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D3.3 – D&E assessment and report on regional diversity

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Executive Summary

The European Union faces a persistent innovation divide that constrains global competitiveness and prevents full valorisation of research investments, particularly in Widening countries and regions. Despite significant investments through Horizon 2020 and Horizon Europe, systematic barriers still impede the effective dissemination and exploitation of research results, limiting their translation into societal and economic value.

While Widening countries have achieved notable progress in the Framework programmes, accounting for around 12.3% of Horizon 2020 participation (EC, 2024), with significant improvements in research quality, substantial gaps remain in knowledge valorisation. Over half of project coordinators lack awareness of key EU valorisation tools, and only 4.8% of projects consider downstream synergies with structural funds, representing missed opportunities for regional impact (European Research Executive Agency, 2021).

To increase the impacts of Widening projects, widerAdvance Facility combines direct support to projects' coordinators and interventions targeting policymakers. To that end, this deliverable proposes a comprehensive framework for understanding and addressing the bottlenecks that have inhibited the dissemination and exploitation of Widening projects.

Through systematic review of more than 140 sources spanning EU policy documents, academic research, and institutional studies, combined with seven structured interviews of senior experts from regional development agencies and national innovation offices across Czech Republic, Hungary, Poland, Portugal, Romania and Spain, this deliverable highlights the key factors that determine the effective valorisation of Widening projects.

These factors have been translated into a "Regional D&E Self-Assessment Tool", which offers policymakers the opportunity to assess their territorial performance using 20 quantitative indicators and 88 qualitative questions. The tool employs robust benchmarking methodology to determine the main assets, challenges and priority fields of intervention in specific geographic context.

Through the exploration of 5 dimensions – "knowledge production and absorption capacities", "knowledge-producing organisations policies," "local

networks", "international openness and integration", "facilitating policies and funding synergies" – the present report and self-assessment tool propose a typology composed of 6 categories of regions which present distinctive characteristics and challenges: "Research-Developing Regions", "Coordination-building regions", "Collaboration-Based Regions", "European-engaged Regions", "Industry-Centered Regions", and "Foundation-Building Regions."

These categories reflect the diversity of Widening research and innovation systems and territories with the objective to propose in the near future evidence-based and targeted policy interventions building on local strengths while addressing specific constraints. Such policy recommendations will be designed for both regional and national policymakers in the frame of the 2027-2033 smart specialisation strategies and European Regional Development Fund Programmes.

Table

List of Acronyms

CDE	Communication, Dissemination, and Exploitation
D&E	Dissemination and Exploitation
ECA	European Court of Auditors
ERA	European Research Area
ERC	European Research Council
ERDF	European Regional Development Fund
ESIF	European Structural and Investment Funds
EU	European Union
FP7	Framework Programme 7
GDP	Gross Domestic Product
H2020	Horizon 2020
HE	Horizon Europe
IP	Intellectual Property
IPR	Intellectual Property Rights
ITRE	Committee on Industry, Research and Energy
NUTS	Nomenclature of Territorial Units for Statistics
KT0	Knowledge Transfer Organization
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
R&I	Research and innovation
S3	Smart Specialisation Strategy
SEWP	Spreading Excellence and Widening Participation
SoE	Seal of Excellence
TTO	Technology Transfer Office
WIDERA	Widening Participation and Spreading Excellence
WP	Work Package

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Introduction

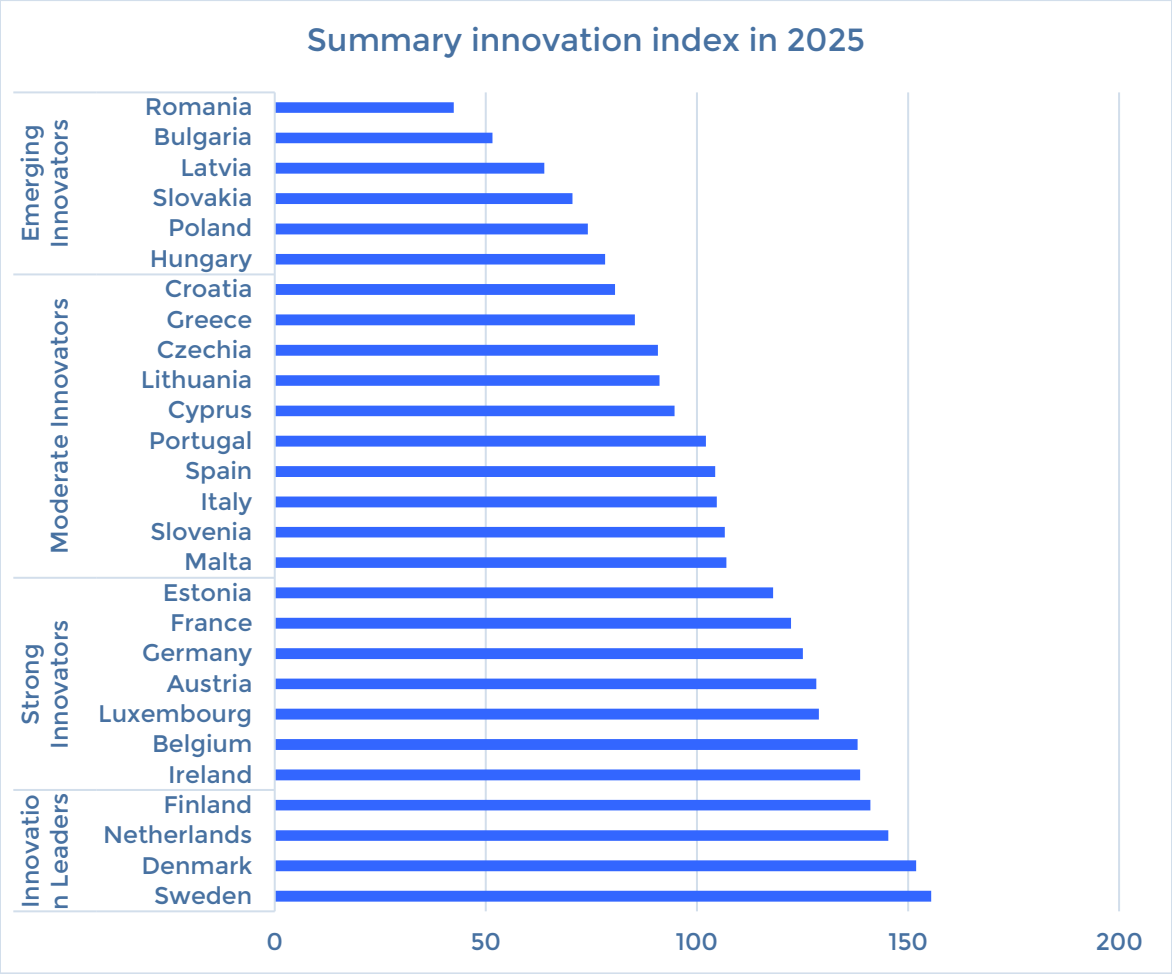
Addressing the innovation divide

The European Union faces a persistent innovation divide that manifests at multiple territorial levels and constrains the Union's capacity to achieve its strategic objectives of global competitiveness, social cohesion, and sustainable development. This divide can be understood as the significant and persistent variations in innovation capacity, performance and outcomes between and among Member States and Regions (Veugelers 2016), leading to growing territorial inequalities.

A heterogeneous European Research Area

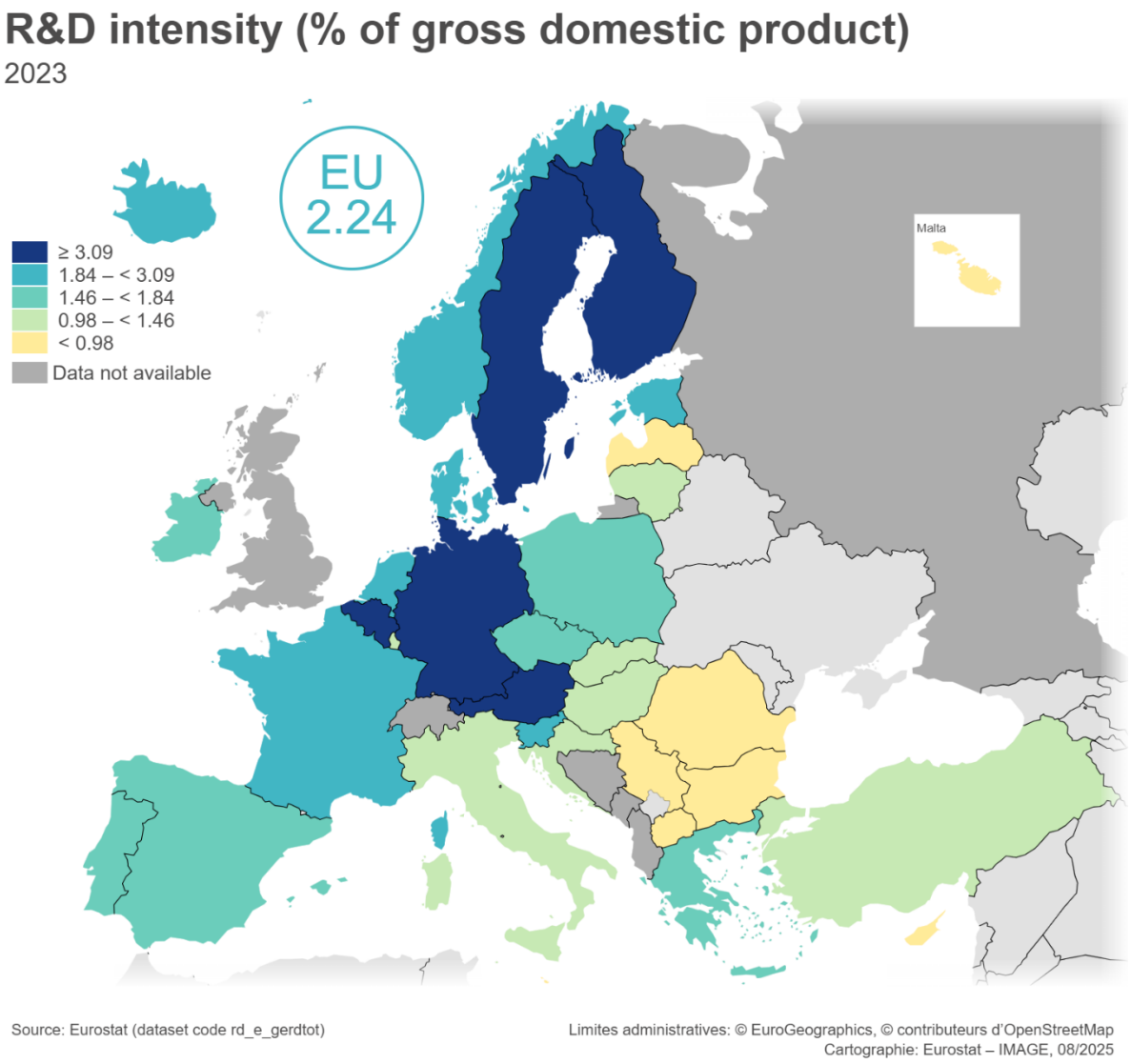
The European Innovation Scoreboard illustrates the persistence of hierarchies across Member States, split into four performance groups :

