



EUROPEAN RESEARCH AREA WHITE PAPER

The European Charter for Researchers in Modern Talent Ecosystems: Structural Gaps and Policy Pathways across the ERA

This white paper examines how the European Charter for Researchers is being implemented across diverse talent and innovation ecosystems within the European Research Area (ERA). Drawing on mixed-methods evidence and early implementation data from 10 collaborative ERA projects, it synthesises completed surveys, interviews, focus groups, institutional diagnostics and policy mappings, while clearly distinguishing these findings from ongoing pilots and planned targets. The paper identifies five interlocking structural gaps: funding-dependent career instability; weak institutional career-support capacity and competence recognition; limited intersectoral mobility and employer integration; under-recognition of applied and entrepreneurial outputs, combined with low intellectual-property literacy; and uneven regional and inclusion conditions. The evidence indicates that these gaps arise primarily from legacy system design and variable implementation capacity rather than rejection of the Charter's principles. Section 6 translates the evidence presented in Session 2 of the ERA clustering event into policy-brief evidence statements, implications and priorities for further testing.

This page intentionally left blank

Table of Contents

List of Abbreviations and Acronyms	5
List of Authors	6
1. Executive Summary	8
2. Introduction & Purpose	9
2.1 The Evolving ERA Landscape and the new Charter for Researchers	9
2.2 The WIDERA Portfolio: A Unified Network for Systemic Change	10
2.3 Scope and Objectives of the ERA White Paper	11
3. Methodology & Data Sources	12
3.1 Project-Specific Methodological Frameworks & Scopes	12
3.1.1 DeepTechSeeds Project	12
3.1.2 ARCOE Project	12
3.1.3 SECURE II Project	13
3.1.4 ECROS Project	15
3.1.5 CROSS Project	16
3.1.6 AttractAdria Project	17
• Research design and intervention logic	17
• Geographic and sectoral scope	18
• Planned outputs and indicators	18
3.1.7 NextTechTalents Project	18
3.1.8 SMART Researchers Project	20
3.1.9 BREATH Project	21
3.1.10 INSIGHT Project	24
3.2 Methodological Synthesis and Overview	25
4. Results: Current European Charter for Researchers Implementation	27
4.1 Integrated Project-Specific Findings	27
4.1.1 DeepTechSeeds Project	27
4.1.2 ARCOE Project	28
4.1.3 CROSS Project	29

4.1.4 NextTechTalents Project	30
4.1.5 ECROS Project.....	31
4.1.6 BREATH Project.....	32
4.1.7 SECURE II Project	33
4.1.8 SMART Researchers Project	34
4.1.9 INSIGHT Project	35
4.1.10 AttractAdria Project	37
4.2 Cross-Project Synthesis of Systemic Structural Gaps	38
5. Comparative Analysis and Evidence for Policy Briefs across ERA Projects	41
5.1 Comparative Analysis across ERA projects	41
5.1.1 Shift from Formal Compliance to Institutional Capacity and Culture	41
5.1.2 Contextual Employability and the Primacy of Practice Over Competence Alone	41
5.1.3 Ecosystem-Based Implementation and Deep Tech Talent Retention	42
5.1.4 Systemic Alignment of Evaluation Frameworks and Reward Structures	42
5.2 Evidence for Policy Recommendations across ERA projects	42
5.2.1 Evidence concerning ECRs.....	43
5.2.2 Evidence concerning Academic Institutions	44
5.2.3 Evidence concerning Industry and Intersectoral Pathways	44
5.2.4 Evidence concerning the ERA Ecosystem.....	45
6. Conclusions & Way Forward	46
6.1 Insights on ERA Policy Evidence.....	46
6.2 Opportunities & Way Forward.....	46
References	47
Contacts	50

List of Abbreviations and Acronyms

Abbreviation	Definition
AI	Artificial Intelligence
CMO	Context-Mechanism-Outcome
CoARA	Coalition for Advancing Research Assessment
CSC	Career Support Center
ECR	Early-Career Researcher
ERA	European Research Area
ESR	Early-Stage Researcher
ESCO	European Skills, Competences, Qualifications and Occupations
EU	European Union
FAIR	Findable, Accessible, Interoperable, and Reusable
GDPR	General Data Protection Regulation
GEP	Gender Equality Plan
HEI	Higher Education Institution
HR	Human Resource
HRS4R	Human Resource Strategy for Researchers
IP	Intellectual Property
IPA	Importance-Performance Analysis
NGN	Next-Generation Network
NLP	Natural Language Processing
QC	Quantum Computing
R&I	Research and Innovation
RCF	Research Career Framework
RFO	Research Funding Organization
RPO	Research Performing Organization
SSH	Social Sciences and Humanities
STEM	Science, Technology, Engineering, and Mathematics
UCD	User-Centered Design
WG	Working Group
WIDERA	WIDening Participation & ERA

List of Editors

Name	Institute/University/Company	Country	Project
Harilaos Koumaras	National Center for Scientific Research DEMOKRITOS	Greece	DeepTechSeeds
Janina Fengel	European University of Technology (EUt+), Hochschule Darmstadt	Germany	ECROS
Marina Koulaloglou	INFOLYSIS P.C.	Greece	DeepTechSeeds
Stefanos Plastras	National Center for Scientific Research DEMOKRITOS	Greece	DeepTechSeeds

List of Authors

Name	Institute/University/Company	Country	Project
Harilaos Koumaras, Stefanos Plastras	National Center for Scientific Research DEMOKRITOS	Greece	DeepTechSeeds
Marina Koulaloglou, Vaios Koumaras, Alexandros Ntagiantas	INFOLYSIS P.C.		
Janina Fengel	European University of Technology (EUt+), Hochschule Darmstadt	Germany	ECROS
José María Balbuena Sánchez	European University of Technology (EUt+), Universidad Politécnica de Cartagena	Spain	
Gülsah Solmaz	Fraunhofer Institute for Applied Information Technology	Germany	INSIGHT
Matteo Falsetta	28Digital	Belgium	
Suad Krilašević	Association for the advancement of science and technology	Bosnia and Herzegovina	
Damir Haskovic	MINDS & SPARKS	Austria	NextTechTalents

