected Europe**. Innovation-relevant actions may be more limited, but can be linked to e.g. tourism infrastructure (e.g. **DK**) or R&D&I actions targeted at the development of transport and mobility (e.g. in East and North **FI**, as long as the interventions are linked to the Smart Specialisation strategy).

- **PO5 Europe closer to citizens**. Innovative actions can also be supported through the integrated territorial approaches, which are aligned with the Smart Specialisation strategies (e.g. **PT**). For example in **Bulgaria**, support can be provided for innovation-related infrastructure (including buildings) and development of SMEs as part of the two territorial instruments (SUD and ITI) of the programme (Development of Regions). In **Denmark**, limited support is available for welfare technologies under PO5. In other programmes, while innovation can be supported under this PO, it is not necessarily a central focus of the programme, and a 'broader' definition of innovation applies (e.g. NWRA in **IE**). For example, the Town Centre First initiative could involve some aspects of 'broader' innovation.

While ERDF funding is also possible under **PO4 (More social Europe)**, this is a key funding priority for the ESF+. PO4 has a role in the 'wider' support for innovation, especially in terms of supporting skills for green and digital transitioning. It also provides direct support to social innovation through the Employment and Social Innovation (EaSI) strand. This strand (which has a budget of c. €762 million) is directly managed by the European Commission.[53]

Table 2: POs delivering innovative actions in 2021-27

POs supporting innovative actions	IQ-Net country/region/programme
PO1 Smarter Europe	All
PO2 Greener, low-carbon Europe	All
PO3 More connected Europe	DK, FI (East & North only)
PO5 Europe closer to citizens	CZ (OP TAC), DK, NL (West), IE (NWR and SR), PT

Source: IQ-Net research

4.2 Innovative themes under PO1 and PO2

The Operational Programme documents set out detailed information on the types of innovation themes specified at the level of Specific Objectives (and in more detail at the level of intervention codes). By and large, there is **continuity with innovative actions from the 2014-20 period** (e.g. **AT, CZ, FI, Vla, W-M**). However, several issues have been underlined by programme authorities as having a **stronger emphasis in 2021-27**.

First, programme authorities note **a higher level of ambition and prioritisation of R&D&I activities.** This is reflected in the (1) higher technological readiness level (TRL) of projects, as well as in the desire to (2) address societal challenges and specific territorial needs. The focus of support is very much on applied research and the uptake of new technologies.

- **Projects with high level of technological readiness.** In **Finland**, the European Commission required a more precise description in the programme document in relation of R&D&I actions under PO1 and PO2. The programme document therefore specifically describes the higher level of technology (TRL). It notes that the R&D&I actions under PO1 and PO2 ought to be focused on the mid/top level of technological readiness level (TRL 3-9), including applied research and the deployment of new technologies and their refinement for commercialisation and export purposes. In addition, the programme document also notes that the development potential of regions with a weaker innovation level (e.g. rural regions) should also be supported, and in such cases a lower TRL level (TRL 2) may be relevant. The key change is that basic research at the level of TRL 1 is no longer eligible.[54] Similarly, in the **Netherlands** (West), the focus has shifted from early stage projects and proof of concept to innovations with a higher TRL. In **Czechia** (OP TAC), the planned projects under PO1 (under SO 1.1) should fall under TRLs 3-9, with an emphasis on TRL 5 and above. In addition, only product and process innovations are supported, and organisational innovations are no longer eligible in the OP TAC.

- **Approaches to address societal challenges.** Many programme authorities have also noted a shift towards innovations that address societal challenges associated with the key mega trends (e.g. **CZ** (OP TAC)). For example in the **Netherlands** (South), one of the major changes in the RIS3 is that it has shifted the focus from sectors to themes, with societal challenges representing a key theme.

- **Local strengths as a basis for developing future potential**. In **Denmark**, the so-called 'local business lighthouses' approach has been continued in 2021-27 to take local strengths and potentials as the point of departure for developing new Danish strengths,

especially regarding green innovation. Each lighthouse is locally rooted but at the same time has responsibility for developing a particular strength throughout the country. The Table 3 below provides an overview of the location, thematic focus and initial funding of the eight local business lighthouses.

Table 3: The eight local business lighthouses in Denmark

Location	Theme	€ mil
North Jutland	CO_2 capture, usage and storage	12.4
Central Jutland	Water handling technologies	10.2
South Jutland	Green energy, including Power-to-X and integrated energy systems	13.8
Funen	Robotic and autonomous solutions in industrial production	14.6
Lolland-Falster	Green construction	5.8
Zeeland	Bio-solutions	8.1
Copenhagen	Health technologies and qualities	11.1
Bornholm	Off-shore wind turbines and business development	3.7

Source: https://em.dk/ministeriet/arbejdsomraader/erhvervspolitik/lokale-erhvervsfyrtaarne/

Second, there is a clear **market-orientation in the planned R&D&I activities** to support industrial transition to higher value added, future-oriented activities, including services and primary production and value chains.[55]

- In **Portugal**, innovation support in 2021-27 reflects a more company-centred approach, which implies greater integration of investment areas and a greater strategic focus. Similarly, some countries have noted a specific focus on larger-scale, more strategic investments (e.g. **IE NWRA**, **Vla**). For example in the case of **Warmińsko-Mazurskie** (PL), strategic projects are foreseen to be implemented, especially under PO1, for example in the context of supporting pro-innovative activities in the Municipal Functional Area of Ełk and economic promotion of the region.
- In **Vlaanderen**, The expectation is that there is a greater focus on pilot and demonstration projects. This is partly due to the focus on 'valorisation' which in terms of the innovation trajectory is situated towards the end of the process. Hence there is a focus on prototypes, living-labs and demonstration projects which represents the final step before it can be brought to the market. This applies to both PO1 and PO2.

Commercialisation of research through needs-led training – Ireland (SRA)

In **Ireland** (SRA), one key area of focus is the commercialisation of research. This is approached through Smart Hubs, and through needs-led innovation training (also known as immersive-based needs-led innovation training).

Needs-led innovation training is an approach which has been trialled successfully by the Bio-innovate Centre at the University of Galway. As part of this approach, a group of industry professionals (e.g. from hospitals or the med-tech sector) take part in a fellowship programme, receiving a stipend of c. €50.000 per year. If they have a product idea or have identified a problem that needs to be addressed in their area of work, they can join the fellowship programme and receive an intensive boot camp/programme around developing new product innovation in the bio-tech space. They receive support from the academic and research expertise of the University but also from the med-tech industry, as well as from angel investors and other enterprise agencies in Ireland.

The aim is to deliver:

- spin-out companies and start-ups;
- successful applications for large-scale funding, and patent and licencing opportunities; and
- if the R&D journey is at an early stage, it may be possible to apply later for funding from Enterprise Ireland schemes for commercialisation of research.

The idea is to set a path towards commercialisation of research and product ideas. This has been delivered successfully, and the plan is to duplicate this in other S3 areas in the region.

Third, an emphasis on **cooperation** and **partnerships** (e.g. PT) including international connections. For example in **Portugal**, one of the key issues is to deepen the involvement of the main stakeholders by reinforcing the EDP process. This includes greater involvement of the Monitoring Committee members and other monitoring bodies.