Figure 1. Innovation Index in 2025



Despite a moderate reduction of performance disparities between 2018 and 2025, these groups constitute a striking and permanent characteristic of the EU: since 2018, only Croatia – moved up from Emerging to Moderate Innovators group. In the meantime, Cyprus dropped from Strong to Moderate innovators to Moderate Innovators while Hungary fell from Moderate to Emerging Innovators. These groups are notably characterised by unequal and growing disparities in terms of R&D expenditures :

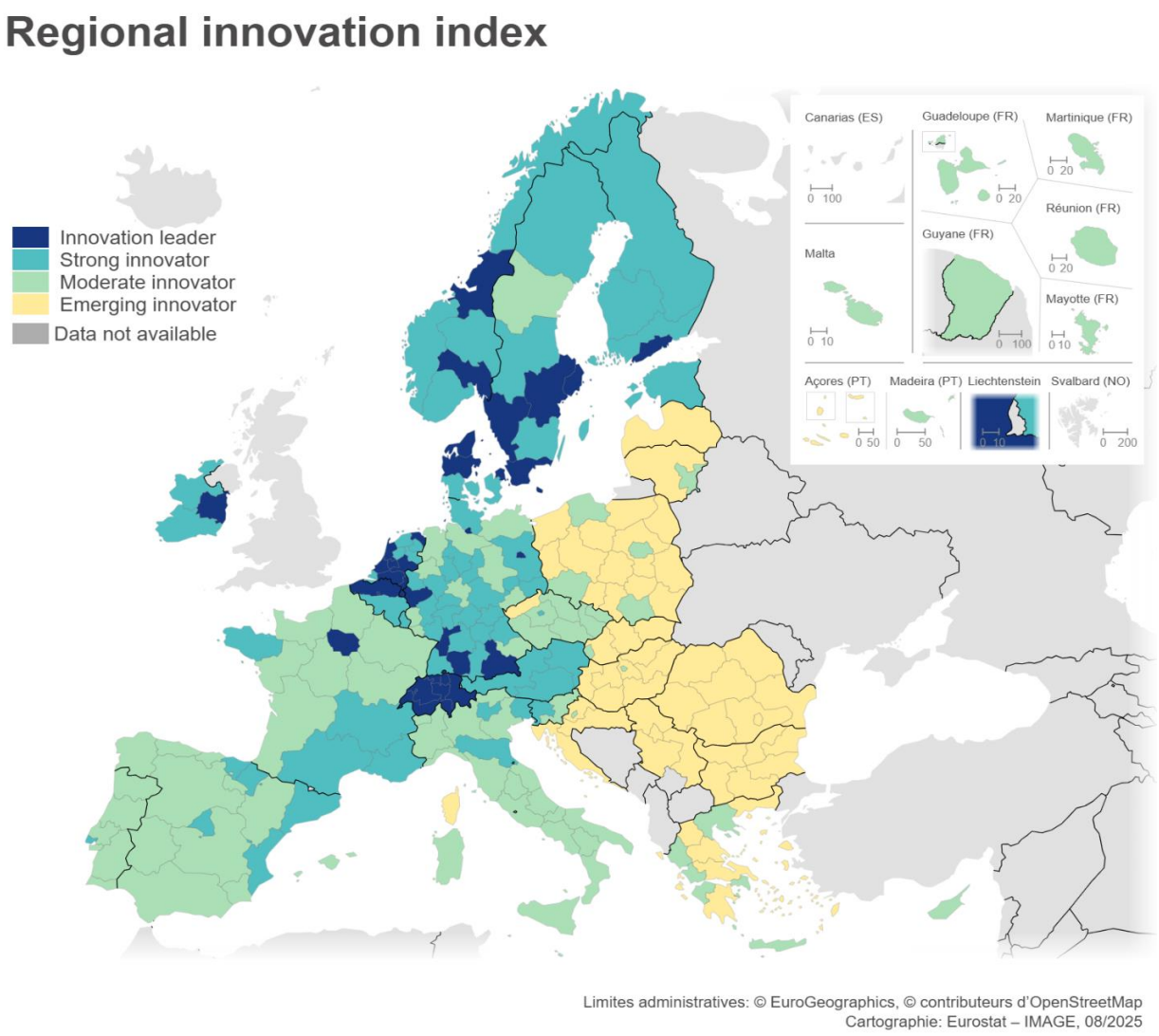
Figure 2. R&D expenditures in EU27 Member States



At regional level, the Regional Innovation Scoreboard reveals even starker disparities that underscore the concentrated nature of European innovation

capacities: the top 20% of EU regions demonstrate innovation performance levels that are more than five times higher than the bottom 20%; and 50 regions account alone for over 60% of total patent applications (Rodríguez-Pose, 2020)

Figure 3. Regional innovation index (2025)



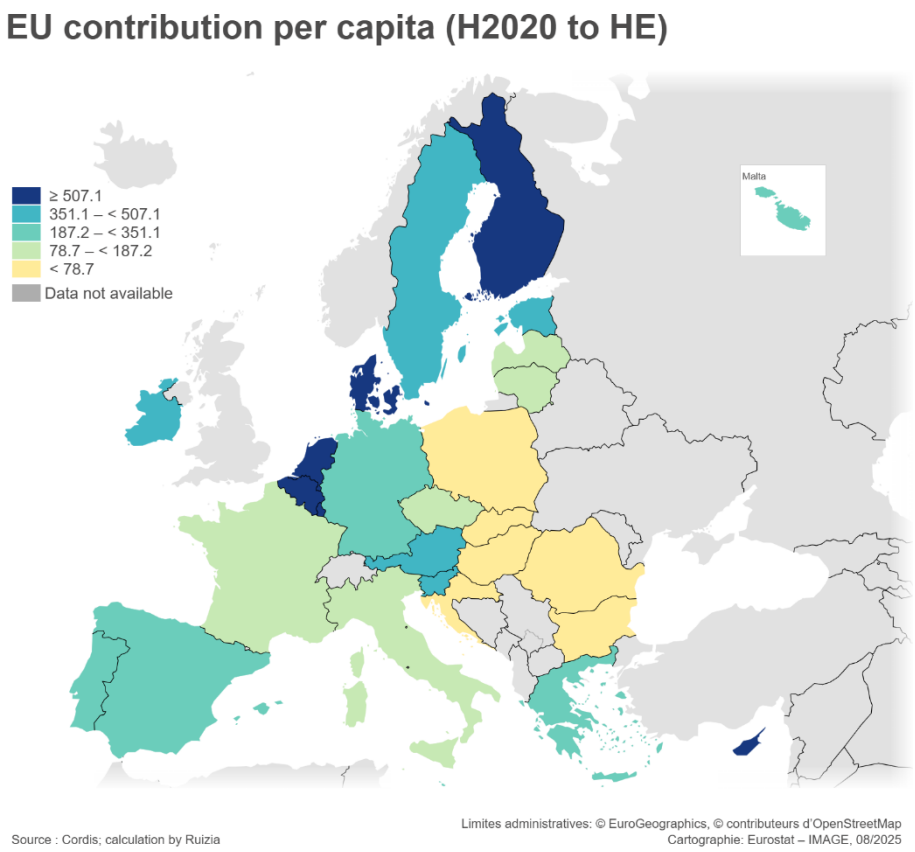
The top- 5 leading regions include Hovedstaden (Denmark), Helsinki-Uusimaa (Finland), Oberbayern (Germany), Stockholm (Sweden), and Berlin (Germany) - emerging as innovation leaders due to substantial R&D investment, skilled workforces, and vibrant entrepreneurial ecosystems. Conversely, many regions, particularly in Southeastern Europe, lag significantly behind due to

limited resources, infrastructure deficits, and weak institutional support. Such inequalities are also reflected in Widening countries, where capital cities concentrate leadership positions (European Commission, 2024)

The Framework Programmes' geographic impacts:

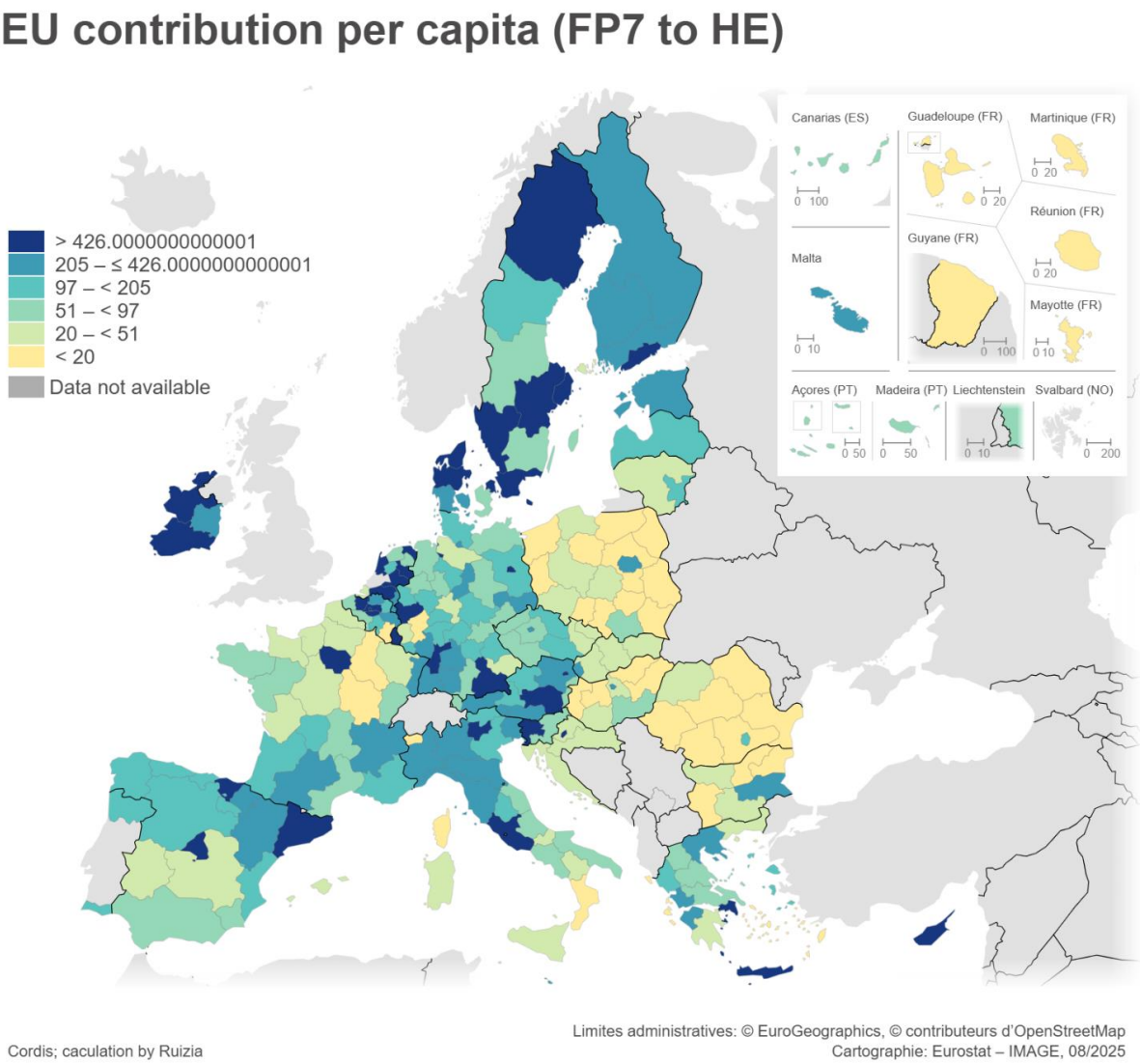
The innovation divide becomes particularly evident in the European Framework Programmes (FPs) participation patterns. Multiple studies highlight the dominance of a limited number of core players bound by repetitive collaborations in "persistent oligarchic networks" (Enger and Castellacci, 2016) : during FP7, 152 higher education institutions accounted for 70% of all projects, while 95% of participating organizations were involved in only one project (Lepori et al, 2014). These networks form "closed clubs", geographically concentrated in Northern and Western Europe, leading to unequal participation in the FPs.

Figure 4. National participation in the Framework Programmes



The heterogeneous capacities to exploit the opportunities provided by the Framework programmes are even more visible at regional level. Capital city regions consistently emerge as key research hubs, with the higher participation levels reflecting the "Matthew effect" where superior research infrastructure, higher R&D investments, and robust networks attract additional funding, further enhancing capabilities and deepening existing inequalities. At the opposite end of the spectrum, peripheral regions present a limited participation in the FPs.

Figure 5. Regional participation in the Framework Programmes



A self-reinforcing process penalizing the EU as a whole

The concentration of innovation represents a global phenomenon driven by powerful economic forces that generate agglomeration externalities. These forces create self-reinforcing feedback loops through several mechanisms. Territories with strong innovation systems act as magnets for talent, capital, and ideas, creating critical masses and competitive advantages. The most complex technologies display stronger spatial concentration compared to less sophisticated applications. As innovation systems grow more competitive, their attractiveness also improves.

The persistent innovation divide generates multiple negative consequences that affect European competitiveness and social cohesion. The EU has experienced declining global economic standing, with its GDP share falling from over 25% in 1991 to less than 17% by 2022 (EC, 2024). Territorial disparities notably prevent the EU from unleashing its full economic potential across its geography.

Innovation concentration creates increasingly unequal regional development, with 23 out of 27 EU Member States showing capital regions performing above national GDP averages. Many regions become trapped in persistent under-development cycles. EU research funding mechanisms inadvertently reinforce existing disparities through the Matthew effect, where well-performing regions enhance their capabilities, while lagging regions face marginalization. This phenomenon is particularly evident in Widening countries where capital cities systematically outperform their national averages, creating internal territorial divides that mirror the broader European pattern. The concentration in capital regions reflects superior access to international networks, research infrastructure, and policy attention, while peripheral areas struggle with limited connectivity and institutional capacity (EC, 2024).

Widening: An opportunity to address the innovation divide

The Spreading Excellence and Widening Participation program (SEWP) represents the EU's strategic response to address innovation disparities through targeted interventions designed to strengthen R&I intensity and performance in less advanced countries and regions.

A major instrument to structure peripheral research and innovation systems…

Widening initiatives address the innovation divide through multiple coordinated mechanisms and instruments. The program targets lower-performing EU member states that joined after 2004 and specific regions in developed countries, notably the Outermost Regions since 2021 Capacity building addresses critical components like strengthening the collaborative links with experienced organizations, creating Centers of Excellence, attracting and retaining new talents and promote innovation in the industry and dedicated deep-tech startups. The approach fosters linkages by creating connections between leading institutions and lower-performing regions. Policy support provides expert guidance for strengthening innovation ecosystems. Structural change stimulates transformations at institutional, regional, and national levels.

Widening initiatives have demonstrated measurable success across multiple indicators, as shown by the 2022 report by the European Court of Auditors :

- Entities from Widening countries accounted for 12.3% of Horizon 2020 participations, representing a 1.3 percentage point increase from FP7 (EC, 2024).
- 43% of Twinning and 70% of Teaming projects' coordinators attracted new competitive research funding.
- Publications from SEWP actions account for one-third of Horizon 2020 publications from Widening countries. The percentage of highly cited SEWP publications increased from 6% in 2014 to 17% in 2020.
- 18% of Teaming projects engendered innovation-related results, and many initiatives reinforced the connections with local companies.
- Coordinating institutions achieved institutional changes

… whose impacts are reduced by persistent valorisation challenges

Despite notable achievements, Widening projects face significant challenges in translating research results into societal and economic value, limiting their potential impact on reducing innovation disparities:

1) Limited commercial exploitation: The dissemination and exploitation survey conducted by the European Commission on Horizon 2020

projects revealed substantial gaps between targeted and achieved innovation results. Only 6.63% of SEWP results were innovation-related, with significant barriers including lack of funding after project completion and regulatory frameworks hindering innovation (European Research Executive Agency, 2021). The primary challenge lies in the cultural divide between academic excellence and economic considerations

2) Insufficient awareness of dissemination and exploitation tools: over 50% of the survey respondents lacked knowledge regarding Innovation Radar and IPR Helpdesk usefulness, while 30-40% had no opinion regarding Horizon Dashboard and Results Platform (EC, 2024). This represents a critical gap in tool promotion and uptake that constrains valorisation effectiveness.

3) Downstream synergies gap: Only 4.8% of Horizon 2020 projects with exploitation potential considered European Structural and Investment Funds for further development, and merely 0.5% of European Research Council proof-of-concept projects pursued this pathway (European Court of Auditors, 2022). This represents a fundamental disconnect between research excellence and regional development funding that limits long-term impact sustainability.

4) Systemic territorial capacity constraints: countries and territories face particular valorisation challenges including insufficient long-term funding for post-project development, underdeveloped intermediary organizations with limited technology transfer expertise, limited absorptive capacity in industry, reducing the use of advanced research results. These systemic constraints create "absorptive capacity traps" where R&D investments yield reduced territorial outcomes, in the absence of effective knowledge valorisation systems.

WiderAdvance Facility, a comprehensive response

In this context, dissemination and exploitation (D&E) represent crucial obligations for Horizon Europe projects in general, and for WIDERA initiatives particularly. Through its dedicated services, widerAdvance Facility provides an unique opportunity to strengthen projects' impact and sustainability. This quest for impact also drives the project strategic objective n°5, which aims to

improve valorisation policy at multiple governance levels. This policy component, which constitutes the core of Work Package, complements direct services through highlighting instrumental roles of synergies in establishing appropriate policy mixes for research investments. Key activities include mapping corresponding programmes for D&E needs, fostering regional synergies, collecting best practices, coaching applicants on funding synergies utilization and Mutual Learning for better policymaking.