Bobby Woods	Munster Technological University	Ireland	
Linda Rudzroga	Ventspils University of Applied Sciences	Latvia	
Mihaela Aluas, Horatiu Damian	Babes-Bolyai University	Romania	
Carolina Varela	The International Consortium of Research Staff Associations	Luxembourg	SECURE II
Danijela Ciric Lalic, Maja Petrović, Biljana Vrzić	University of Novi Sad, Faculty of Technical Sciences	Serbia	SMART Researchers
Elisa Boeri, Eleonora Lombardi	Fondazione E. Amaldi	Italy	ARCOE
Tamer Bego, Elma Omeragić, Alisa Elezović	University of Sarajevo	Bosnia and Herzegovina	AttractAdria
Begona Minarro	Universita Autònoma de Barcelona	Spain	BREATH
Zuzana Musilová	Heyrovský Institute of the CAS	Czechia	CROSS

1. Executive Summary

The [European Charter for Researchers](#) [21] is a central framework for ethical, sustainable and attractive research careers across the European Union. Yet significant implementation gaps continue to constrain Europe's long-term research and innovation (R&I) capacity. This white paper synthesises evidence from 10 European Union-funded projects under the Horizon Europe WIDERA programme: ARCOE, AttractAdria, BREATH, CROSS, DeepTechSeeds, ECROS, INSIGHT, NextTechTalents, SECURE II and SMART Researchers [1, 2]. The portfolio combines surveys of early-career researchers (ECRs), research-performing organisations (RPOs), research funders and industry stakeholders with interviews, focus groups, institutional diagnostics and policy mapping. Because the projects are at different stages, the analysis distinguishes completed findings and baseline measurements from planned outputs and policy hypotheses.

Among respondents who are familiar with the Charter, support for its principles is generally strong. However, the evidence consistently identifies barriers to their practical implementation within regional, national and sectoral talent ecosystems:

- **Career Pathways and Stability:** Reliance on short-term, project-based funding creates contractual uncertainty and weakens career predictability. The evidence links this pattern to unclear career progression pathways, limited institutional continuity mechanisms and heightened retention risks, particularly in Widening contexts.
- **Knowledge Valorisation and Intellectual Property:** Despite active academia-industry collaboration, many ECRs report limited formal training and confidence in intellectual-property management. This complicates the balance between Open Science, protection of research results and commercial or societal valorisation.
- **Talent Capacity, Competence Recognition and Career Support:** Doctoral training does not consistently provide structured support for entrepreneurship, advanced digital skills and transversal competences. Employer evidence indicates that the central challenge is often not a lack of technical ability, but the translation of research competences into organisational and commercial settings.
- **Mobility and Evaluation Systems:** Administrative, regulatory and organisational barriers impede sustained intersectoral mobility, while recruitment and promotion systems remain strongly influenced by publication-based indicators. Applied outputs, mentoring, Open Science, mobility and technology-transfer contributions are not yet recognised consistently.
- **Regional Capacity and Inclusion:** Implementation capacity varies across regions and organisations. Widening contexts face particular continuity constraints, while gender, employment-status and career-stage disparities shape access to stable work, mobility and progression.

Taken together, the evidence indicates that these implementation gaps are associated with outdated system design, uneven institutional capacity and incomplete reform infrastructures. The paper therefore provides an evidence-led basis for policy briefs and future grants: it identifies what is already supported by cross-project findings, what remains project-specific, and which proposed measures still require comparative testing and longitudinal evaluation.

2. Introduction & Purpose

The ERA seeks to establish a seamless talent ecosystem in which researchers can thrive across borders, sectors and career stages. Fields such as engineering and deep tech, artificial intelligence, advanced materials, quantum computing, automotive manufacturing and robotics are central to European competitiveness, yet they face acute talent shortages that are intensified by fragmented career structures.

2.1 The Evolving ERA Landscape and the new Charter for Researchers

The European Research Area (ERA) is undergoing a structural transformation intended to create an open, sustainable and globally competitive labour market for research, innovation and entrepreneurial talent. The 2005 European Charter and Code of Conduct established an important foundation, but cross-sectoral dependencies, digital transformation and the growing importance of knowledge valorisation required an updated framework. The Council Recommendation of 18 December 2023 on a European framework to attract and retain research, innovation and entrepreneurial talents in Europe established the revised European Charter for Researchers [3, 4]. The Charter consolidates the previous 40 principles into 20 principles organised under four interconnected pillars:

1. Ethics, Integrity, Gender Equality, and Open Science: Institutionalizing rigorous research ethics, safeguarding intellectual freedom, combating structural gender disparities, and mainstreaming open, FAIR data sharing across all Member States [5].
2. Assessment, Recruitment, and Progression of Researchers: Standardizing fair, transparent, and merit-based institutional recruitment procedures while overhauling classical promotional pathways.
3. Working Conditions and Practices: Directly confronting systemic precarity by advocating for stable, predictable contractual arrangements, healthy work-life integration, and robust social protection measures.
4. Research Careers and Talent Development: Building out diverse, flexible professional pathways that equip researchers with continuous upskilling options to thrive inside and outside traditional academic structures.

The HR Excellence in Research process is the principal implementation mechanism for these 20 principles. It supports research-performing organisations in aligning their human-resources policies and practices with the Charter and the wider ERA Policy Agenda [6].

2.2 The WIDERA Portfolio: A Unified Network for Systemic Change

Translating European policy instruments into institutional practice requires robust empirical evidence from the organisations and researchers expected to implement them. The Horizon Europe WIDERA programme therefore funded a portfolio of 10 collaborative projects under the topic 'Talent ecosystems for attractive early research careers - pilot' [1, 2, 7]:

- *ARCOE* [8],
- *AttractAdria* [9],
- *BREATH* [10],
- *CROSS* [11],
- *DeepTechSeeds* [12],
- *ECROS* [13],
- *INSIGHT* [14],
- *NextTechTalents* [15],
- *SECURE II* [16],
- *SMART Researchers* [17]

The portfolio provides a deliberately diverse cross-section of European research and innovation environments. It covers deep-tech and STEM fields, including artificial intelligence, robotics, advanced engineering and quantum technologies, alongside social sciences and humanities, public health, clinical sciences, and environmental biosciences. Its geographic and institutional diversity enables comparison across different regional capacities and disciplinary settings, although the samples are not designed to be statistically representative of the entire ERA. Beyond this core pilot portfolio, the analytical framework of this White Paper is contextualized within the broader landscape of Horizon Europe research careers policy-supporting grants. Specifically, it aligns with complementary initiatives focused on skills and competence development such as SECURE [22], DocTalents4EU [23], and RESKILLSPAN [24]. Furthermore, it links to major structural and mobility infrastructure projects, including the RESAVER [25] grant series (enabling cross-border pension schemes), ERA Talent, and the FORESEE [26] grants supporting the EURAXESS network. Finally, it incorporates horizontal insights from dedicated communities of practice, namely ERA CAREERS and CareerEnhance. Mapping these synergies ensures a comprehensive understanding of the entire Horizon Europe policy portfolio supporting ERA research careers.