Fourth, **the diffusion of knowledge, technologies and innovation** is another key element (e.g. PT), and this relates also to the importance of the development of skills and capacities. In **Portugal**, even more focus than before will be placed on results (for the society and the economy), as well as on the process that leads to the strengthening of innovation activities.

4.2.1 PO1 (Smarter Europe)

PO1 is the key Policy Objective for funding innovative actions. Under PO1, the Specific Objectives, which are listed in the ERDF Regulations, provide an indication of the types of innovative themes that can be funded. The SOs relate to R&I, digitalisation, SMEs, and skills. An illustrative list of innovative activities is provided in Table 4.

Table 4: Examples of innovative activities under PO1

SOs	Examples
SO1.1: R&I	• Business investment in R&I • Research infrastructure • Pilot lines, early product validation, technology transfer • Key digital technologies • Living labs, test-beds • Cooperation (SMEs and knowledge institutions, international cooperation), capacity building
SO1.2: Digitalisation	• ICT uptake in SMEs; B2B; B2C; C2C • E-government • E-inclusion, e-health, e-learning, e-skilling
SO1.3: SMEs	• New firms, start-ups/scale-ups • Industrial cluster development/ EDP process • Access to finance & advanced business services • Access to knowledge on internationalisation, digitalisation, green transition • New business models

SO1.4: Skills for S3	• Innovation management in SMEs • Training, reskilling for smart specialisation areas • Integration of education & training institution in innovation ecosystem • Skills in higher education to increase commercial viability
SO1.5 Digital connectivity	• High-speed Internet access • Technical capacity building

Source: List of EU level examples of activities based on European Commission, Future Cohesion Policy Objective 1: A smarter Europe – innovative & smart transformation https://ec.europa.eu/regional_policy/sources/policy/communication/regional_offices/0512_smarter_eu.pdf and IQ-Net research.

Programme authorities select the most relevant SOs. For example, amongst the IQ-Net partner programmes, priority is given to the first three SOs (SO 1.1, 1.2 and SO 1.3), see Table 5. Uniquely in the case of the **Netherlands** (South and West), only one SO is supported under PO1, namely SO 1.1. **Bizkaia** is concentrating only on SO 1.2, but the wider Basque programme has interventions in both SO 1.1 and 1.2.

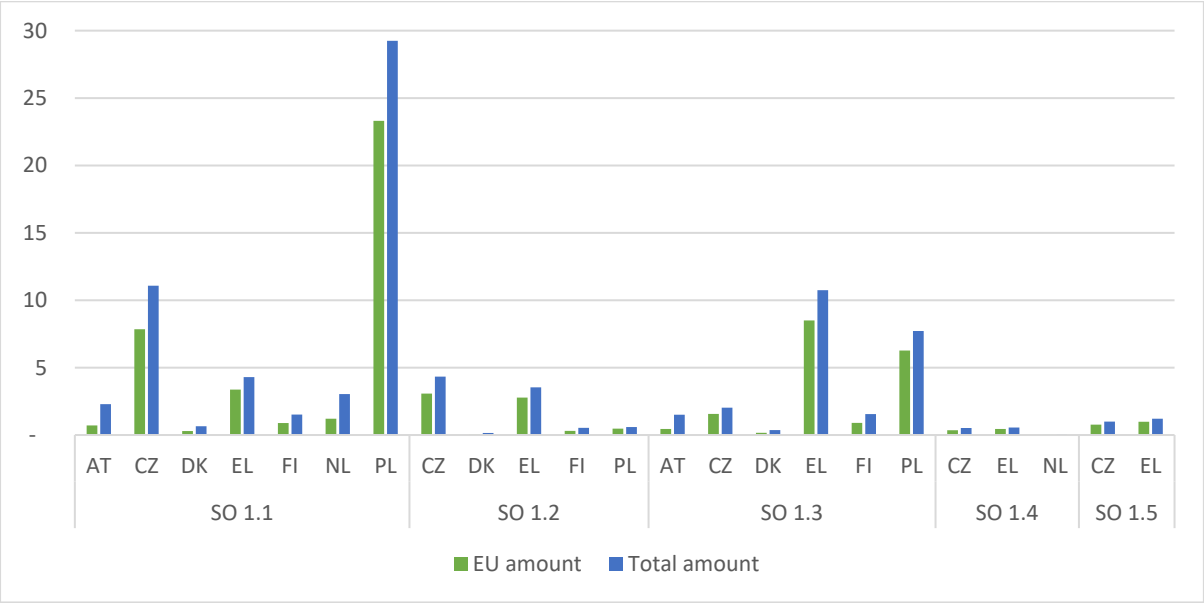
Table 5: Specific Objectives under PO1 in the IQ-Net partner programmes

	AT	Biz	CZ	DK	EL	FI	HU	IE (NWRA)	IE (SRA)	NL (W)	NL (S)	PL (W-M)	PT	Vla
1.1	x		x	x	x	x	x	x	x	x	x	x	x	x
1.2		x	x	x	x	x	x		x			x	x	x
1.3	x		x	x	x	x	x	x	x			x	x	
1.4					x		x					x	x	x
1.5			x		x							x	x	

Source: IQ-Net research. Notes: CZ = OP TAC; EL = OP Competitiveness for SOs 1.1-1.4, OP Digital Transformation for SO1.5. Note that the wider Pais Vasco OP (ES) has interventions in both SO 1.1 and 1.2.

Figure 9 provides an indication on the planned funding across the SOs (please note that data includes approved programmes in IQ-Net countries only).

Figure 9: Planned finances in approved programmes - PO1 (€bn)



Source: Cohesion Open Data Platform, 2021-2027 Cohesion Policy Overview, https://cohesiondata.ec.europa.eu/cohesion_overview/21-27# (data accessed 16 November 2022).

Under the broad headings of the SOs, programme authorities focus on actions that are most relevant to their country/region taking into consideration their prosperity (regional category), the level of innovation, and the specific innovation strengths and needs. Therefore the innovative actions vary across countries and regions. In terms of specific actions planned under the SOs, IQ-Net programme authorities highlight the following focus areas for 2021-27:

SMEs and capacity issues

- In **Denmark**, the majority of funding is directed to SMEs for activities which include counselling and advice; networking and cooperation; improving their innovation capacity and competitiveness; green transition and internationalisation.[56] While the ERDF programme remains firmly focused on providing direct support for SMEs, the focus on the new clusters (see Section 5.1) may also indirectly bring in larger firms functioning as resources for SMEs in the clusters.

- In **Ireland** (SRA), the emphasis is on improving capacity within the higher education (HE) sector to engage with SMEs. The country report for Ireland[57] notes that there is good innovation performance, but this is partly due to the innovation performance of larger companies. The HE sector and its capacity to engage with industry is more limited, with a tendency to engage with bigger firms. Therefore the focus is on having higher level of capacity within the HE sector to engage more broadly, namely with more SMEs in the region.

- In **País Vasco**, the RIS3 strategy aims to position the region among the most advanced European regions in innovation, highlighting the need to address three main challenges: increasing investment in R&D, especially in the private sector; promoting innovation in SMEs; and increasing the share of female research staff.