Task 3.2 specifically targets policymakers to optimize their policy mix supporting the valorisation of WIDERA projects, notably through the use of funding synergies, through a two-step approach:

1) The characterization of diverse regional situations and challenges, through the definition of regional profiles and the publication of a self-assessment tool allowing policy-makers to assess specific bottlenecks and key interventions priority (deliverable 3.3.)
2) The definition of tailor-made policy recommendations aligned with specific regional challenges.

As a conclusion of the first step, the present deliverable is structured as follows:

1) The first section describes the policy and scientific background regarding knowledge valorisation in Widening regions.
2) The second section introduces the deliverable objectives and methodology.
3) The last section presents the regional typology defined through the self-assessment tool.

Section 1 - The evolution and importance of knowledge valorisation policies

A growing European emphasis on valorisation

The European emphasis on knowledge valorisation traces its origins to the Lisbon Agenda and strategic measures designed to transform Europe into "the most dynamic knowledge-based economy in the world." This initiative directly addressed the "European knowledge paradox" - the persistent inconsistency between Europe's excellence in scientific output (22.7% of world's high-quality scientific publications) and its limited success in translating research advantages into economic benefits and job creation.

From downstream valorisation to more holistic approaches

The initial approach focused on downstream activities in the knowledge valorisation chain, supporting technology-based company creation and innovative solution development. The European Commission's 2008 Recommendation on intellectual property management in knowledge transfer activities reflected this orientation, providing impetus for higher education institutions to develop IP strategies and institutional practices. However, this early framework primarily emphasized IP management and traditional technology transfer, representing a relatively narrow understanding of valorisation potential.

The limited results from this approach led to fundamental paradigm shifts in the 2020s, reflected in the Commission Communication "*A New ERA for R&I*" (September 2020), which identified knowledge valorisation as a key element for research and innovation uptake by economy and society. The overarching goal expanded to maximizing long-term leverage of EU R&I investment, ensuring data, research results, and inventions transform into sustainable products, processes, and services, generating economic value and societal benefit.

The transformation was formalized through the Council Recommendation on Guiding Principles for Knowledge Valorisation (December 2022), which replaced the 2008 recommendation and introduced fundamental changes in scope, approach, and stakeholder engagement.

Knowledge valorisation became defined as "*the process of creating social and economic value from knowledge by linking different areas and sectors and transforming data, know-how, and research results into sustainable products, services, solutions, and knowledge-based policies that benefit society.".* This definition extends far beyond commercialization to encompass holistic approaches connecting research outcomes with societal needs and economic opportunities.

The comprehensive framework introduced several key changes:

- The expanded scope shifted focus from traditional IP to intellectual assets management (IAM), encompassing all R&I activity results, including data, know-how, prototypes, processes, and tacit knowledge.
- Emphasis moved from purely scientific discovery to entrepreneurial discovery, fostering entrepreneurial culture among researchers.
- The approach shifted from stand-alone activities to multi-stakeholder co-creation processes involving academia, industry, public administration, and civil society.
- Policy moved from vertical thematic interventions to systemic changes

This framework is also supported by specific Codes of Practice including recommendations on intellectual assets management (2023), standardization in ERA (2023), citizen engagement (2024), and industry-academia co-creation (2024).

Integration in the Framework programmes

Horizon 2020 innovations introduced strategic integration of valorisation activities as mandatory proposal components requiring clear "pathways to impact". The Communication, Dissemination, and Exploitation (CDE) framework required strategic planning from proposal stage with continuous monitoring and adjustment throughout project lifecycles.

Horizon 2020 demonstrated remarkable impact, generating 276,784 peer-reviewed publications with twice the world average citation rate, 3,898 IP applications (77.3% patents), and over 53,800 joint public-private co-publications. Economic impact reached €15.9 billion average annual GDP increase, totaling €429 billion over 2014-2040 with employment effects peaking at 220,000 additional jobs in 2020.

However, systematic analysis revealed significant valorisation gaps. Only 4.8% of projects with exploitation potential considered ESIF funding for

downstream development, while merely 0.5% of ERC proof-of-concept projects pursued this pathway. The monitoring framework proved inadequate for capturing societal impacts, with dissemination and exploitation remaining "uneven and requiring more attention."

Horizon Europe enhancements address these challenges through several transformative elements. The enhanced legal framework through Regulation (EU) 2021/695 mandates beneficiaries use "best efforts to exploit" results or facilitate exploitation by others. Supporting instruments include Horizon Results Platform, Horizon Results Booster, European Innovation Council, Seal of Excellence, and EU Knowledge Valorisation Platform. Enhanced synergies encompass transfer mechanisms, cumulative funding, SoE integration, and "pathways to synergies" calls launched March 2023.

Why regions matter for knowledge valorisation

The EU paradigm shift recognizes regional ecosystems' critical importance in transforming research results into societal and economic value. This regional focus reflects a global understanding that effective valorisation requires proximity to markets, territorial ecosystems, and place-based innovation dynamics that cannot be replicated through centralized approaches alone.

The spatial dimensions of knowledge valorisation

Research consistently demonstrates that strongest innovation interactions and knowledge spillovers occur in geographical proximity, with returns declining significantly with distance. This spatial dimension proves particularly crucial for transferring tacit knowledge requiring direct interpersonal interaction for effective transmission.

Innovation activities concentrate spatially, with patent citation frequency and R&D spillovers decreasing with distance. Regional ecosystems serve as natural spaces for knowledge valorisation, providing concentrated environments necessary for effective knowledge circulation between academia, industry, and society.

Beyond geographical distance, knowledge diffusion is influenced by relational, social, technological, and cognitive proximity. Interpersonal networks and quadruple helix collaborations prove crucial for managing complex knowledge. Regional ecosystems provide a facilitating milieu fostering enhanced cooperation among universities, companies, public authorities, and civil society within manageable geographical boundaries.

Effective regional valorisation requires access to external connections and global knowledge sources. Regional authorities serve as facilitators and brokers, ensuring relationship fluidity and supporting collaboration within regions ("regional buzz") and with external networks ("global pipelines"). This dual connectivity enables regions to leverage local strengths while accessing global knowledge flows

Absorptive capacity as a key valorisation determinant

Regional absorptive capacity - the ability to understand, decode, and exploit newly produced knowledge - proves vital for successful valorisation outcomes. This capacity requires systematic development through strategic investments and policy interventions addressing "absorptive capacity traps" where regions with limited R&D capabilities struggle to benefit from knowledge spillovers.

Regional policies play crucial roles through targeted investments in human capital development, infrastructure, and institutional capabilities. Regional governments possess higher education laws and sectoral plans promoting knowledge transfer activities, allowing tailored approaches based on local needs and opportunities. This flexibility enables experimental governance approaches, testing different strategies within overarching national and European frameworks.

Regional ecosystems provide key environments for scientific and technological entrepreneurship, offering frameworks and funding necessary for research-driven spin-offs and start-ups. Regional policies can establish specific incentives for academic start-ups, improve early-stage finance access, and create supportive environments encouraging researchers to engage in commercialization activities.

Knowledge valorisation importance for regional development

The quest for knowledge economy

In today's economy, regional competitive advantage increasingly depends on abilities to generate, absorb, and apply knowledge effectively. This represents fundamental shifts from traditional industrial development models based on natural resources, cheap labor, or geographic advantages toward strategies centered on knowledge assets, innovation capabilities, and learning processes.

Regional competitiveness depends critically on accumulated knowledge stocks measured through patent portfolios, research publications, human capital concentrations, and institutional capabilities. Regions effectively valorizing knowledge assets demonstrate significantly higher productivity levels and economic resilience compared to those relying on traditional factors alone.

Knowledge valorisation directly contributes to regional total factor productivity through intangible assets like knowledge, human capital, social capital, and entrepreneurial capacity showing significant positive effects on regional economic performance. This impact extends beyond individual firms to create system-wide productivity improvements through knowledge spillovers and network effects.

Overcoming regional innovation divide

While R&I investment often concentrates in northern, central, and western regions with robust innovation ecosystems, valorisation provides mechanisms for less developed regions to build capacity and participate more effectively in the European knowledge economy.

Through strategic integration of European Structural and Investment Funds with Horizon Europe's excellence-driven objectives, regions can develop tailored approaches building on existing strengths while addressing innovation gaps. Smart Specialisation Strategy implementation exemplifies this approach, enabling regions to identify and develop unique capacities rather than attempting to replicate successful models from other contexts.

Section II - objectives and methodology

D3.3 objectives and content:

This deliverable addresses Task's 3.2 dual objectives of characterizing regional diversity among Widening countries and developing practical tools for policymakers to evaluate D&E performance. The analysis serves as foundational input for Task 4.6 recommendations while providing immediate value through actionable insights and assessment capabilities.

Highlighting regional diversity

The first objective focuses on comprehensive characterization of national and regional diversity among Widening countries through systematic analysis combining quantitative indicators with qualitative insights from stakeholder engagement. This approach moves beyond simple performance rankings to identify underlying factors that enable or constrain effective D&E activities across different regional contexts.

The regional diversity analysis recognizes that Widening regions demonstrate significant heterogeneity in innovation capabilities, institutional frameworks, economic structures, and development trajectories. Rather than applying uniform policy approaches, effective D&E enhancement requires understanding these differences and developing tailored interventions that build on regional strengths while addressing specific constraints.

Regional self-assessment tool:

The second objective involves creating a practical instrument, that enables policymakers to evaluate regional performance in D&E of research and innovation projects. Developed in collaboration with D&E experts, this tool provides systematic frameworks for performance assessment, bottleneck identification, and improvement pathway development.