2.3 Scope and Objectives of the ERA White Paper

Formal endorsement of the European Charter for Researchers is widespread, but day-to-day implementation at institutional, departmental, and laboratory level remains uneven. This white paper synthesises evidence from ARCOE, AttractAdria, BREATH, CROSS, DeepTechSeeds, ECROS, INSIGHT, NextTechTalents, SECURE II and SMART Researchers. Its scope covers research-career frameworks, working conditions, competence development, mobility mechanisms, and institutional support across academic and non-academic settings. The evidence base combines quantitative surveys with ECRs, researchers, institutional leaders and employers; qualitative interviews, and focus groups; cross-sector workshops; institutional diagnostics; and national and European policy mapping.

The primary purpose of the white paper is to consolidate evidence for policy briefs, shared metrics and future programme design. It pursues four objectives:

- **Ecosystem and Labour-Market Evidence:** Examine how training providers, employers, universities, research and technology organisations, public authorities and intermediaries interact in research-career ecosystems, and identify where these relationships do or do not meet labour-market needs.
- **Charter Implementation Evidence:** Assess the gap between formal endorsement of the Charter and its operational embedding in recruitment, career development, working conditions, mobility, and institutional governance.
- **Research Excellence and Workload Evidence:** Examine how career-development, mentoring, teaching, administration and knowledge-valorisation activities are allocated and recognised, while safeguarding the primary role of high-quality research and avoiding uncompensated workload expansion.
- **Competence and Intersectoral Evidence:** Identify the competences, forms of practical exposure, recognition mechanisms and organisational conditions that support career mobility within and beyond academia.

These objectives structure the project-specific findings, cross-project comparison and evidence-led policy-brief synthesis presented in the following sections.

3. Methodology & Data Sources

3.1 Project-Specific Methodological Frameworks & Scopes

3.1.1 DeepTechSeeds Project

DeepTechSeeds applies a mixed-methods framework to examine the gap between policy endorsement and the day-to-day experience of researchers in deep-tech fields, including artificial intelligence, 6G, robotics, advanced materials and quantum computing. The analysis uses a realist Context-Mechanism-Outcome (CMO) framework: it examines how structural contexts, such as project-based funding, activate institutional mechanisms, such as recruitment and evaluation procedures, and produce observable outcomes, such as career predictability. ResearchComp is used as an interpretative framework for competence-related signals, including intellectual-property literacy and innovation orientation.

- **Methodology:** The research design combines four evidence streams: a multi-stakeholder survey; qualitative focus groups and structured interviews; a comparative review of governance frameworks, HR Excellence in Research documentation and national R&I strategies; and an EU-level governance analysis of the 2023 European Charter for Researchers. Triangulation across these streams strengthens the validity and interpretation of the findings.
- **Data and Geographical Scope:** DeepTechSeeds runs from October 2025 to September 2028 and is coordinated by the National Centre for Scientific Research 'Demokritos' (NCSRD). Countries are grouped into Central and Eastern Europe, Southern Europe, and Western and Northern Europe to support macro-regional comparison without over-interpreting individual-country effects. The evidence base comprises 218 ECR survey responses, 164 responses from industry and regional stakeholders, 24 participants in four focus groups, and 15 semi-structured interviews.

3.1.2 ARCOE Project

The ARCOE project utilizes a comprehensive, multi-layered methodology framework designed to address the complex challenges of the European research ecosystem. This framework integrates digital platform development, systematic stakeholder engagement, and a combination of quantitative and qualitative research methods to ensure inclusivity, scientific rigor, and long-term sustainability. A core component of this framework is the development of the Virtual Talent Innovation Ecosystem Hub through a User-Centered Design (UCD) approach, characterized by iterative prototyping, continuous stakeholder feedback, and technical infrastructure designed to effectively respond to the needs of the

European research community. Furthermore, the analytical framework incorporates advanced artificial intelligence techniques, including Natural Language Processing (NLP) and clustering methods, to perform "as is" competency mapping of researchers based on ResearchComp and ESCO frameworks, mapping data-driven career transition pathways visualized through interactive Sankey charts within the Virtual Hub.

- **Methodology:** The research design adopts a multi-layered approach combining digital platform development with quantitative, qualitative, and desk research methodologies. Quantitative data are gathered through structured questionnaires and surveys distributed to a broad range of stakeholders to capture insights into HR procedures and career development models. Qualitative data are obtained through in-depth, semi-structured interviews and focus groups—including co-creation workshops, mentoring sessions, and interactive conferences to explore organizational culture. This is complemented by systematic policy reviews involving detailed document analysis of national and institutional frameworks (internal reports, HR regulations, and career development strategies) to assess alignment with the European Charter for Researchers and HRS4R standards.
- **Data and Geographical Scope:** ARCOE runs from May 2025 to April 2028 and is coordinated by Fondazione E. Amaldi. Its 13-partner consortium covers nine EU countries: Italy, Belgium, Bulgaria, Cyprus, the Netherlands, Greece, Romania, Ireland and Malta. The quantitative dataset includes 27 organisations, through an organisational assessment survey and a baseline survey of R1-R2 researchers.

3.1.3 SECURE II Project

The SECURE2 project is the follow-up phase of the Sustainable Careers for Researcher Empowerment (SECURE) project, which was designed to develop coordination and support recommendations for the creation, testing, implementation, and mainstreaming of a common Research Career Framework (SECURE RCF) as a practical toolbox for research-performing organisations (RPOs) and research-funding organisations (RFOs) seeking to reform research careers and reduce structural precarity in the research system. The SECURE RCF is built on the main European policy initiatives that currently shape research careers in the European Research Area, including the European Framework for Research Careers (EFfRC), the European Charter for Researchers, ESCO, and ResearchComp. On this basis, the SECURE RCF is structured around eight action areas: Strategy, Stability, Conditions, Skills, Mobility, Assessment, Pathways, and Interoperability. Together, these action areas provide a comprehensive framework for institutional reform, covering governance, employment conditions, career development, mobility, evaluation, and alignment with European standards. SECURE2 moves from framework design and short-term implementation to higher and longer time scale implementation, with the core objective to pilot and operationalise selected actions of the

SECURE RCF within RPOs and RFOs to improve research career progression and mobility by supporting pilot institutions in developing tailored action plans enabling action implementation.