Research infrastructure

- In **Austria**, the key innovative action funded in the joint ERDF/JTF programme (under SO 1.1) focuses on research infrastructure in SMEs, large enterprises, and in public research centres and higher education where this is directly linked to R&I activities. (intervention codes 002[6],003[7],004[8] and 029[9]).

Cooperation and the citizens

- In the **Netherlands** (South & West), PO1 funding is focused entirely on SO1.1. In the **South**, the emphasis is on cooperation between SMEs and knowledge institutes for innovations that are in a higher TRL (in PO1 projects, knowledge institutes have a 'valorisation' role rather than a traditional academic role). Cooperation projects, as well as living labs and pilot projects, are seen as important as they provide a direct connection with end users and citizens. In this context, citizens are viewed broadly, for example, patients in health care transition, and local municipalities or housing corporations in energy transition. In **West**, programme authorities note that field labs are intended to function at the 'next level' as a place for co-creation between SMEs, end users and knowledge institutions (see Box 6).

Box 6: Delivering innovation through Smart Industry Field Labs & Living Labs in the Netherlands

Two initiatives concerning field labs (NL West) and living labs (NL South), which started in 2014-20, will be continued into 2021-27. Both provide settings where SMEs, organisations and knowledge- and education institutes collaborate on innovation: [11]

Field labs are "a practical environment where solutions based on enabling technology are developed and tested as well as an environment where people learn the solutions to apply".

Living labs are real-life settings which reflect the complexity of daily life. Innovative solution are tested and further developed in these real-life settings in close collaboration with end user(s).

NL West first introduced vouchers for **Smart Industry Field labs** in 2014-20. The MA supported 17 field labs in the region, some have a regional focus, others have a national, European or global focus. Examples include:

the Airport Technology Lab, a collaboration between Rotterdam/The Hague Airport, the municipality of Rotterdam, SMEs and knowledge institutes at all (higher) education levels, to carry out a broad innovation programme for aviation technology.

Fieldlab Vertical Farming, a collaboration between SMEs, knowledge institutes and a foundation where an innovative ecosystem is created in which state-of-the-art

[6] 002 = Investment in fixed assets, including research infrastructure, in SMEs (including private research centres) directly linked to R&I activities

[7] 003 = Investment in fixed assets, including research infrastructure, in large enterprises directly linked to R&I activities-

[8] 004 = Investment in fixed assets, including research infrastructure, in public research centres and higher education directly linked to R&I activities

[9] 029 = R&I processes, technology transfer and cooperation between enterprises, research centres and universities, focusing on the low carbon economy, resilience and adaptation to climate change

knowledge is brought together and where facilities are offered to companies for business-driven research and innovation in the field of vertical farming.

In the 2014-20 programme, OP Zuid (co)financed living labs, such as:

Living Lab Metal Power, aiming to apply metal power technology (a circular process) in coal-fired power stations, as a sustainable alternative to coal with the preservation of employment.

The Sustainable Construction Site, where project partners, in collaboration with end users, work on the technical and process innovations to make the construction site more sustainable, as well as the smart roll-out to the construction sector.

Living Lab Structural Health in BioBased Constructions: developing various promising biobased technologies and their potential applications.

4.2.2 PO2 (Greener Europe)

PO2 can also deliver innovative actions, especially linked to the green transition, although the extent to which PO2 delivers innovative actions varies (at the level of Specific Objectives, as well as between different programmes).

As in the case of PO1, the Specific Objectives, which are listed in the ERDF Regulations, provide an indication of the types of innovative themes that can be funded under PO2. The SOs relate to energy efficiency, renewable energy, smart energy systems, innovative solutions to the market etc.

Table 6: Examples of innovative activities under PO2

SOs	Examples
2.1: Energy efficiency	• Use of climate-relevant technologies & services • RTDI demonstration projects • Eco-innovations for low-carbon economy • Upgrading & reconstruction of energy distribution systems/facilities
2.2: Renewable energy	• Renewable energy technologies • Innovative projects/concepts (living labs & pilot projects) • Innovative solutions for sustainable energy generation • Support for construction of facilities
2.3: Smart energy systems	• Smart energy transmission, distribution systems & digitalisation of networks • Development of energy storage & data, and systems that are able to better adapt to energy demand • Construction, reinforcement, reconstruction & modernisation of transmission and distribution systems & and related infrastructure
2.4: Climate change adaptation	• Green infrastructure (e.g. through nature-based solutions or ecosystem-based approaches)

2.5: Access to water	• Utilisation of waste/water, optimisation of technology, capture, storage • Consultancy services (e.g. for SMEs aimed at developing water recycling plans)
2.6: Transition to circular economy	• Innovative technologies for the recovery, processing and use of use of raw materials • Improving material recycling • Innovative technologies for manufacturing (for eco-design of products) • Green production processes in SMEs • R&T transfer to SMEs to strengthen the circular economy
2.7: Protection & preservation of nature	• Projects which contribute to the protection of biodiversity (species, ecosystem, landscape, pollution reduction etc.)
2.8: Sustainable urban mobility	• Innovative technologies in low-carbon transport (e.g. hydrogen-based solutions) • Innovative pilot & demo projects that promote multimodality • Innovative mobility concepts

Source: IQ-Net research

In comparison to PO1, there is a more even spread of selected SOs, see Table 7. In the case of **Austria, Denmark** and **Ireland** (SRA), only one SO has been selected, namely SO2.8 (**IE** SRA), SO2.6 (**DK**) and SO2.1 (**AT**). Four IQ-Net countries/regions have selected all SOs (**EL**, **FI**, **W-M**, **PT**).

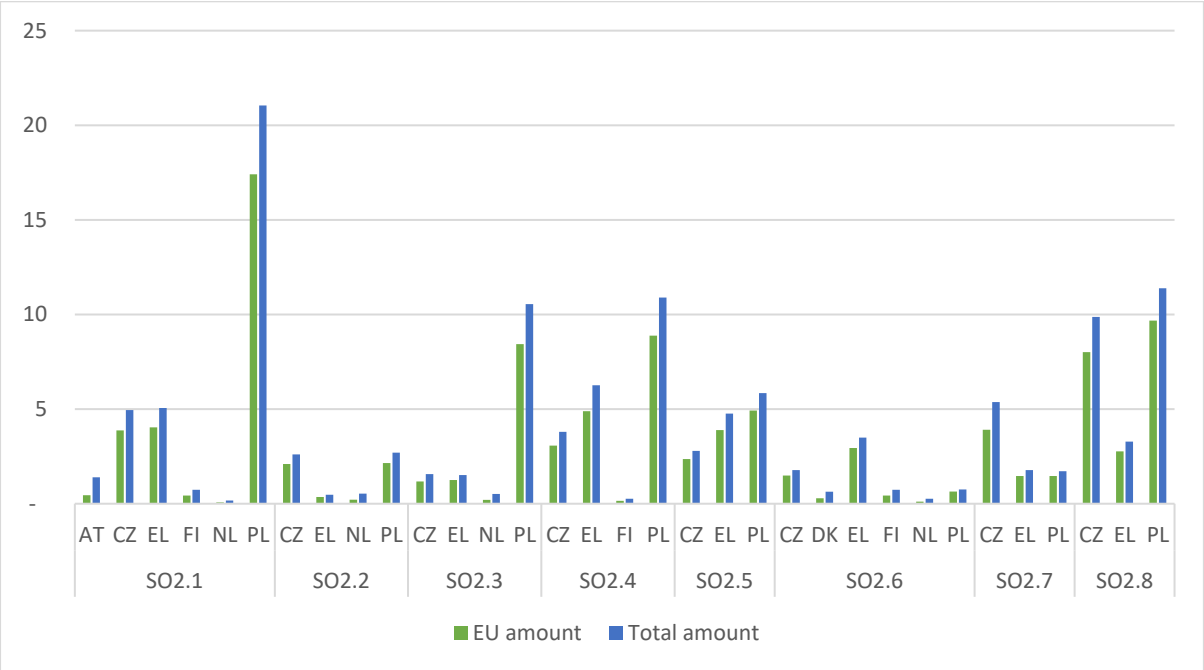
Table 7: Specific Objectives under PO2 in the IQ-Net partner programmes