The Regional Knowledge Valorisation Self-Assessment Tool employs a balanced measurement approach combining 20 quantitative indicators with 88 qualitative questions across five critical dimensions defined in the literature on knowledge valorisation. All performance is benchmarked against EU averages calculated from official European databases, ensuring comparability and policy relevance.

Step 1 : literature review on knowledge valorisation

This literature review synthesizes current understanding of knowledge valorisation systems, drawing from a comprehensive corpus of policy reports, academic research, and institutional analyses complemented by systematic stakeholder consultation. The review aims to establish a robust evidence base for understanding the determinants of effective knowledge valorisation, notably from WIDERA projects, while identifying the multidimensional challenges that constrain the translation of research outputs into societal and economic value.

Corpus mobilized

The literature review component draws from a comprehensive and diverse corpus of more than 140 sources spanning multiple document types and institutional perspectives, as detailed in the accompanying comprehensive bibliography. This evidence base represents one of the most comprehensive syntheses of knowledge valorisation literature to date, incorporating both policy-oriented and academic research perspectives across European and international contexts.

1) European Commission reports and policy documents constitute a 23 source corpus, including Council and Commission Recommendations such as the landmark Council Recommendation (EU) 2022/2415 on “guiding principles for knowledge valorisation and related Codes of Practice on standardization, intellectual property management, and citizen engagement”. European Commission strategic documents and reports provide comprehensive evaluations of Horizon 2020 and Horizon Europe programmes alongside practical guides on valorisation channels, citizen engagement, and industry-academia collaboration. Council and policy framework documents offer policy guidance and strategic frameworks for knowledge valorisation implementation.

2) OECD publications are composed of 7 sources providing comparative analysis through regional innovation reviews, science, technology and innovation policy surveys including the 2023 EC-OECD STIP Survey providing international benchmarking data, and innovation diffusion studies offering practical guidance on implementing regional innovation assessments.

3) Mutual learning exercises and case studies provide 21 sources documenting implementation experiences and best practices. EU mutual learning exercise reports provide systematic analysis of valorisation practices across member states. National and regional case studies examine specific implementation experiences and best practices. Peer learning and best practices documentation facilitates knowledge exchange between regions and countries.

4) Interreg Europe studies and policy briefs add 5 sources covering research valorisation, skills for innovation, innovation in less-developed regions, and innovation networks, plus peer review reports providing detailed analysis of knowledge and technology transfer support in specific member states.

5) EU funding program synergies documentation offers 22 sources examining the interaction between different European funding instruments. Horizon Europe and Cohesion Policy synergies studies provide critical assessments of coordination between research and regional development funding, notably to maximize regional impacts through downstream synergies.

6) Academic literature on knowledge valorisation and innovation systems contributes 24 sources examining theoretical foundations and empirical evidence of valorisation effectiveness. Core knowledge valorisation studies examine theoretical foundations and empirical evidence, while university-industry collaboration and knowledge networks research focuses on mechanisms of knowledge flow, network effects, and collaborative innovation processes. Knowledge transfer and innovation studies analyze innovation diffusion, technology transfer effectiveness, and the social processes underlying knowledge valorisation.

7) Regional innovation and development studies provide 37 sources analyzing territorial dimensions of innovation and knowledge transfer. Regional innovation systems and patterns provide theoretical frameworks and empirical analysis of regional innovation capabilities. Regional knowledge transfer and networks examine spatial patterns of knowledge diffusion and inter-regional collaboration. Regional development and universities analyze the role of higher education

institutions in territorial development. Innovation diffusion and spatial patterns offer insights into geographical dimensions of innovation processes.

Objectives of the literature review

This literature review addresses three interconnected objectives:

The first objective is to highlight the key determinants to the valorisation of WIDERA projects by identifying critical factors that enable successful transformation of research outputs into societal and economic value, including both necessary conditions (baseline requirements) and sufficient conditions (factors distinguishing high-performing from low-performing systems).

The second objective is to map multidimensional bottlenecks that may arise through comprehensive identification and categorization of systemic barriers constraining knowledge valorisation effectiveness, emphasizing interconnected nature of bottlenecks across system dimensions.

The third objective is to identify key factors for consideration in policy design by translating empirical findings into actionable insights for policy makers.

Conceptual approach:

To address these objectives, we propose a holistic approach, which replace the dissemination and exploitation of WIDERA projects in a larger framework: what are the systemic determinants of effective knowledge valorisation?

Traditional "end-of-pipe", knowledge-transfer approaches assume valuable research outputs will naturally find their way to market through sequential discovery-development-deployment processes. However, extensive evidence demonstrates fundamental limitations of this linear model. The holistic approach adopted in this document recognizes the systemic nature of innovation, with knowledge valorisation as complex, iterative system involving multiple actors, feedback loops, and contextual factors. Multi-stakeholder value creation involves dynamic interaction within the "knowledge square" - universities, companies, public authorities, and civil society.

The systemic vision operates through a core conceptual framework where knowledge valorisation functions as a complex adaptive system integrating

six critical dimensions. Knowledge generation and quality requires high-quality, relevant knowledge with scientific excellence and practical applicability. Intermediary organizations and support structures include TTOs, incubators, accelerators, science parks facilitating knowledge translation. Collaborative networks and partnerships involve multi-stakeholder networks enabling knowledge sharing and co-creation. Human capital and skills development requires skilled individuals navigating between knowledge domains and practice. Funding mechanisms and financial resources need diversified funding supporting different value creation stages. Policy and regulatory environment shapes institutional context for valorisation effectiveness.

Effective systems demonstrate absorptive capacity, balanced proximity and distance, feedback loops, and contextual adaptation.

Key determinants of effective knowledge valorisation :

The literature analysed reveals that the effective valorisation of Horizon 2020 / Horizon Europe projects requires alignment of multiple determinants across individual, institutional, and systemic levels, categorized into six primary dimensions.

Human capital and skills dimensions include :

- entrepreneurial competencies such as opportunity recognition, financial literacy, risk management, and technical communication.
- motivation and engagement : intrinsic motivation, societal engagement drivers, while addressing time and awareness challenges.
- communication capabilities, connecting technical knowledge to commercial opportunities.
- Absorptive capacity ; regional ability to recognize, understand, and utilize new knowledge.
- Intermediary professional skills: knowledge transfer professionals bridging academic-commercial domains.

Institutional and organizational factors encompass

- knowledge creation capability through high-quality knowledge generation capacity.
- strategic vision and culture, notably clear valorisation strategies and entrepreneurial cultures.

- support structure effectiveness, including quality TTOs, KTOs, incubators, and science parks.
- incentive alignment involves recognition systems rewarding knowledge transfer activities.
- Funding and resource adequacy, notably sufficient support, especially proof-of-concept funding.

Network and collaboration dynamics involve

- multi-stakeholder engagement through quadruple helix collaboration facilitation.
- proximity and distance management balancing local relationships with external networks.
- Trust and social capital : high-trust interpersonal networks enabling knowledge transfer.
- Absorptive capacity of partners requires external organizations' ability to understand and utilize knowledge.

Step 2: From literature evidence to assessment framework

Capitalizing on the evidence base established in step 1, we developed a "regional knowledge valorisation self-assessment tool" to empower policymakers at regional and national levels to evaluate and enhance their territories' capacity for knowledge dissemination and exploitation, particularly in the context of Horizon Europe and WIDERA projects.

The tool primary objectives are to:

- Enable evidence-based policy design by translating the determinants and bottlenecks identified in the literature in a comprehensive and exhaustive diagnostic framework
- support strategic decision-making through systematic benchmarking vis à vis other European territories.
- Adapt policy mixes using empirically-identified determinants and bottlenecks and addressing the specific barriers.

Defining 5 critical families of determinants

The different determinants and bottlenecks identified under step 1 were grouped into 5 coherent assessment families, that collectively determine regional knowledge valorisation capacity.

1) Regional knowledge production and absorptive capacities: this dimension examines both regional knowledge generation capabilities through research and innovation activities and diverse stakeholders' capacities to absorb and use knowledge for practical applications within regional systems. The assessment considers items such as the level of tertiary education, R&D expenditure, scientific publications and R&D personnel.

2) Knowledge-producing organizations' strategies and capacities explore how higher education establishments and research centers prioritize and incentivize knowledge valorisation. Assessments focus areas include technology transfer office capabilities and professional staffing levels, institutional valorisation strategies and entrepreneurial culture development, researcher entrepreneurship support and spin-off company development, intellectual property management and commercialization expertise, Horizon Europe integration and systematic project valorisation, and performance measurement systems and incentive alignment mechanisms.

3) Networks supporting proximity and knowledge valorisation intermediaries assess informal interpersonal connections and formal inter-organizational networks and support organizations facilitating knowledge exchange and collaborative innovation. The assessment considers criteria such as the level of trust among stakeholders, intermediary effectiveness, citizen engagement in innovation processes and science-policy dialogue.

4) International openness and EU integration captures the regional capacity to connect with global knowledge networks, participate effectively in European initiatives and absorb the knowledge produced in other parts of the European Research Area. The assessment includes criteria such as the level of participation in Horizon Europe, the level of international scientific co-publications, talent attraction capabilities, etc.

5) Facilitating policies and funding synergies finally examines how policy-mixes and financial mechanisms support knowledge

valorisation, particularly through synergies between structural funds and Horizon Europe.

Selecting key indicators and questions

For each family of determinants, the different determinants and bottlenecks identified in the literature were translated into a selection of quantitative indicators and qualitative questions.

The self-assessment tool is thus composed of 20 quantitative indicators, systematically available and standardized for NUTS2-level regions. These indicators are sourced from official EU databases: the Regional Innovation Scoreboard, Eurostat Regional database, and the JRC REMO funding database, which compiles data on ERDF and Horizon 2020-funded R&I activities.