- **Methodology:** The first phase of SECURE2 focused on benchmarking the level of implementation of RCF actions across the pilot organisations to produce a structured and comparative assessment of pilots' maturity across the eight action areas. Each pilot organisation carried out a self-assessment of the 80 actions of the RCF using a common five-level maturity scale: 0 (Not started: no evidence of activity or planning), 1 (Initiating: early discussions or first activities are in place), 2 (Developing: partial implementation and clear signs of progress), 3 (Established: implementation is systematic, consistent, and operational), and 4 (Leading: practice is advanced, exemplary, and aligned with emerging European standards). Based on the collected scores, several indicators were calculated: the average maturity score per action area for each pilot institution, the overall maturity score of each institution across all actions, and the average score for each action area across the full group of pilots. This benchmark data was analyzed at three complementary levels: institution-level analysis (identifying strengths and weaknesses within each pilot organisation to map where implementation is embedded vs. where institutional gaps remain), cross-pilot comparative analysis (examining variation in maturity across the eight action areas, identifying recurring patterns, and highlighting shared systemic weaknesses and maturity clusters), and consortium-level baseline assessment (establishing an overall baseline maturity profile of RCF implementation to support future monitoring and impact assessment).
- **Data & Geographical Scope:** Funded under the Horizon Europe WIDERA programme, the project runs from June 2025 to May 2029 and is coordinated by the higher education organization, Instituto Superior Tecnico. The project's empirical data and benchmarking activities cover 8 pilot institutions, consisting of 7 RPOs located in Moldova, Ukraine, Cyprus, Portugal, Spain, and Poland, and 1 RFO located in Romania. The benchmarking exercise identified three broad groups of pilot institutions based on their overall maturity scores: Advanced pilots (showing strong performance across most action areas to contribute to peer learning), Mid-range pilots (achieving partial implementation but requiring support to move towards systemic adoption), and Early-stage pilots (continuing to face major gaps, particularly in strategy, mobility, stability, and interoperability). The compiled data shows that several action areas remain consistently underdeveloped across the cohort and require targeted intervention: Stability (dedicated to improving stability via permanent, fixed-term, or tenure-track-like models) emerged as the weakest area overall, highlighting that employment insecurity remains a structural constraint; Mobility (focusing on interdisciplinary,

intersectoral, and international mobility for better talent circulation) also showed low maturity across the cohort; and Interoperability (aligning career steps, organisations, sectors, and countries with European frameworks) was similarly underdeveloped. These findings reveal that the main barriers to implementing the European Charter for Researchers are not primarily a matter of institutional resistance, but of unequal system capacity and incomplete reform infrastructures.

3.1.4 ECROS Project

The ECROS project is working on empowering early-career researchers with new opportunities and skills through creating a talent ecosystem offering tailored mentoring, strategic training, and cross-sector career opportunities across the European University of Technology (EUT+) together with partners from industry and young researchers associations. EUT+ is a European University Alliance established under the European Commission's flagship European Universities initiative. In the alliance nine technological universities from across Europe came together to fundamentally reimagine the role of technological higher education and research in Europe grounded in the shared belief that technology must always serve society. In ECROS, the EUT+ alliance partners build the project consortium together with industrial partners and young researcher associations. Thereby, nine European Member States are geographically represented, Romania, Latvia, Ireland, France, Germany, Italy, Spain, Bulgaria, and Cyprus. Within the project, four studies are created looking at STEM and non-STEM disciplines:

- Meta-analysis of Early Career Researchers' Conditions: Literature review related to ECRs careers concerning working conditions, wellbeing, mental health, legal-policy landscape, covering all ERA countries to identify the situation of ECRs at the starting point of the ECROS project, both at an institutional and working conditions level in Widening and Non-Widening countries.
- Critical Analysis of Career Development and Capacity Building: Qualitative content analysis in the EUT+ members regarding career development and capacity building practices in the institutions to assess existing practices and their alignment with ERA priorities, and to identify gaps and opportunities.
- Stakeholder engagement interviews and focus groups: Qualitative interviews with R1 and R2 researchers, industrial employers, institutional leaders, and policy makers in the EUT+ countries to examine the experiences and perspectives of stakeholders regarding support for career development and capacity building for ECRs at ECROS partner institutions, in order to identify barriers, needs, and opportunities for improving researchers' career development.
- Early Career Researcher's conditions surveys: Quantitative surveys with R1 and R2 researchers, industrial employers, and institutional leaders in the EUT+ countries to understand the challenges faced by R1 and R2 researchers at the early stages of

their careers and how these challenges impact their integration into the broader research and industrial ecosystem, as well as to gather information into the requirement and expectations of supervisors and employers regarding Early Career Researchers.

Funded under Horizon Europe WIDERA, ECROS runs from October 2025 to September 2028 and is coordinated by the Technical University of Cluj-Napoca. At the time of writing, the first two studies had been completed, while the stakeholder interviews, focus groups and surveys were still under way. The completed and ongoing studies provide the evidence base for a cohesive talent ecosystem, tailored training, career-development services, and cross-sectoral mobility activities.

3.1.5 CROSS Project

The CROSS project (Career Management Services for European Talents) applies an implementation-driven methodological framework designed to support the practical uptake of the European Charter for Researchers and the ResearchComp framework across ERA. Its approach goes beyond analytical assessment by combining evidence generation, stakeholder co-creation, institutional needs assessment, and pilot-based validation. In doing so, CROSS contributes to ERA priorities on attractive careers and intersectoral mobility, while providing evidence to support the uptake of ResearchComp and the European Charter for Researchers. By combining co-creation, empirical evidence, institutional needs assessment, and real-life validation, the project provides a replicable model for bridging policy and practice within the ERA.