	AT	Biz	CZ	DK	EL	FI	IE (NWRA)	IE (SRA)	NL (W)	NL (S)	PL (W-M)	PT	Vla
2.1	X		X		X	X	X		X		X	X	X
2.2			X		X	X			X	X	X	X	
2.3			X		X	X			X	X	X	X	
2.4		X			X	X					X	X	X
2.5			X		X	X					X	X	
2.6			X	X	X	X			X		X	X	
2.7		X			X	X					X	X	X
2.8		X	X		X	X		X			X	X	

Source: IQ-Net research. Notes: CZ = OP TAC; EL=OP Environment & Climate Change.

Figure 10 provides an indication on the planned funding across the SOs (please note that data includes approved programmes in IQ-Net countries only).

Figure 10: Planned finances in approved programmes – PO2 (€bn)



Source: Cohesion Open Data Platform, 2021-2027 Cohesion Policy Overview, https://cohesiondata.ec.europa.eu/cohesion_overview/21-27# (data accessed 16 November 2022).

While the Specific Objectives provide a list of general themes, not all of these have a strong innovation dimension. Therefore some SOs are more relevant than others:

- **Focus on energy efficiency (SO2.1) and smart energy (SO2.3)**. In **Finland**, selected projects under SO2.1 and SO2.3 are the most relevant for innovative actions, and need to be aligned with the priorities of the regional S3. In **Greece**, the 'GR-eco' islands project is an example of an innovative action which aims at greening the islands. This action is funded through the programme 'Environment and Climate Change' (under SO2.1 and SO 2.2). Islands which are labelled as green will not only cover their energy needs through renewable energy sources, but will also be subject to series of interventions including sustainable waste management, adoption of circular economy practices, and the management of natural resources. In the **Netherlands** (West), developing energy storage and data and systems that are able to better adapt to energy demand are key innovative actions in SO2.3. Some of these include projects implemented in 2014-20, which are now ready for further development and scale-up. Key innovative actions include: aquifer thermal energy storage (heat-cold storage) and district heating.

- **Focus on circular and resource efficient economy (SO2.6)**. In **Denmark**, the overall aim is to support the transition to a circular and resource efficient economy. Efforts are therefore concentrated primarily on SO2.6, which involves support for green production processes in SMEs (90 percent of funding), and secondarily on research and technology transfer to SMEs, aiming to strengthen the circular economy (10 percent of funding).

IQ-Net programmes highlight some key issues and challenges in relation to the implementation of PO2 actions. In terms of changes, some have noted the opportunity to deliver **more local**

projects. For example in **Denmark**, green PO2 projects may be more local (potentially also a limited number of firms working in partnership with a knowledge institution) to address a particular green issue. However, at this stage of implementation, challenges and uncertainties are equally pressing:

- **More complex projects.** The nature of the PO2 suggests that some funded projects may be more complex. For example, programme authorities in the **Netherlands** (West) note that this PO is likely to have issues in comparison to PO1. First, the scarcity and delivery delays of materials can slow down the scale-up of projects. Second, there are limitations regarding possible physical locations for energy infrastructure projects. Third, laws and regulations cannot keep up with the speed of technological development. For example, the price cap on energy counteracts the objective to accelerate green innovation in energy because energy companies and housing cooperatives are expected to wait and see what will happen with the price cap, which in turn does not encourage innovative projects. In **Warmińsko-Mazurskie**, a significant barrier in the case of innovations in the renewable energy sector are the procedures related to both obtaining a permit to conduct an investment, as well as the long period of spatial planning and preparation of analysis assessing the impact on the natural environment. At the same time, the increasing coverage of protected areas belonging to the NATURA 2000 network is viewed as an increasing obstacle in conducting innovative investments.

- **Indicators.** The issue of indicators can be complicated with regard to green innovation, given the wide range of green objectives that can be pursued. In the case of **Denmark**, working on the basis of the indicator lists provided by the European Commission, the Danish programme has largely succeeded in fulfilling the policy-makers' ambitions to institute as few indicators as possible (simplification) and making them measure the expected impact (relevance).

- **DNSH principle and climate proofing.** IQ-Net programme authorities have noted issues such as the lack of guidance on the methodology from the European Commission as problematic given that project generation has started/is ongoing in many programmes. The requirements regarding the DNSH and climate proofing are reportedly not clearly defined by the European Commission, and as such the responsibility for the delivery of the regulatory aspects is left for the MAs, IBs and project applicants/beneficiaries. This creates uncertainty, and has, in some instances, affected the level of project interest/uptake (e.g. **CZ** – OP TAC).

- **GBER.** In **Czechia** (OP TAC), the General Block Exemption Regulation (GBER) is perceived as complicating and limiting the practical implementation of energy savings and shift to low-carbon economy. For example, for the support for clean mobility, a use of comparative methodology is suggested by the programme authority to assess compliance with GBER and to set a degree of support (i.e. a comparison of prices of an intended electric car and a comparable car with combustion engine). However, at the end, the intensity of support depends on the size of company, type of region, type of applicants, sector etc. This is very complicated and can affect the motivation of applicants. A clear trade-off is perceived between the European Commission's idea of decarbonisation and the regulatory requirements posed by DG Competition.

Discussion item: How are programmes addressing the various implementation issues, such as setting the conditions for innovative actions so that they comply with the GBER?

5 IQ-NET: NEW WAYS TO DELIVER S3 & INNOVATION

The delivery systems for generating and selecting projects are at the heart of programme implementation to deliver quality projects and create lasting impact. There is no uniform approach to project generation, appraisal and selection among the EU Member States. Rather, different systems are in place reflecting national practices[58], which have evolved over successive programme periods. The models for project generation and selection adopted by the programmes vary in terms of their selectivity and degree of targeting, their timing and the burden involved in preparing and managing them. A common trait is that these delivery systems have, over time, aimed to increase administrative efficiency and to deliver more results and impact.[59]

While there is a large degree of continuity from the 2014-20 programme period, there are also new elements in 2021-27, in particular with new and strengthened initiatives around clusters and cooperation.