The self-assessment also mobilizes 88 qualitative questions based on the determinants and bottlenecks identified. For each question, policy makers are invited to evaluate regional performance using a scale that ranges from 1 (lowest performance) to 4 (highest performance). The integration of stakeholder insights is essential to assess practical implementation experiences while identifying region-specific challenges and opportunities not fully captured in existing indicators. This dual approach ensures that the assessment framework and regional typology reflect both evidence-based best practices and practical constraints faced by valorisation practitioners across Widening regions

Assessment method

With the exception of Family 2 (knowledge-producing organizations) and 5 (Facilitating policies and funding synergies), the different families are evaluated with quantitative indicators and qualitative questions.

For each indicator, a quantitative score is calculated employing the following formula: “Score = MIN(100, (Regional_Value / EU_Benchmark) × 100)”.

Qualitative scores are calculated with the following formula: “Score = (Selected_Level / 4) × 100, where Selected_Level ranges from 1 to 4.”

A family score is determined this way : “Average_Indicator_Score × 0.6) + (Average_Question_Score × 0.4)”

Total regional performance calculation uses: “Total_Score = Sum_of_all_Family_Scores / 5”

Each family receives equal weight (20%) in overall performance calculation.

Table 1 Assessment framework :

Assessment framework			
Family	**Quantitative indicators**	**Qualitative questions**	**Key Focus Areas**
1. Knowledge Production & Absorptive Capacities	9	12	- Research infrastructure - Human capital development - Business innovation capacity - Knowledge absorption mechanisms
2. Knowledge-Producing Organizations	0	15	- Technology transfer capabilities - Institutional valorisation strategies - Researcher entrepreneurship support - IP management & commercialization
3. Dynamics networks	2	25	- Inter-organizational collaboration - Trust relationships - Intermediary organizations - Cross-sector mobility
4. International Openness & EU Integration	4	14	- •Global knowledge networks - EU Framework Programmes participation - International collaboration - Research infrastructure access
5. Facilitating Policies & Funding Synergies	0	22	- Smart Specialisation Strategy implementation - Funding synergies - Administrative capacity - Innovation ecosystem coordination

Step 3 : Definition of regional categories

Objectives

The development of a regional typology for knowledge valorisation represents a comprehensive effort to understand the diverse landscape across European regions with varying levels of research and innovation performance. The typology is composed of “ideal-types” that combine different aspects of valorisation capacity.

The regional typology provides policymakers with contextual understanding through recognition of their region's specific position within the European innovation landscape, enabling more targeted and effective policy interventions. Peer learning opportunities identify regions with similar characteristics and challenges, facilitating knowledge exchange and best practice sharing. Strategic prioritization provides clear guidance on intervention areas most likely to generate impact given regional starting conditions and constraints. Policy mix optimization offers evidence-based recommendations for combining different policy instruments and funding sources to maximize valorisation effectiveness. Performance benchmarking enables systematic comparison capabilities for progress monitoring and continuous improvement of regional innovation strategies. Synergy identification enhances ability to align regional development strategies with European research and innovation funding opportunities, particularly Horizon Europe and Cohesion Policy synergies.

Methodology

The typology construction relied on the five-family framework established in Step 2, with each family capturing distinct yet interconnected aspects of regional knowledge valorisation capacity. The combination of the scores obtained in the different families generates 6 distinct performance profiles, with a specific combination of strengths, weaknesses and regional characteristics.

Besides the theoretical definition of these 6 regional categories, 7 interviews with senior experts in charge of Smart Specialisation Strategies across Widening countries contributed to refine regional profiles, and a senior expert, former JRC member, and chair of the Smart Specialisation Community of Practice working group on knowledge diffusion.

Table 2. List of interviews

Expert	Position	Organisation	Region	Country
Fábio AL. Vieira Rute IRD. Gregório	Director of the Research, Innovation and Development Service Regional Director of Science, Innovation and Development	Regional Directorate of Science, Innovation and Development	Azores	Portugal
Laura Ruiz Caramés	Jefa de Sección del Servicio de Apoyo a la Investigación	Agencia Canaria de Investigación, Innovación y Sociedad de la información.	Canary Islands	Spain
Krisztina Sovago	Head of S3 Project Management Office	National Research, Development, and Innovation Office	National	Hungary
Agatha Filimon Lucian Sandu Simona Mihaela Ionel	Head of Sectorial Specialisation Office Smart specialisatio management office	North-East Regional Development Agency	Nord-East	Romania
Dorota Bałamonczek-Fabich / Monika Radziszewska	Entrepreneurship and Innovation Development Department of Economic Development	Office of the Marshal of the Pomeranian Voivodeship	Pomerania	Poland
Zdeněk Husek	Teamleader Regional Innovation Strategy Usti region	ICUK Inovační centrum Ústeckého kraje	Ústecký kraj	Czech Republic
Susana Elena-Pérez	Senior Researcher, former JRC expert. Chair of the S3 COP working group on knowledge diffusion	European Future Innovation System (EFIS) Centre		

The interview sample was purposefully designed to capture diverse regional innovation system configurations in Widening areas : emerging regions (Romania's North-East), established industrial regions seeking knowledge connections (Czech Republic's Ústí region, Poland's Pomeranian Voivodeship), policy coordination leaders (Hungary's national office, Northern Portugal), and geographically challenged regions developing specialized capabilities (the Azores and Canary Islands). Together, participants offered unique insights into regional adaptation challenges and opportunities that enriched the

understanding of how geographical context influences valorisation capacity across all regional types.

Table 3 Assessment framework :

Regional profiles				
Regional category	**Assessment Profile (Family Scores 1-5)**	**Core Strengths**	**Main challenges**	**Regional examples**
Research-Developing Regions	F1: 70-90, F2: 30-50, F3: 50-70, F4: 75-95, F5: 40-60	- Exceptional research infrastructure - High-quality scientific publications - Strong EU research funding - International research networks	- Weak technology transfer - Academic-industry cultural divide - Limited commercialization services - Low spin-off creation rates	- Prague (CZ), Budapest (HU)
Policy-led regions	F1: 40-60, F2: 50-70, F3: 60-80, F4: 70-85, F5: 75-95	- Strong policy coordination - High EU funding absorption - Comprehensive S3 implementation - Multi-stakeholder alignment	- Limited research critical mass - Brain drain issues - EU funding dependency - Weak local R&D base	- Tallinn (EE), Riga (LV)
Collaboration-based regions	F1: 60-75, F2: 65-80, F3: 70-90, F4: 40-60, F5: 60-75	- Dense collaboration networks - Strong university-industry partnerships - Trust-based innovation culture - Mature industrial clusters	- Limited international connectivity - Restricted global knowledge access - Technology isolation risks	- Silesia (PL), South Moravia (CZ)
European-engaged regions	F1: 60-75, F2: 40-60, F3: 65-80, F4: 75-90, F5: 65-80	- Exceptional Framework Programmes Participations - High success rates in applications - Strong administrative systems - Growing research infrastructure	- Weak commercialization infrastructure - Limited TTO expertise - Restricted venture capital - Project-to-market gaps	- Regional capitals (PL, HU, CZ),

Industry-Centered Regions	F1: 45-65, F2: 35-55, F3: 70-85, F4: 50-70, F5: 60-75	- Advanced manufacturing capabilities - Mature industrial ecosystems - Strong technical workforce - Excellent vocational training	- Weak academic research infrastructure - Limited university-industry linkages - Academic-industry disconnection - Formal transfer mechanism gaps	- Czech automotive regions
Foundation-Building Regions	F1: 20-40, F2: 15-35, F3: 25-45, F4: 20-40, F5: 30-50	- Distinctive regional assets - Growing Framework Programmes participation - Emerging policy coordination - Structural fund utilization potential	- Multiple systemic obstacles - Limited knowledge creation capacity - Geographic isolation - Institutional capacity constraints	- Rural Romania, Remote Bulgaria/Lithuania

III. D&E regional diversity in Widening countries: a typology

Type 1 : Research-Developing Regions

Regional profiles and key characteristics

Research-Developing Regions represent regions achieving remarkable success in building high-end research capabilities while facing persistent challenges in translating excellence into economic and societal applications. These regions feature strong universities and research institutions consistently producing high-quality scientific outputs, attracting significant European research funding, and maintaining extensive international research collaborations.

More specifically, these regions present the following profiles in the different families of determinants :

- Family 1 (Knowledge Production) shows high scores (70-90) in research infrastructure, scientific publications, and international collaboration indicators.

- Family 2 (Organizations) demonstrates low-moderate scores (30-50) in technology transfer capabilities and commercialization support.
- Family 3 (Networks) shows moderate scores (50-70) with strong academic networks but weak industry connections.
- Family 4 (International) achieves high scores (75-95) in EU program participation and international collaboration.
- Family 5 (Policies) demonstrates moderate scores (40-60) with policy awareness but limited implementation effectiveness.

Core strengths include exceptional research infrastructure meeting international standards), strong concentration of highly qualified researchers (>8 researchers per 1000 population vs 6.2 EU average), successful applications to the Framework Programmes including ERC grants, high international visibility and citation rates for scientific publications (>15 top-cited publications per capita vs 10.8 EU average), and dynamic academic environments fostering scientific creativity and knowledge exchange.

Structural challenges encompass pronounced asymmetry between academic research strength and economic application capacity, technology transfer offices focusing primarily on IP protection rather than commercialization facilitation, cultural divide between academic excellence metrics and market relevance considerations, limited incentives for researchers to engage in knowledge transfer activities, and relatively underdeveloped commercialization infrastructure.