- **Methodology:** CROSS combines co-creation, labour-market evidence, institutional needs assessment, and pilot validation. It involves RPOs, employers, career professionals and policymakers in translating ResearchComp into practical career-support tools, including the ResearchComp Self-Assessment Tool and related services. Semi-structured interviews with non-academic employers examine awareness and usability of ResearchComp, transversal-skill needs and the alignment between researcher competences and workplace expectations. In parallel, an institutional needs assessment covers organisations at different stages of the HR Excellence in Research process, including both Award holders and organisations not yet awarded. It examines institutional challenges, support needs and preferred support mechanisms related to stakeholder engagement, resource capacity, internal communication, the operationalization of Charter principles and the preparation and implementation of strategies and action plans. Tools and services are then piloted in four intersectoral talent ecosystems.
- **Data & Geographical Scope:** Funded under the Horizon Europe WIDERA programme, the project runs from June 2025 to May 2028 and is coordinated by the university, VYSOKA SKOLA CHEMICKO-TECHNOLOGICKA V PRAZE. The

CROSS consortium represents 12 institutions across 7 European Member States: Czech Republic, Belgium, Finland, Estonia, Cyprus, Germany, and Spain. This geographical distribution covers a diverse set of European innovation environments, and establishes four distinct pilot ecosystems representing thematic, regional, and structural diversity. The empirical evidence base combines three complementary datasets: a dedicated stakeholder co-creation workshop in Brussels involving 78 participants from over 20 countries; 42 structured and semi-structured labour-market interviews with private-sector and non-academic employers across 10 European countries; and an institutional HR Excellence in Research needs assessment with 55 respondents from 16 countries, representing a diverse range of research and innovation organisations and different stages of the HR Excellence in Research process. Together, these datasets provide complementary perspectives on researcher employability and competence translation, the visibility and practical usability of ResearchComp and its SA tool, and the organisational challenges and support needs associated with implementing and sustaining the principles of the European Charter for Researchers.

3.1.6 AttractAdria Project

AttractAdria provides a regional, sector-specific implementation case focused on building an attractive research-career ecosystem in Bosnia and Herzegovina and Croatia, using personalised preventive healthcare as a pilot domain. The consortium connects universities, a university hospital, research-intensive SMEs, a pharmaceutical company, ministries, regional-development and funding bodies, and experienced partners from Norway. This quadruple-helix configuration enables the project to examine Charter implementation simultaneously at institutional, researcher, employer, clinical, and policy levels.

- Research design and intervention logic

The project follows an action-oriented methodology that combines baseline organizational assessment, policy and document review, capacity building, mentoring, intersectoral exposure, mobility pilots, and institutional reform. Work Package 1 evaluates research-career standards and supports alignment with the European Charter for Researchers and HRS4R. Work Packages 2 and 3 develop and deliver transversal and technical training, mentoring, job-shadowing, and academia-industry-clinical collaboration. Work Package 4 develops and tests funding and mobility mechanisms for early-career researchers, while the horizontal communication and management work packages support dissemination, uptake, monitoring, and sustainability. Feedback from training, mentoring, mobility, and institutional pilots is intended to inform subsequent organizational and policy adjustments.

- The AttractAdria evidence base is expected to include:
- institutional document evaluations and organizational - change proposals linked to HRS4R and Charter principles;
- participation, completion, feedback, and pre/post assessment data from transversal, intellectual - property, digital, and domain-specific training;
- monitoring data from mentoring, job-shadowing, clinical exposure, and academia-industry mobility activities;
- case evidence from two research support hubs and from institutional policy - framework development;
- policy-learning outputs from ministries, regional-development bodies, and research funders piloting new support and funding mechanisms.
- Geographic and sectoral scope

Funded under the Horizon Europe WIDERA programme, the project runs from September 2025 to August 2028 and is coordinated by the university, UNIVERZITET U SARAJEVU. The core implementation geography covers Bosnia and Herzegovina and Croatia, with transfer of practice and external benchmarking from Norway and Ireland. The design is particularly relevant to widening contexts affected by brain drain, fragmented research-career structures, limited institutional support, and weak academia-industry mobility. Its personalized preventive healthcare focus also makes it possible to test Charter principles in a research environment where academic, clinical, industrial, digital, regulatory, and data-governance requirements intersect.

- Planned outputs and indicators

Because the AttractAdria evidence presented here is partly drawn from its Description of Action, numerical values are identified as planned targets rather than completed findings. The targets include HRS4R-related institutional reforms, two research-support hubs, three institutional policy frameworks, 10 transversal training modules, a mentoring network involving at least 30 senior researchers, industrial and clinical courses, hands-on exposure for 100 young researchers, at least 20 beneficiaries of new mobility mechanisms, and policy briefs and a white paper. These indicators provide a basis for later cross-project comparison once implementation data are available.

3.1.7 NextTechTalents Project

The NextTechTalents project aims to create a robust and sustainable talent ecosystem, fostering talent circulation across sectors and enhancing employability and mobility. The project develops tailored career services, mentoring programs, and training modules based on the ResearchComp framework to equip researchers with the tools for both academic and non-academic pathways. As part of its core deliverables, NextTechTalents is developing a comprehensive Handbook for HR managers and training providers within

research and innovation organizations to guide the integration of the NextTechTalents Training System, promote interdisciplinary skills acquisition, and strengthen collaboration across academia, industry, and entrepreneurial ventures. By addressing mobility, cross-sector employability, and inclusive career support, the project helps ECRs thrive in evolving, competitive sectors. The consortium brings together 8 partners from 5 EU countries (Austria, Romania, Latvia, Slovenia, and Ireland) with interdisciplinary expertise spanning academia, industry, digital transformation, innovation ecosystems, and communication, dissemination, and exploitation.

- **Methodology:** NextTechTalents applies a structured, three-phased methodology explicitly aligned with the European Charter for Researchers and the European Competence Framework for Researchers (ResearchComp), enabling the identification of implementation barriers related to career development, intersectoral mobility, skills recognition, mentoring, and talent circulation. Phase 1 (Aggregate and Analyse) focuses on the systematic compilation and re-use of existing materials, tools, and platforms, alongside stakeholder identification, mapping (HR managers, training professionals, and employers), and requirements collection through structured interviews with key experts and early-stage researchers. Phase 2 (Create and Elaborate) delivers the institutional Service Framework to coordinate career development services across partner organizations and develops a tailored Training System containing modules for essential career skills, interdisciplinary collaboration, and academic-to-non-academic career transitions. Phase 3 (Implement, Rollout, and Validate) focuses on the structured execution of training systems, workshops, and webinars, followed by comprehensive validation and feedback processes.
- **Data & Geographical Scope:** Funded under the Horizon Europe WIDERA programme, the project runs from June 2025 to September 2027 and is coordinated by the research organization, MINDS & SPARKS GMBH. The geographic scope of the project spans Austria, Romania, Latvia, Slovenia, and Ireland, leveraging regional innovation ecosystems as real-world "living laboratories" to test and validate research career policies. A primary empirical and operational anchor is the Cluj Innovation Days 2026 (CID) event, which systematically brings together universities, research organisations, industry representatives, innovation intermediaries, and ECRs to facilitate dialogue on improving career pathways, strengthening academia-industry cooperation, and aligning talent development with ResearchComp. The empirical data and case evidence gathered through these ecosystem activities include qualitative insights from practical open-source software training, deep-dive discussions on DeepTech, Artificial Intelligence, and future workforce needs, and structured feedback from connecting researchers with industry experts and employers to bridge the gap between academic training and labour market demands.