5.1 Delivering innovation through clusters and cooperation

A focus on clusters. 14 new nation-wide cluster organisations have been established in **Denmark** to strengthen innovation and the use of technologies in SMEs. The strategy integrates many regional cluster initiatives previously supported through European and regional development funding. The setting-up of the new clusters has drawn on national funding through the Danish Executive Board for Business Development and Growth, in conjunction with the Agency for Education and Research. In 2021-27 this funding structure will change, with European funding set to play a major role. The 2021-27 period will be characterised by a more targeted approach to programme calls. For example, the first ERDF call was addressed only to the currently appointed clusters, to move their basic funding from national to EU sources. Next, a new round of applications for official cluster status is foreseen, potentially associated with a further round of ERDF funding. **Vlaanderen's** approach also focuses on six **spearhead clusters**, which support their members in accessing domestic and international R&D&I funding (see Box 7).

Box 7: Spearhead clusters in Vlaanderen

Vlaanderen focuses on six **spearhead clusters** which coordinate and support access to domestic and international R&D&I programmes. Spearhead clusters have a budget for organisational working costs which are funded half by the government (max. €500,000 per year) and half by the enterprises. Activities range from basic research to dissemination and implementation. Clusters include:

- Flanders' Food in the domain of **agro-food**. A project under this domain is **The Belgian Fries Pilot**, a pilot production line for coating, baking and degreasing potato products, aimed at the potato processing industry.
- Flux50 in the domain of **energy (smart grids**). Five innovator zones have been selected: energy harbours, micro grids, multi-energy solutions for districts, energy cloud platforms, intelligent renovation
- **Blue cluster** with an emphasis on sustainable economic activities related to the North Sea and beyond. The cluster is active in (1) coastal protection and mineral resources, (2) renewable energy and fresh water production, (3) maritime connectivity, (4) sustainable food production and marine biotechnology, (5) blue tourism and (6) ocean pollution.

A focus on cooperation and capacity building, including between relevant actors domestically, and also internationally**.** In **Finland**, in particular, there is a strong focus on **cooperation and participation in international networks and cooperation projects**. In the region of Helsinki-Uusimaa, actors are involved in various cooperation networks in the context of the delivery of S3. This includes the S3 Platform and different thematic networks. The regional actors are also actively involved in the Knowledge and Innovation Communities of the European Institute of Innovation & Technology (EIT).[10] Helsinki-Uusimaa region has chosen Amsterdam, Hamburg, Copenhagen and Stockholm as the reference and cooperation areas, and together these areas form the **Big Five network**. The cooperation started on the basis of the various S3 themes, and this is being further developed by implementing joint development projects. Cooperation also takes place at the national level in Finland (see Box 8), including through the Six Cities (the cities involved in the Six Cities ITI strategy in 2014-20). The regions participate also in a **Smart Specialisation network** in which representative of the regions get together to discuss topical themes several times a year.

Box 8: National innovation and competence networks in Finland

In Finland, to complement the delivery of the Ecosystem Agreements of the ITI and the regional level Smart Specialisation strategies, ERDF funding has been earmarked for the implementation of innovative themes at the national level. This concerns the delivery of **national innovation and competence networks**, in which projects are selected and funded through national-level ERDF funding calls. These are intended to improve the capabilities of regional R&D&I actors (especially research organisations and businesses) to develop larger and more impactful projects and cooperation networks (which could also take advantage of the EU's instruments such as Horizon and Digital Europe). The theme encourages closer cross-border cooperation between the regional R&D&I actors (especially research organisations and businesses). The theme promotes R&D investments especially those which promote green and digital transition.

Source: https://rakennerahastot.fi/valtakunnalliset/innovaatio-ja-osaamisverkostot

[10] https://eit.europa.eu/our-communities/eit-innovation-communities

The **development of international networking activities** have also been reinforced in **Portugal**, in strategies, projects, networks and programmes, which allow the participation of regional actors in international networks and global value chains to be strengthened, including initiatives to strengthen supply chain operators (see Box 9). At the same time, cooperation work continues between the Regional Coordination and Development Commissions and neighbouring regions (e.g. Galicia-North Portugal Cross-border Smart Specialisation Strategy (RIS3T), the **first cross-border RIS3 at European level**.

Box 9: Portugal's Suppliers' Club

Run as a pilot in 2014-20, the **Suppliers' Club** instrument (*Clube de Fornecedores)* is expected to be extended and revised in 2021-27. The initiative aimed to stimulate clustering dynamics, increasing the interaction of companies and their suppliers with the economy, building the capacity of enterprises which are identified as having relevant innovation capacity and are willing to invest. The initiative supports participation in international consortia and collaborative working.

The **national RIS3 coordinator in Czechia has been cooperating with the Commission's Joint Research Centre** (JRC) as Czechia is one of the pilot countries to set S3 priorities according to the SDGs. The JRC organized workshops for stakeholders to participate in the development of the 'missions' concept. Currently, the JRC provides expertise to Czech national stakeholders on monitoring procedures and setting of missions, including their governance. In addition, cooperation with the JRC promotes the networking of Czech RIS3 policy makers with the leading European countries on this agenda. Additional wider cooperation has taken place between World Bank experts and representatives of some regions (their innovation centres) to assist with the evaluation of innovation measures.

In terms of cooperation between domestic research institutions and industry, initiatives have been rolled out in **Austria** relating to technology transfer, and in **Hungary** relating to cooperation between higher education and industry (see Box 10). Cooperative R&D projects focused on technology transfer are being rolled out in **Austria.** These were supported under the 2014-20 ERDF OP's research and transfer programme aimed at the development of capacities for green, digital technologies and life sciences. Multi-annual and cooperative R&D projects could be implemented which resulted in technology transfer. The measure was implemented differently by the Austrian *Länder*, and in 2021-27, the approach taken by Salzburg will be rolled out to two more *Länder* (Carinthia and Vorarlberg) The measure has been implemented in Salzburg by the Austrian Labour Market Service (AWS), a federal IB. Research institutions are supported with increased staffing and cooperative R&D projects to build up long-term competencies in the region's areas of strength. To avoid State Aid, the projects must be pre-competitive. The funded transfer centres must develop a research programme as well as a transfer agenda focused on companies. ERDF funding for the measure

will amount to €16.4 million, with a total of 12 funded projects from the three participating *Länder*.

Box 10: Cooperation between the research community and industry, Hungary

Several calls have been published under Hungary's GINOP with the aim of supporting cooperation between the research community and industry. In 2015, a first call aimed to establish Centres for Higher Education and Industry Cooperation (HEICs), aiming to:

- build RDI capacity to meet the needs of industrial partners,
- develop competitive products and services,
- develop competitive manufacturing of products.

In 2020, a second call was launched, supporting consortia to establish competence centres building long-term and sustainable partnerships between industry, service-providers and universities. Projects must fit in with the sectoral priorities or smart technologies identified in the National S3.

Five HEIC centres and five Competence Centres received funding worth HUF 38.8 billion. The new HEICs and Competence Centres specialise in automotive, pharmaceutical, biotechnology, materials technology, crop and animal breeding, ICT and clean and renewable energy. The scheme brings together 7 universities, 4 research institutes, 8 large companies and 5 SMEs from the innovation ecosystem in an industry-service-academia partnership.