Prague (Czech Republic) exemplifies this type through prestigious institutions like Charles University and Czech Technical University maintaining strong international research profiles while facing commercialization challenges. Despite proximity to dynamic economic centers, only 12% of university research projects result in industry collaboration, with average time from research to market application extending 7-10 years.

Budapest (Hungary) demonstrates similar characteristics through strong universities, developing technology transfer capabilities, and growing tech sectors that nonetheless struggle with systematic commercialization success. Despite institutional strengths and policy support, 85% of patents filed by universities never reach commercialization.

Assessment-based priority interventions

For this first category, priority focus emphasizes technology transfer professionalization, higher support to researcher entrepreneurship and industry partnerships.

Technology transfer office professionalization (Family 2 Enhancement) requires substantial investment in professional staff recruitment with industry experience, specialized training in technology assessment and market analysis, and development of performance-based funding systems linked to commercialization outcomes rather than patent filing statistics.

Researcher entrepreneurship development (Family 1-2 Integration) involves mandatory commercialization training for PhD programmes, sabbatical opportunities in industry settings and entrepreneur-in-residence programmes, and institutional policy reforms recognizing knowledge transfer activities in career advancement decisions. The target improvement seeks to increase spin-off creation rates and industry collaboration measured in Family 3 indicators.

Industry partnership infrastructure (Family 3 Network Development) encompasses co-located research and industry facilities, shared equipment programmes and joint research center establishment, and sustained university-industry collaboration platforms.

Type 2 : Policy-led regions

Regional profile and key characteristics:

Coordination-building regions distinguish themselves by their strong capabilities in innovation policy development, European funding absorption, and multi-stakeholder coordination while working to build stronger local knowledge production capacity. These regions demonstrate sophisticated governance mechanisms effectively aligning diverse stakeholders around shared innovation objectives.

In terms of performance, these regions present a singular profile:

- Family 1 (Knowledge Production) shows moderate scores (40-60) with growing research capacity but limited critical mass.
- Family 2 (Organizations) shows moderate scores (50-70) with developing institutional frameworks.

- Family 3 (Networks) achieves good scores (60-80) reflecting strong coordination capabilities.
- Family 4 (International) demonstrates good scores (70-85) in EU program participation and management.
- Family 5 (Policies) shows excellent scores (75-95) in policy coordination and funding absorption.

Core strengths encompass well-developed institutional coordination mechanisms bringing together diverse stakeholders, strong regional development agencies with substantial European funding expertise, comprehensive Smart Specialisation Strategy implementation with multi-stakeholder engagement, sophisticated policy approaches often adopted by other regions as best practices, and exceptional success in accessing and managing European structural and research funds.

Development areas include limited domestic research base requiring external research partnerships (<4 researchers per 1000 population vs 6.2 EU average), universities and research institutions lacking critical mass and advanced infrastructure, over-reliance on European funding creating sustainability challenges, and brain drain due to limited domestic research opportunities and modest private sector R&D investment.

Estonia's Tallinn region exemplifies this type through digital governance excellence and strategic policy coordination. The region's e-governance platform serves as an EU model with 95% of government services online, providing foundation for innovation policy implementation extending beyond typical regional capabilities.

Latvia's Riga region demonstrates similar characteristics through strong policy coordination and effective European fund utilization, ranking among top performers with 97% structural fund absorption while implementing comprehensive Smart Specialisation Strategy with multi-stakeholder participation through Regional Innovation Council.

Assessment-based priority interventions

For this second category, priority areas of interventions concentrate on research infrastructures and international talent attraction.

Research infrastructure modernization (Family 1 Enhancement) involves strategic investments in equipment procurement and facility upgrades targeting 2-3 specialized areas, international standard certification and shared

facility development, and focus on building world-class capabilities rather than broad-based capacity. The target improvement seeks to increase R&D expenditure from <1% to approach 2% of GDP while improving research quality indicators.

International talent attraction (Family 4 Strengthening) requires competitive salary packages with housing assistance and integration services and systematic recruitment campaigns targeting specific expertise areas. The target improvement aims to increase international researcher mobility and co-publication rates to exceed EU averages.

Strategic university partnerships (Family 3-4 Integration) encompass alliances with leading European research institutions, joint research centers and shared PhD supervision programmes, and long-term commitments with substantial investment requirements.

Type 3 : Collaboration-Based Regions

Regional profile and key characteristics:

Collaboration-Based Regions represent regions successfully developing robust local innovation ecosystems characterized by strong inter-organizational collaboration, effective university-industry partnerships, and dense networks facilitating knowledge exchange while facing challenges with international connectivity and global knowledge access.

These regions present the following profiles in the different families of determinants :

- Family 1 (Knowledge Production) shows good scores (60-75) and solid regional research capabilities.
- Family 2 (Organizations) demonstrates good scores (65-80) reflecting effective local institutional development.
- Family 3 (Networks) achieves excellent scores (70-90) in collaboration density and trust relationships.
- Family 4 (International) shows moderate scores (40-60) with limited global connectivity.
- Family 5 (Policies) demonstrates good scores (60-75) supporting local ecosystem development.

Core strengths include strong inter-organizational collaboration and effective university-industry partnerships (>0.20 public-private co-publications per

capita vs 0.15 EU average), dense networks of relationships facilitating systematic knowledge exchange, innovation culture emphasizing cooperation, trust, and mutual support, mature industrial clusters and effective local knowledge conversion mechanisms demonstrating practical application success.

International connectivity challenges encompass limited international connectivity constraining access to global knowledge networks (<30 international co-publications per capita vs 45.0 EU average), restricted access to cutting-edge research and emerging technological developments, with limited international research collaboration.

Silesia (Poland) exemplifies this type through mature industrial clusters and strong local cooperation culture. The region features over 45 higher education institutions with robust industry connections, advanced manufacturing clusters with embedded R&D capabilities, and regional innovation systems with over €100 million annual investment, though international integration remains limited with EU Framework Program participation 15% below national averages.

South Moravia (Czech Republic) demonstrates similar characteristics through well-developed innovation infrastructure and active networks. Brno University of Technology maintains strong industry partnerships while JIC facilitates effective collaboration across regional innovation ecosystems, supporting over €50 million annual innovation investment and hosting more than 200 innovative companies.

Assessment-based priority interventions

For this first category, priority focus emphasizes international connections and global market access development, through the development of international partnerships, research mobility programmes and cross-border initiatives.

Global partnership facilitation (Family 4 Enhancement) involves systematic identification and engagement with top international innovation centers, memoranda of understanding with leading research institutions, and international innovation network participation and reverse investment missions. The target improvement seeks to increase international co-publications to exceed EU average while maintaining local network strength.

Researcher mobility programmes (Family 4 Talent Development) require international sabbatical and exchange opportunities, hosting programmes for international researchers and entrepreneurs, and language training and cultural preparation for international engagement. The target improvement aims to enhance H2020 participation rates and success rates measured through Family 4 indicators.

Cross-border innovation projects (Family 3-4 Integration) encompass collaborative research initiatives with neighboring regions, joint EU funding applications with international consortium partners, and shared innovation infrastructure development. The target improvement seeks to maintain high Family 3 scores while significantly improving Family 4 performance.

Type 4 : European-engaged regions

Regional profile and key characteristics:

European-engaged regions achieve remarkable success in European Framework Programmes participation while developing commercialization infrastructure necessary to maximize regional impact of European investments. These regions demonstrate exceptional capabilities in European program application, project management, and multi-stakeholder coordination for international research collaborations.

More specifically, the families of determinants present the following profiles:

- Family 1 (Knowledge Production) shows good scores (60-75) and growing research capabilities.
- Family 2 (Organizations) shows moderate scores (40-60) with developing commercialization infrastructure.
- Family 3 (Networks) achieves good scores (65-80) reflecting collaboration capabilities.
- Family 4 (International) demonstrates excellent scores (75-90) in EU program participation and success.
- Family 5 (Policies) shows good scores (65-80) with strong administrative capacity for EU programmes.

Core strengths encompass exceptional European program application and project management capabilities (>60 EUR H2020 funding per capita vs 45 EU average), success rates exceeding national averages, strong policy coordination mechanisms aligning European program participation with

regional development, growing research infrastructure development funded through European programmes and capacities to facilitate knowledge transfer.

Valorisation gaps include persistent challenges translating European project results into commercial applications, underdeveloped services creating gaps between project completion and practical application, limited technology transfer office expertise and industry networks, and restricted regional venture capital and business angel networks (<15 EUR venture capital per capita vs 25 EU average).

Regional centers in Poland, Hungary, and Czech Republic exemplify this type through strong European program participation and emerging commercialization capabilities. These secondary cities demonstrate high Horizon Europe success rates, growing European-funded research infrastructure, and emerging university-industry collaboration initiatives while facing common challenges including limited technology transfer capabilities and weak venture capital ecosystems.

Cross-border cooperation centers participating in Interreg programmes represent another manifestation, demonstrating strong European connections and excellent project management alongside limited commercialization infrastructure.

Assessment-based priority interventions

To increase the valorisation performance of the 4th category of regions, the main priority areas are the reinforcement of commercialization capacities and business incubation capacities, through the modernization of technology transfer offices, commercialization skills development and the facilitation of industry partnerships.

Technology transfer office establishment (Family 2 Development) involves professional staff recruitment with industry and commercialization experience, high-quality services to valorize projects' results The target improvement aims to move Family 2 scores from 40-60 to 70-85 through systematic institutional development.

Commercialization skills development (Family 2 Capacity Building) requires mandatory entrepreneurship training for researchers and administrators, business development workshops and intellectual property management training, and mentorship programmes connecting researchers with successful

entrepreneurs. The target improvement seeks to increase spin-off creation rates and technology licensing measured through specific indicators.