3.1.8 SMART Researchers Project

The SMART Researchers project focuses on strengthening the career development, employability, and working conditions of early-stage researchers (ESRs) by developing sustainable research talent ecosystems across Widening countries. Aligned with the European Framework for Research Careers, the European Charter for Researchers, and ResearchComp – the European Competence Framework for Researchers, the project combines institutional HR transformation with evidence-based competence development, career support, recognition, and progression mechanisms. Through multi-sectoral collaboration, SMART Researchers seeks to create a more integrated and responsive research and innovation ecosystem capable of supporting researchers across career stages and facilitating mobility between academia and other sectors.

- **Methodology:** The project applies a systems-thinking and evidence-based intervention approach that integrates institutional HR diagnostics, individual-level competence assessment, and targeted capacity-building. The methodology begins with two complementary baseline assessments. First, an institutional HR audit is conducted across participating institutions to assess existing research career practices, working conditions, career development and support mechanisms, and their alignment with the European Framework for Research Careers and the European Charter for Researchers. The institutional audit identifies systemic strengths, gaps, and areas for improvement, which provide the evidence base for the development of Strategic Action Plans and targeted institutional interventions.
- Second, SMART Researchers conducts a large-scale survey of ESRs to identify competence-development needs. ResearchComp is decomposed into its 39 sub-competence units, and an Importance-Support gap analysis assesses the perceived importance of each competence and the support currently available. The results prioritise institutional and individual interventions: institutional gaps inform Strategic Action Plans and career-support mechanisms, while competence gaps guide modular Learning Units and development pathways. Building on this evidence, the project is developing a stackable micro-credential and certification architecture. The intervention cycle is therefore: institutional HR audit and ESR survey -> ResearchComp decomposition -> gap analysis -> prioritisation -> Strategic Action Plans and Learning Units -> competence development, recognition and certification.

Data & Geographical Scope: Funded under the Horizon Europe WIDERA programme, SMART Researchers runs from September 2025 to August 2028 and is coordinated by the University of Novi Sad, Faculty of Technical Sciences. The consortium comprises nine partners across four countries: Serbia, Greece, Croatia, and Latvia. The project generates

empirical evidence at both institutional and individual levels through institutional HR audits and a large-scale competence survey involving more than 300 ESRs, with the latter providing the basis for the ResearchComp-based Importance–Performance Analysis.

The resulting evidence is translated into interventions implemented through seven Career Support Centers (CSCs), designed as sustainable institutional hubs for researcher guidance, competence development, and career support. Project targets include training more than 300 ESRs, with at least 150 researchers achieving certification in one or more ResearchComp competence areas, engaging more than 180 participants through ESR Career Weeks, establishing a Competency Lab, and supporting more than 80 ESRs through structured peer-learning and mentoring activities. Through this integrated approach, SMART Researchers connects institutional HR transformation, granular competence diagnostics, evidence-based intervention design, capacity building, and formal competence recognition within a single research career development ecosystem.

3.1.9 BREATH Project

The BREATH project aims to establish a sustainable Talent Ecosystem for the Health Innovation (HI) sector, enabling academic and non-academic talent managers to jointly strengthen researcher careers, improve talent retention, and enhance mobility. In this context, BREATH builds and pilots this Talent Ecosystem across three European regions with different innovation profiles: Catalonia (Strong Innovator), Flanders (Leader Innovator), and Lithuania (Moderate Innovator), bringing together universities, clusters, businesses, non-profit organisations, and public administration.

Methodology:

- The project follows a co-creation model: academic and non-academic stakeholders jointly generate evidence rather than having it collected about them.

This unfolds across four phases:

1. Understanding and mapping. Exploring stakeholder motivations and barriers, assessing HI ecosystem needs against labour market demand, and mapping PhD holders' career paths through desk research, literature review, and benchmarking.
2. Co-creating. Validating and prioritising skills and training needs with stakeholders, developing the Career Path Guidance Platform (CPGP), and co-designing the Breadth Experience (career guidance and training) with non-academic actors.
3. Piloting and evaluation. Testing career guidance and capacity-building activities (including micro-credentials) with early-career researchers (ECR) in each region, monitored against pre-established KPIs.

4. Policy and impact. Consolidating cross-regional findings into guidelines and policy recommendations, drawing on mutual learning between the three ecosystems.

Data sources and collection methods

BREATH follows a mixed-methods approach, combining quantitative and qualitative data collection:

- Phase 1 – Talent Ecosystem creation: qualitative data is gathered through stakeholder interviews and dedicated workshops, complemented by a quantitative survey to capture motivations, barriers and needs at scale across the three regions.
- Phase 2 - Career paths, competence gaps and training design: an ECR survey maps career trajectories and competence gaps; a Delphi study builds expert consensus on competences required for different career paths; and data on training provision and uptake inform programme design.
- Phase 3 – Career guidance: findings are grounded in desk research on existing career guidance practices, complemented by the exchange of good practices and experiences within the project's mutual learning community.
- Phase 4 – Pilot implementation and monitoring: outcomes from career guidance and capacity-building activities piloted with 150 ECR will be monitored with quantitative and qualitative data, including CPGP platform usage data.
- Standards and data governance

Skills and training data are mapped against established EU competence frameworks (ResearchComp, Science4Policy, GreenComp, DigComp, EntreComp) and the Deep Tech Talent Initiative, allowing findings to be compared across projects using shared reference points. All data collection follows a Data Management Plan aligned with GDPR and FAIR principles, with informed consent obtained from all participants and pseudonymisation applied to non-professional contributors.

- Relevance to the cluster's evidence base

BREATH's data are regionally comparative by design. The same instruments - career-tracking surveys, workshops and KPI monitoring - are applied across Catalonia, Flanders and Lithuania, allowing the findings to be interpreted as regional case studies or as a cross-regional dataset, subject to the limits of each instrument.