Based on the experience of the scheme, support for these regionally organised knowledge centres and competence centres is expected to continue in 2021-27 under GINOP Plus.

Discussion Item: Programmes emphasise clusters and cooperative practices in 2021-27 programme period. What approaches add value to delivering innovate actions?

5.2 Delivering innovation through territorial instruments

Integrated Territorial instruments provide a strategic approach to delivering research and innovation policies and can complete and reinforce the place-based approach of S3. In the 2014-20 programme period, territorial instruments have been credited in some contexts with strengthening strategic quality and innovation, including through the development of integrated, cross-sectoral frameworks, more participatory processes of strategy-building, tailored thematic content, and the design of more strategic or innovative projects.[60] In 2021-27, for example, the territorial instruments (ITI and CLLD) continue to be an important means of delivering innovative actions (e.g. **FI**, **CZ**). For example in **Finland**, the ITI actions are implemented under PO1 and PO2 under the SOs: 1.1, 1.2, 1.3, 2.1 and 2.6 (see Box 11: Innovative actions through the ITI in Finland in the 2021-27 programme period.

Box 11: Innovative actions through the ITI in Finland in the 2021-27 programme period

Sustainable Urban Development is delivered through an ITI in Finland. The ITI covers 18 University cities. The participating cities and the state conclude so-called Ecosystem Agreements. There are 16 such agreements (the capital cities - Helsinki, Vantaa and Espoo - are included under one Ecosystem Agreement).

The Ecosystem Agreements are innovation agreements, which have been drafted through a co-creative process between the State and each participating city. Each Agreement sets out the key development priorities and needs of the city to enable innovation-led growth and renewal (including themes such as low-carbon, digital technology, wellbeing and health). The Agreements are intended to develop innovation ecosystems, which are collaboration models that bring together key actors (e.g. business, Universities, research institutes and funding partners) to speed up innovation.

They enable, for example, the gathering of research and related networks into larger knowledge hubs where different actors complement each other. One commonality for each participating city is that their development is based on University-led, top-level expertise and the utilisation of this expertise. The Ecosystem Agreement approach is very much in line with the national policy thinking, and links innovation policy with urban development policy.[11]

The Ecosystem Agreements provide:[12]

- Large-scale future investments in cities which are platforms for innovation;
- New sources of growth – creation of new business ecosystems;
- Local solutions to global challenges;
- New concepts for innovation – dynamism;
- Mutual insights facilitated by the regular dialogue between national and regional stakeholders.

Note: Image from the presentation slides delivered by Olli Voutilainen of the Ministry of Economic Affairs and Employment on 'Sustinable Urban Development (SUD) in Finland: Speeding up cities' innovation ecosystems, 29 September 2022

In **Portugal**, the SUD strategies in 2021-27 will place a greater focus on issues such as decarbonisation, digitalisation, attraction of talent, and promotion of international competitiveness. Two examples are of particular relevance here:

- **ITI Inter-Municipal Communities / Metropolitan Areas (ITI CIM/AM):** Contracts for Territorial Development and Cohesion are signed with the Inter-Municipal Communities / Metropolitan Areas (SO5.1) at the NUTS 3 level. The

[11] https://tem.fi/ekosysteemisopimukset
[12] Voutilainen O (2022) Presentation slides on 'Sustainable Urban Development (SUD) in Finland: Speeding up cities' innovation ecosystems, Ministry of Economic Affairs and Employment, 29 September 2022.

priorities include: promotion of innovation ecosystems (mainly mobilising support for the creation, transfer and application of knowledge and actions and equipment to support competitiveness (implemented under PO1/PO5)).

- **ITI Urban Networks** (SO 5.1), which aim to promote innovation capacity, economic, social and cultural development, and networks of Urban Centres that can implement joint strategies, with a view to strengthening their competitiveness in the international context.

5.3 Generating and selecting innovative projects

As mentioned previously, project generation and selection procedures vary greatly across the countries and regions. However, there are some key considerations in relation to the generation, selection and monitoring of innovative projects, including the **degree of targeting**, and the use of **innovation-relevant selection criteria.**

i Targeted vs. broad themes

One particular issue concerns the extent to which programme authorities decide to adopt a targeted, broad or thematic approach to generating innovative projects.

- **Broad approach, but can be adapted to changing needs**. In **Vlaanderen**, a general call for projects under PO1 can be broad, focusing on e.g. innovation capacity, which can be applied to all domains. A more targeted call can also be issued to address specific gaps or issues in the course of the programme implementation. In **Portugal**, calls can cover more than one type of action of one or more SOs, aiming at **a more strategic nature and greater integration** of the project's areas of intervention.

- **Targeted approach, but can be adapted to the priority.** In **Denmark**, project generation takes place through targeted calls, in a change from the broader calls and framework measures of 2014-20. However, the approach can be adjusted depending on the priority in question. Under PO2, calls are expected to be more open, as green innovation is not specifically associated with one particular type of organisation, while under PO1, the 14 clusters play a key role (especially under SO 1.1). It remains to be seen how the programme will evolve and to what extent the approaches under the POs will differ (i.e. more targeted, top-down approach under PO1, and more experimental, bottom-up approach under PO2).

- **Targeted and thematic approaches.** In **Czechia,** calls can be targeted for specific R&D&I topics within the domains of specialisation. Furthermore, a specific sub-set of targeted calls can be organised for thematic missions. These missions, which will address societal challenges through R&D&I actions, will be defined during the programme period. The first targeted mission call – energy-climate mission - is expected to be launched in 2024 under the OP JAC. Alternatively, the identified themes or mission themes can be taken into account by means of a bonus in a standard call. A thematic approach is also used in the **Netherlands** (South) (see Box 12).

Box 12: Delivering different innovations through themes – Netherlands (South)

In the **Netherlands** (South), the focus in 2021-27 is on themes instead of sectors. This means that there are no PO1 calls or PO2 calls, but calls for a specific theme (e.g. health, agriculture and food, energy, climate and raw materials). The first call focuses on specific issues within these broader themes:

- **Health**: prevention and personalised health care
- **Agriculture and food**: valorisation of residual flows, protein transition, precision farming
- **Energy**: smart energy system, renewable energy generation and energy storage
- **Climate**: flooding in urban areas and water shortage in rural areas
- **Raw materials**: circular manufacturing industry and circular construction industry

This approach is expected to lead to new and different kinds of innovations.

ii Appraising and selecting innovative projects

S3 is given greater consideration in project appraisal and selection procedures than previously. In **Finland**, for example, the implementation of the S3 priorities through the ESIF programme is more strongly emphasised in 2021-27, and is taken into account at the call stage, as well as in the project selection criteria (which include specific S3-related criteria (see Box 13) and in the scoring of projects. This approach is also notable elsewhere, such as in **Ireland** (SRA) and **Hungary**, where the selected projects (under relevant priorities) need to demonstrate alignment with S3. In **Czechia**, the project appraisal includes binary criteria and criteria which relates to the fulfilment/consistency of a project proposal with the national RIS3. For example, the OP JAC assigns (under one of its priorities) c. 10 percent weighting to the national RIS3 and provides bonus points to those project proposals which relate to the RIS3 mission(s).