Industry partnership facilitation (Family 3 Enhancement) encompasses systematic partnership building between universities and industrial clusters, joint research center establishment with industry co-investment, and industry advisory boards for research priority setting. The target improvement aims to maintain high Family 4 scores while significantly improving Family 2 and Family 3 collaboration indicators.

Type 5: Industry-Centered Regions

Regional profile and key characteristics:

Industry-Centered Regions feature robust manufacturing capabilities, strong industrial clusters, and excellent practical networks demonstrating high capacity for absorbing and applying new technologies within existing production systems while facing challenges building systematic connections with academic research institutions and formal knowledge transfer mechanisms.

The assessment profile can be summarized as follows:

- Family 1 (Knowledge Production) shows moderate scores (45-65) and stronger applied research focus.
- Family 2 (Organizations) demonstrates low-moderate scores (35-55) reflecting weak academic-industry formal connections.
- Family 3 (Networks) achieves good scores (70-85) in industrial networks but academic-industry gap.
- Family 4 (International) shows moderate scores (50-70) through industrial connections.
- Family 5 (Policies) demonstrates good scores (60-75) supporting industrial development.

Core strengths encompass advanced manufacturing capabilities in automotive, machinery, chemicals, and food processing, mature industrial ecosystems with established supply chains and skilled technical workforces, industrial clusters with extensive supplier networks and embedded R&D capabilities (>1.8% business R&D/GDP vs 1.46% EU average), excellent technical vocational training systems producing skilled workers adapted to industry

needs, and strong traditions of industrial networking and collaboration between companies.

Academic-industry connection challenges include relatively weak academic research infrastructure and limited formal university-industry knowledge exchange, universities lacking research intensity, advanced facilities, and international networks (<0.8% public R&D/GDP vs 0.66% EU average), disconnect between strong industrial capacity and modest academic research capabilities, and missed opportunities for innovation development limiting ability to respond to technological transitions.

Czech manufacturing regions with automotive and machinery clusters exemplify this type through combination of advanced automotive manufacturing with Škoda, BMW, and extensive supplier networks alongside strong machinery manufacturing clusters. These regions feature excellent technical vocational training and skilled workforces but face challenges including limited university research connections and weak formal technology transfer mechanisms.

Slovak automotive clusters in Bratislava and Košice regions demonstrate similar characteristics through integration with Volkswagen, PSA, and Kia operations alongside extensive supplier networks, but encounter academic development needs including limited research universities with automotive focus and insufficient innovation services for supplier companies.

Assessment-based priority interventions

To improve their performance, Industry-Centered Regions should strengthen academic-industry connections and support applied research, through the development of dedicated centers, university-industry linkage programmes and the support to technology transfer services.

Applied research center development (Family 1-2 Integration) involves establishment of specialized research facilities in priority manufacturing sectors, shared research infrastructure accessible to universities and industry, and co-investment models with industry partners and international partnerships. The target improvement seeks to increase public R&D expenditure while strengthening university-industry collaboration measured through Family 2 indicators.

University-industry linkage programmes (Family 2 Enhancement) require systematic partnership development between universities and industrial

clusters, joint research project facilitation with shared funding arrangements, and industry advisory boards for research priority setting and regular networking events. The target improvement aims to move Family 2 scores from 35-55 to 65-80 through systematic relationship building.

Technology transfer mechanism establishment (Family 2 Infrastructure) encompasses professional technology transfer office development with manufacturing focus, intellectual property management and licensing capabilities for manufacturing technologies, and technology scouting services connecting research with industry applications. The target improvement seeks to increase formal knowledge transfer mechanisms while maintaining strong industrial network advantages.

Type 6 : Foundation-Building Regions

Regional profile and key characteristics:

Foundation-Building Regions face multiple systemic obstacles across all knowledge valorisation dimensions while possessing distinctive assets and long-term potential for specialized development in targeted areas aligned with geographic, cultural, or resource endowments. These regions require comprehensive capacity building across the entire assessment framework.

More specifically, these regions present the following profile on the different families of determinants :

- Family 1 (Knowledge Production) shows with low scores (20-40) and limited research infrastructure and human capital.
- Family 2 (Organizations) shows low scores (15-35) reflecting reduced institutional strategies and capacities to support knowledge valorisation.
- Family 3 (Networks) demonstrates low-moderate scores (25-45) with emerging collaboration attempts.
- Family 4 (International) shows low scores (20-40) with limited international connectivity.
- Family 5 (Policies) demonstrates low-moderate scores (30-50) with developing policy frameworks.

Development context includes high dependence on traditional economic activities including agriculture, natural resource extraction, or basic manufacturing, limited knowledge creation capability (<3 researchers per

1000 population vs 6.2 EU average), private sector demonstrating minimal innovation investment (<0.5% business R&D/GDP vs 1.46% EU average), and limited institutional capacity for innovation policy development and coordination.

Emerging opportunities encompass distinctive assets including specific natural resources, cultural assets, geographic positioning, or emerging specialisations, growing participation in European programmes providing foundations for systematic capacity building, emerging policy coordination capabilities and increasing recognition of innovation importance, and European structural fund utilization providing opportunities for foundational investments

Rural Romania regions exemplify this type through high agricultural employment with limited knowledge creation capability, restricted higher education institutions with minimal research capacity, developing European fund utilization with emerging policy coordination, and geographic isolation from major knowledge centers, while possessing strategic opportunities including agricultural innovation focus and sustainable development specialisation.

Remote areas in Bulgaria and Lithuania demonstrate similar characteristics through basic research infrastructure establishment with European structural fund support, limited connectivity constraining access to knowledge networks, heavy European dependency for innovation activities, and institutional learning processes for innovation policy development.

Assessment-based priority interventions

To address their situation, Foundation-Building Regions should in priority engage in capacity building and foundational infrastructure development.

Key Interventions encompass educational infrastructure modernization and digital connectivity (Family 1 foundation), mobile innovation services and talent retention programmes (Family 1-3 service delivery), and European program preparation and selective excellence development (Family 4-5 building).

Comprehensive capacity building (All Families Development) involves substantial investment in educational infrastructure modernization, digital connectivity enhancement and institutional capacity building, and professional development programmes for government officials and

institutional leaders. The target improvement seeks systematic improvement across all five families with 15-25 point increases over 5-7 year period.

Mobile innovation units (Family 1-3 Service Delivery) encompass traveling technology demonstration and training services addressing geographic isolation, mobile laboratories with basic research and testing capabilities, and technology demonstration equipment and training facilities for digital literacy. The target improvement aims to improve access to knowledge and innovation services measured through Family 1 and Family 3 indicators.

European program preparation (Family 4-5 Integration) involves application support and capacity building enhancing access to European funding, professional development in funding application development and project management training, and partnership development with experienced regions and administrative system development. The target improvement seeks to increase EU funding absorption and program participation rates measured through Family 4 and Family 5 indicators.

Selective excellence development (Long-term Family 1 Building) encompasses focused capability building in 2-3 specialized areas creating competitive advantages, research and innovation center development in areas of regional advantage, and international partnership development and advanced training programmes. The target improvement aims to develop specialized capabilities scoring 60-75 points in targeted areas while maintaining broader improvement trajectory.

Table 4 Assessment framework :

Regional profiles					
Regional category	Family 1	Family 2	Family 3	Family 4	Family 5
Research-Developing Regions	- Researcher entrepreneurship training - Industry collaboration incentives	- **TTO professionalization** - **Valorisation infrastructure**	- Industry partnership platforms - Proof-of-concept networks	- Maintain excellence - Technology export support	- Innovation funding diversity - Policy coordination
Policy-led regions	- **Research infrastructure** - **International talent attraction**	- Institutional capacity building - Technology transfer platforms	- Network quality enhancement - Strategic partnerships	- Research excellence development - Global connectivity	- Maintain policy excellence - Sustainability planning

Collaboration-based regions	- Innovation capability scaling - Knowledge export preparation	- International best practices - Global partnership support	- Maintain network strengt - Quality enhancement	- **Global partnership facilitation** - **International connectivity**	- International program support - Cross-border coordination
European-engaged regions	- Applied research development - Industry relevance	- **TTO establishment** - **Commercialization skills**	- Industry partnership facilitationBusiness incubation	- Maintain EU excellenceValorisation focus	- Funding diversification - Synergy optimization
Industry-Centered Regions	- **Applied research centers** - University-industry alignment	- **Academic-industry bridgesTechnology transfer mechanisms**	- Formal collaboration systems - Knowledge broker development	- International manufacturing networks - Technology scouting	- Innovation policy development - Funding mechanism design
Foundation-Building Regions	- **Foundational capacity building** - **Educational modernization**	- **Basic institutional development** -	- **Network formation support** - **Trust building initiatives**	- **EU Framework Programmes preparation** - **Partnership development**	- **Comprehensive policy development** - **Administrative capacity building**

Conclusion: from territorial analysis to evidence-based policies

Capitalizing on more than 140 sources spanning EU policy documents and evaluation reports, academic research and institutional studies, and structured interviews of senior experts, this deliverable presents a comprehensive analysis of the valorisation of WIDERA projects. It provides a framework for developing targeted policy recommendations that address both national and territorial needs to increase the impacts of such projects and reduce the European innovation divide.

Using the six regional categories defined and the Self-assessment tool, the widerAdvance Facility project will now develop specific policy recommendations for national and regional authorities to design or improve tools within the 2027-2033 smart specialisation strategies (S3) and European Regional Development Fund programmes. This evidence-based approach will leverage the distinct characteristics of Widening territories to propose tailor-made intervention principles and practical instruments, notably to maximize funding synergies.

Practically, the self-assessment tool and the associated policy recommendations will be discussed and refined during mutual learning workshops, ensuring that the propositions reflect the practical experience, needs and capacities of policy makers.

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