- Data and geographical coverage

The BREATH consortium ensures balanced coverage of the Health Innovation (HI) sector through the participation of 11 organisations distributed across three European regions

with contrasting innovation profiles: Catalonia, Spain (Strong Innovator), Flanders, Belgium (Leader Innovator), and Lithuania (Moderate Innovator).

Empirical data collection focused on a detailed needs assessment within each of the three regional ecosystems, in order to identify structural challenges and skills gaps affecting Early-Career Researchers (ECRs) at both regional and national level. This assessment was carried out through two complementary research exercises, each combining qualitative and quantitative evidence streams.

Mapping Talent Ecosystem Requirements and Barriers

The first exercise focused on mapping and exploring talent ecosystem requirements and barriers. Its qualitative dataset was built around 30 semi-structured interviews conducted across the three regional ecosystems, engaging stakeholders from academia and research organisations, industry and private-sector actors, and public administration or funding bodies in a structured consultation process. Its quantitative dataset was gathered through an online survey, collecting 72 valid responses from organisations operating mainly within the three BREATH pilot ecosystems, with a smaller number of responses from additional countries. Together, these two evidence streams offer a comprehensive, cross-validated picture of the talent ecosystem's requirements and structural barriers.

Assessing Career Trajectories and Competency Gaps

The second exercise focused on assessing career trajectories and identifying competency gaps among PhD holders and ECRs. Its quantitative dataset was built around a career path survey, which collected data from 155 PhD holders and ECRs across the three regional ecosystems. The survey mapped career trajectories, evaluated the perceived importance and proficiency of 35 competencies derived from established European frameworks including ResearchComp, Science4Policy, GreenComp, and DigComp and explored respondents' perceptions of the value of doctoral training for careers both inside and outside academia. Its qualitative dataset was gathered through a modified Delphi study, engaging 47 senior experts from academia, industry, healthcare, and public administration in a structured consensus-building process. This process aimed to validate and prioritise the most critical skill gaps across five functional career profiles: Research Careers, Business Development and Innovation Careers, Education and Communication Careers, Regulatory and Policy-Making Careers, and Clinical and Medical Careers. Together, these two evidence streams offer a comprehensive, cross-validated picture of the competencies ECRs need to succeed across diverse HI career pathways.

Benchmarking the Landscape of Researcher Career Guidance

The third exercise focused on benchmarking the landscape of researcher career guidance services, extending the evidence base beyond the three BREATH regions to capture

international good practice. The resulting benchmark comprises 48 higher education institutions (HEIs) from 19 countries, including 29 European, 10 Asian, and 9 North American universities. Together, these institutions represent comprehensive universities, technical universities, medical universities, and specialised research institutions of varying organisational scale, with academic staff numbers ranging from approximately 380 full-time equivalent (FTE) to more than 16,500 academic staff. This was complemented by a mapping of 60 non-academic organisations, representing 88 individual career-development practices, drawn from industry, healthcare, innovation intermediaries, and fellowship programmes operating within research-intensive sectors. Together, these two datasets offer a comprehensive, internationally benchmarked picture of good practice in researcher career guidance to inform the design of the BREATH framework.

3.1.10 INSIGHT Project

The INSIGHT project approaches the implementation of the European Charter for Researchers through the perspective of interconnected talent ecosystems that link academia, research organizations, industry, public authorities, and intermediary actors. Recognizing that attractive and sustainable research careers cannot be strengthened through isolated institutional measures alone, the project addresses the wider ecosystem conditions shaping researcher careers, skills development, and cross-sectoral mobility alongside institutional-level dynamics. To achieve this, INSIGHT examines Charter implementation at the organizational level while identifying the systemic drivers and barriers that influence career sustainability across sectors. Through its multi-level analytical architecture, the project provides actionable insights to align internal governance, HR practices, and stakeholder collaboration with the strategic goals of the European Research Area (ERA).

- **Methodology:** INSIGHT applies a structured, multi-level methodology combining two complementary analytical approaches specifically developed to assess Charter operationalization at both ecosystem and organizational levels. Phase 1 (Stakeholder Mapping and Ecosystem Profiling) focuses on identifying and characterizing key actors across higher education, research performing organizations, private industry, public bodies, and innovation intermediaries. Through structured survey-based profiling, this phase evaluates thematic expertise, organizational roles, perceived ecosystem influence, and potential contributions to sustainable talent ecosystems. Phase 2 (Organizational Gap Analysis) dedicated specifically to the European Charter for Researchers utilizes a tailored questionnaire to analyze institutional awareness, formal commitment, operational drivers, and perceived barriers across the 20 Charter principles. Rather than treating implementation as a binary compliance exercise, this dual

methodology evaluates implementation as a layered organizational process—combining descriptive metrics on formal endorsement with perception-based assessments of actual embedding in everyday HR structures and skills formation.

Data & Geographical Scope: Funded under the Horizon Europe WIDERA programme, INSIGHT leverages a broad empirical architecture to deliver a robust comparative perspective across distinct European institutional and national settings. The geographic scope for the ecosystem stakeholder mapping spans 9 European countries, providing an empirical baseline of local conditions in which career support reforms unfold. The organizational gap analysis expands this empirical foundation to an analytical sample of 173 validated institutional responses across 17 European countries. The empirical data collected encompasses quantitative and qualitative metrics on institutional readiness, perceived advantages and bottlenecks of Charter adoption, evaluation of key researcher skills for academic and non-academic career paths, and cross-sectoral interface capabilities across the European Research Area.

3.2 Methodological Synthesis and Overview

Although each participating project has a distinct thematic and operational scope, their methodologies collectively provide a multi-dimensional evidence base on research careers in the ERA. The synthesis rests on three integration pillars:

- **Quadruple-Helix Triangulation:** The portfolio gathers evidence from researchers at different career stages, RPOs and RFOs, employers, HR and career-support professionals, public authorities and innovation intermediaries. This reduces reliance on any single stakeholder perspective.
- **Alignment with European Policy and Competence Frameworks:** The projects use the European Charter for Researchers as a shared policy reference. Many also use ResearchComp and ESCO as common frameworks for describing, assessing or translating researcher competences, while adapting the instruments to their specific contexts.
- **Macro-Regional and Disciplinary Diversity:** The combined portfolio covers more than 26 European countries and a wide range of sectors. This diversity supports comparative analysis of recurring patterns, but does not by itself establish statistical representativeness across the ERA.