Box 13: Consideration of Smart Specialisation in project selection (Finland)

Smart Specialisation is included as a specific selection criterion under SO1.1. Based on this any selected project will need to '*support Smart Specialisation-related partnerships at cross-regional and/or international level*'. Furthermore, Smart Specialisation is included as a further detailed selection criterion in the programme. According to this criteria, any projects funded under SO1.1 must '*target the recognised top sectors or development priorities set out in the respective regional Smart Specialisation strategy*'. In addition, Smart Specialisation must be considered in projects funded under SOs 2.1 and 2.3.

Source: Karppinen P (2022) Älykkään erikostumisen hankkeet osana kevään 2022 EAKR-rahoitushakuja, Uudistuva ja osaava Suomi, Alue- ja rakennepolitiikan ohjelma 2021-2027 – toimilinja 1.1

5.4 More rigorous monitoring of S3

Reflecting the lesson learned from 2014-20 regarding the need for better monitoring and dissemination of results, improvements are widely planned. For example, in **Greece**, the annual monitoring report will include an **appraisal of the EDP process** on the national and regional level (incl. number of workshops, stakeholders involved, businesses involved) and priorities that were identified, as well as monitoring the values of indicators in the European and Regional Innovation Scoreboards. Similarly, monitoring tools and new indicators have been created indicating the overall increased awareness of the importance of monitoring in **Hungary**. Improvements made to the monitoring system in **Portugal** aim to overcome some the constraints identified in the 2014-20 approach – including a complex monitoring system, with a very large number of indicators, not always properly aligned with the ESIF monitoring systems. For 2021-27, **indicators have been reviewed and better articulated** with the regional monitoring and R&I systems. A thorough system of monitoring of the realisation of the National S3 has also been set up in **Czechia**, including a hierarchy of indicators, and **incorporation of bottom-up RIS3 project monitoring data** into the central electronic monitoring system for ESIF. The S3 specifies input, result and context indicators, including milestones and target values. In the **Netherlands** (West), programme authorities aim to share their monitoring reports with the economic boards, which include all relevant stakeholders. This addresses the identified issue of lack a follow up after the consultation for business at the start of the programme.

5.5 Supporting innovation - Ensuring synergies

Support for cohesive and inclusive innovation-driven growth of countries, regions and their relevant stakeholders (including companies) needs to take place by ensuring synergies between the different instruments.[61] Synergies are crucial throughout the different stages of the innovation process, including in the diffusion of innovation.

The JTF programme / priority is relevant for the implementation of innovative actions, and can include e.g. investments in R&I activities, including by universities and public research organisations, and fostering the transfer of advanced technologies; and investments in digitalisation, digital innovation and digital connectivity. The regulations also note that JTF should be able to support the development of innovative storage technologies.[62] IQ-Net programme authorities have also underlined the role of JTF in delivering innovative actions. For example in **Austria**, the JTF axis of the ERDF-JTF programme (measure 6.2 'RTDI and demonstration projects to manage the transition') is directly supporting innovation. Similarly, in **Czechia** and **Greece**, the JTF programme provides an opportunity to implement the national RIS3 strategy.

In addition, there are numerous other programmes/funds which promote innovation (including Horizon Europe, Digital Europe, InvestEU, the Single Market, ETS Innovation Fund, as well as

national instruments). Of particular relevance to many IQ-Net programme authorities are synergies between Cohesion Policy and Horizon Europe (see Figure 11).

Figure 11: Synergies between Cohesion Policy and Horizon Europe

Horizon Europe delivers European excellence.	**Cohesion Policy delivers regional relevance.**
Horizon is the key Framework Programme for R&I in Europe, with a budget of c. €95.5 billion for 2021-27.	Cohesion Policy is the key channel for implementing regional innovation in Europe, and is set to invest c. €56.6 billion in R&I by financing innovation in firms, bringing research results onto the market, supporting business–science cooperation.

IQ-Net programme authorities plan specific actions to promote these synergies. For example in **Greece**, one specific planned activity under SO 1.1 concerns the **support/promotion of international cooperation**. Actions will include support to initiatives in the framework of European Research Area (ERA), mainly through co-financing actions of Greek actors in the Horizon Europe. In addition, the Seal of Excellence is also supported. In **Czechia**, the instrument promoting synergy/complementarity between the Marie Skłodowska-Curie action (MSCA) of Horizon 2020 and the OP Research, Development and Education 2014-2020 (OP RDE) is a successful example. The instrument was established in response to the high demand for support of in-coming and out-going **mobility of researchers and scientists** and to enhance the international relationships of the R&D&I ecosystem in Czechia. This measure will continue also in the 2021-27 period. Similarly in **Wales**, the Sêr Cymru initiative uses ERDF and funds from the Horizon 2020 Marie Sklodowska-Curie Actions (COFUND scheme) in a strategic way to provide and develop a network of talented researchers in Wales and attract international research fellows. Over 96 percent of Sêr Cymru II projects involve smart specialisation activity. The Pais Vasco RIS3 strategy aims to promote more synergies with other EU programmes, with a particular focus on Horizon Europe

Discussion item: How can synergies be promoted between innovative actions under ERDF PO 1 and PO 2 with innovative action supported under JTF, Horizon Europe and other instruments?

6 ISSUES FOR DISCUSSION

Europe currently faces deep challenges. Science, research and innovation will play a crucial role in mitigating the impact of the ongoing crises. Innovative actions have been and continue to be an important priority within Cohesion Policy programmes, under the framework provided by national and regional Smart Specialisation strategies. These strategies respond to current global concerns while also looking ahead to address the grand challenges of the future. Cohesion Policy similarly must also find a balance between responding to today's problems and investing in the solutions needed in coming decades.

IQ-Net programmes show high levels of ambition for their innovative activity in 2021-27, building on experience and lessons learned in 2014-20. While there is evidence of considerable continuity, approaches can also be seen to be evolving and maturing. Programmes continue to face implementation challenges, especially around capacity. Against this background, IQ-Net programmes have identified a range of challenges in implementing R&I actions in 2021-27, which are presented as questions for discussion:

- **Enabling conditions for Smart Specialisation**: How are programmes preparing to continuously fulfil the enabling conditions related to Smart Specialisation throughout the 2021-27 period?
- **Innovative actions to address challenges**: How do programmes manage the balance between addressing current challenges and preparing for the future? How do they "undertake a paradigm shift ….to prepare against future shocks"?
- **Mission-oriented approaches**: A growing number of countries are introducing 'mission-oriented' approaches to innovation, aiming to tackle societal challenges through systemic interventions. To what extent can 'mission-oriented' approaches be applied in Cohesion Policy programmes? Are mission-oriented approaches influencing innovation priorities within IQ-Net programmes?
- **Innovative delivery approaches**: Programmes emphasise clusters and cooperative practices in 2021-27 programme period. What approaches add value to delivering innovate actions?
- **Capacities and resources:** How do programmes plan to address key capacity and resource issues?
- **Implementation issues**: How are programmes addressing the various implementation issues, such as setting the conditions for innovative actions so that they comply with the General Block Exemption Regulation (GBER)?
- **Synergies**: How can synergies be promoted between innovative actions supported under ERDF PO1 and PO2 with innovative action supported under JTF and Horizon or other instruments?

Questions also remain around the most appropriate forms of finance to support R&I (grants versus Financial Instruments) and the need for continued simplification under ERDF, as several programmes report a preference for other sources of innovation funding among beneficiaries.

7 ANNEX 1: SMART SPECIALISATION STRATEGIES & ESIF IN IQ-NET COUNTRIES & REGIONS 2021-27 – QUICK GUIDE

MS/region	Approach to S3	Priorities/domains/themes	How operationalised in 2021-27?
Austria	Based on domestic RTI strategy 2030 (FTI-Strategie 2030) (2020), linked to national-level sectoral strategies and regional innovation strategies in each of the 9 *Länder*.	Each *Land* has defined its own priorities. Styria, for instance, focuses on mobility, green technology and health technology.	Mainly ongoing application principle, with limited number of calls, including one in the field of RTDI, to be implemented by the IB Austrian Research Promotion Agency (FFG) and provide support for research infrastructure. It will be the programme's only call that is open to applications from all 9 Länder.
Bizkaia/Pais Vasco	Based on the domestic RIS3 strategy (PCTI EUSKADI 2030)	Advanced Manufacturing Energy Health Food Urban Habitat Cultural & Creative Ecosystems and Industries	The RIS3 strategy underpins policy interventions in SOs 1.1 and 1.2 and is reflected in the project selection criteria of relevant interventions.
Czechia	National Research and Innovation Strategy for Smart Specialisation of the Czech Republic 2021-2027. Relevant in particular to OP Technologies and Applications for Competitiveness, OP Jan Amos Comenius and OP Just Transition. Intended also for other OPs and national funding programmes. Includes also strong regional dimension (14 separate regional RIS3 strategies).	Advanced materials, technologies & systems Digitisation & automation of production technologies Electronics & digital technologies Green transport Technologically advanced & safe transport Advanced medicine & pharmaceuticals Cultural & creative industries to accelerate socio-economic development of Czech Republic Green technologies, bioeconomy & sustainable food resources Smart settlements	Relevant OPs can implement through: • Consistency of call/support programme with specific objective of National RIS3 (horizontal challenges) • Consistency of thematic call/programme with domain of specialisation • Consistency with theme of key and emerging technologies within domain of specialisation • Targeted call for R&D&I topics within domain of specialisation • Targeted mission call. Also included in project assessment criteria.

Denmark	As of 2020, S3 strategy same as the general strategy of the Danish Executive Board for Business Development and Growth. New strategy due in 2024.	Strengthening innovation and the use of technologies in SMEs.	Focus on clusters as key delivery mechanism.
Finland	• 18 regional S3s (linked to the domestic regional strategic programme or a separate S3) • Provide the framework for the implementation of innovation actions in Structural Funds programme (together with other key strategies e.g. national R&D&I roadmap and domestic regional strategic programmes)	Regional S3s have different priorities, e.g.: Helsinki-Uusimaa Citizens' City Climate neutrality Industrial modernisation Satakunta Technology metal, mineral & battery cluster Automation & robotics cluster Energy cluster Food cluster Bio- and circular economy cluster Blue economy Experience economy Wellbeing economy Safety & security of supply	S3 taken into account in the call stage (call emphasises the need to have alignment with S3 priorities), in the project selection criteria (includes some specific Smart Specialisation relevant criteria which are compulsory) and in the scoring of projects.
Greece	National S3, with 13 regional specialisations. Relevant to several OPs: - 13 Regional OPs - Competitiveness OP 2021-27, which provides a major part of resources supporting S3 - Just Development Transition OP also provides resources and contains relevant targets.	Climate change Digitalisation Health	Priorities will be implemented through calls.

Hungary	National S3 2021-27. Resource requirements for implementation of S3 will be provided mainly by two OPs: Digital Innovation Plus (DIMOP) and Economic Development and Innovation Operational Programme Plus (GINOP+).	National priorities: Agriculture, food industry Health Digitalisation of the economy Creative industries (new) Resource-efficient economy Energy, climate Services Cutting edge technologies Horizontal priorities: Public sector & university innovation Training, education	During selection of operations, project promoters under the RDI priority need to show link to the S3 strategy and to which priority the project contributed. The formal appraisal of projects is a responsibility of the MA but project selection will be managed based on a cooperation agreement with the national agency for research development and innovation. In practice, the agency will issue a statement on the relevance of the operation for the S3 strategy.
Ireland	S3 for Ireland (2021-27) takes regional approach ("a bridge between regional and national innovation strategy building and decision making")[63] informed by development of Regional Enterprise Plans.	Digitalisation & digital transformation Green transformation for enterprise Innovation diffusion International collaboration on RD&I Improving the national or regional enterprise research & innovation system.	Link most direct through proposed Priority 1. Selection of operations to be aligned with S3.
Netherlands	S3 is a living document but only plays a small role in overall innovation funding in NL. New focus on promising sectors (West) and societal challenges/themes (South).	West: Energy transition & sustainability Agriculture, water & food Health & health care Security South: Energy transition Raw material transition Climate transition Agriculture & food transition Health transition	Calls to be theme-based (South).
Portugal	National Strategy for Smart Specialisation 2030 (ENEI 2030), and seven regional strategies.	National RIS3: Digital Transition Materials, Systems & Production Technologies Green Transition Society, Creativity & Heritage Health, Biotechnology & Food Major Natural Assets: Forest, Sea & Space	S3 integrated transversally into programming and is a condition of access to SO 1.1, both in the Thematic Programme Innovation and Digital Transition and in the Regional Programmes (five regions of the Mainland and the two Autonomous Regions), in which it will also be a condition of access in SO 1.4, and a condition of merit in SO 1.3.

Vlaanderen	S3 adopted by Flemish Government as a guiding strategic policy principle for innovation and industrial policies in the 2013 Concept Note 'Smart Specialisation Strategy for a Targeted Cluster Policy'. Latest iteration of S3 strategy in Vlaanderen approved in 2019. Approach focuses on 10 strategic research centres and spearhead clusters.	Sustainable chemistry (Catalisti) Advanced materials (SIM) Smart manufacturing (Flanders Make) Health & life sciences (vib) Specialised logistics (VIL) Agro-Food (Flanders Food) Electronic systems, Iot & photonic systems (imec) Energy (Flux 50) Environment & cleantech (Vito) Blue economy (Blue Cluster)	S3 fully integrated in the 2014-20 programme and will continue to be a guiding principle in 2021-27. MA takes the strategy as the basis when it issues calls under Priority 1 and the 10 domains guide the process of project selection.
Warmińsko-Mazurskie	RIS3 incorporated in regional development strategy "Warmińsko-Mazurskie 2030".	Water Economy, High-quality Food Wood & Furniture Healthy Life	Investments in R&D will be focused on S3, along with staff education and training. In addition, projects in the fields of entrepreneurship, innovation or digitisation of the economy implemented in the areas of specialisation will be rewarded points in calls for funding applications, in order to concentrate support on S3.

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