Table 1: Geographical, Disciplinary, and Validation Coverage

Aspect	Joint Coverage & Integration	Core Policy Value
Geographical Scope	Over 26 European countries represented, combining mature R&I systems (Western/Northern Europe) with a strong, dedicated focus on Widening nations (Southern and Eastern Europe, Baltic regions, and Balkan states).	Enables a realistic, comparative analysis of regional disparities, helping to design policies that address brain drain and promote balanced talent circulation.
Disciplinary Scope	Spans across fast-paced deep tech sectors (AI, 6G, Robotics in DTS), personalized preventive healthcare (AttractAdria), general STEM, automotive industry and manufacturing (INSIGHT) and the Social Sciences and Humanities (SSH in ECROS and CROSS).	Validates that the career frameworks developed are versatile and applicable to both traditional academic tracks and highly agile, market-driven sectors.
Validation Settings	Combines physical and digital structures, including 7 physical Career Support Centers (SMART Researchers), virtual hub (ARCOE), regional "living labs" (NextTechTalents at Cluj Innovation Days 2026), and two in-person pilot events (INSIGHT).	Demonstrates how theoretical career models can be successfully operationalized, scaled, and sustained at a local and regional level.

Taken together, the portfolio provides a triangulated basis for the structural gaps identified in Section 4 and the comparative findings in Section 5. Evidence maturity nevertheless varies: some projects report completed survey and interview results; others report baseline diagnostics, ongoing pilots or planned targets. Sections 4-6 therefore distinguish observed findings from planned outputs and policy hypotheses. This distinction is essential at the portfolio's one-year stage and prevents targets from being presented as achieved impact.

4. Results: Current European Charter for Researchers Implementation

4.1 Integrated Project-Specific Findings

4.1.1 DeepTechSeeds Project

The professional landscape for ECRs in deep-tech ecosystems is characterised by persistent tension between the principles of the European Charter for Researchers and the structures governing career development. The quantitative and qualitative findings converge across four areas:

- **Contractual Precarity and Career Progression:** Researchers rated recruitment processes as transparent and merit-based (4.21/5), yet 48.6% identified the absence of clear progression pathways as a major barrier to attractive research careers. Qualitative evidence links project-based funding to uncertainty beyond individual grants. Transparent recruitment is therefore not sufficient to ensure career continuity.
- **Recognition of Applied Innovation:** Institutional appraisal continues to emphasise traditional research-performance indicators, while prototypes, patents, spin-offs and other innovation-oriented outputs receive less consistent recognition. Qualitative evidence also indicates that existing assessment frameworks do not fully reflect the long development and technology-transfer cycles typical of deep tech.
- **Intellectual-Property and Market Literacy:** ECRs reported low confidence in patent regulation (2.51/5), and only 22.9% had received formal training in intellectual-property management. Industry respondents also identified differences between academic and commercial practice concerning IP protection, publication, and technology transfer.
- **Administrative Barriers to Mobility:** RPO interviews identify administrative complexity, limited organisational capacity and the management burden of intersectoral collaboration as barriers to sustained mobility, even where strategic commitment is strong.

Taken together, these findings demonstrate that successful implementation of the European Charter for Researchers within Deep Tech ecosystems requires more than formal alignment with its principles. Effective implementation depends on organisational practices, appropriate evaluation systems, targeted skills development, and institutional support mechanisms capable of translating the Charter into everyday research practice across academia and industry.

4.1.2 ARCOE Project

ARCOE's findings reveal a gap between formal policy adoption and everyday institutional practice. Across the participating countries, qualitative and quantitative evidence indicates that implementation is often procedural rather than embedded in organisational culture. Four areas of friction are particularly visible:

- **Formal Compliance and Operational Embedding:** Institutional scores were relatively strong for Research Freedom and Open Science ($M = 3.84$), Ethics and Research Integrity ($M = 3.79$), and Diversity, Equity and Inclusion ($M = 3.73$). Public advertisement of vacancies scored $M = 4.44$, and procedures for discrimination complaints scored $M = 4.30$. Interviews suggest that legislation and Horizon Europe requirements support these practices, while weak monitoring and limited internal visibility reduce their day-to-day effect.
- **Career Support and Supervision:** The lowest-performing clusters were Career Development and Mobility ($M = 3.33$) and Training, Supervision and Mentorship ($M = 3.28$). Particularly weak indicators were the absence of career-guidance services ($M = 2.78$), limited institutional career strategies ($M = 2.85$), and lack of mandatory supervisor training ($M = 2.89$). Qualitative evidence describes support as fragmented and often dependent on individual supervisors or short-term projects.
- **The Intersectoral Mobility and Collaboration Bottleneck:** While the valuation of industry collaboration and societal impact scored moderately high ($\$M = 4.07\$$) in evaluations, practical collaboration and intersectoral mobility remain severely limited. In Cyprus, fewer than 5% of innovative firms collaborate with higher education institutions, while in Malta mobility is far more common in the business sector (48%) than in higher education (13%). Bulgaria and Greece similarly report low mobility levels. Qualitative data links these patterns to traditional academic cultures where career progression continues to depend almost exclusively on linear, bibliometric publication paths. Mentoring, open science, and industry collaboration remain insufficiently rewarded, resulting in weak institutional incentives and a lack of joint career pathways.
- **Gender Disparities in Senior Leadership:** Persistent gender inequalities remain evident despite the growing adoption of Gender Equality Plans (which have reached 63% of organizations). In Cyprus, women hold fewer than 20% of senior "Grade A" academic positions, while gender-balanced selection committees received only a moderate alignment score ($\$M = 3.00\$$). The qualitative review highlights that while policy frameworks are on the rise, actual implementation of equality metrics remains constrained by institutional resistance and slow cultural change. Finally, the practical application of the HR Excellence in Research

(HRS4R) award varies considerably across macro-regions, with Romania leading adoption through 27 accredited institutions.

4.1.3 CROSS Project

CROSS combines 42 structured interviews with labour-market actors across 10 European countries with evidence from a multi-stakeholder co-creation workshop involving 78 participants from more than 20 countries and an institutional needs assessment covering organisations at different stages of the HR Excellence in Research process. The findings identify recurring gaps in the alignment of researcher competences, institutional career-support mechanisms - including guidance, mentoring, assessment and employer-facing services - and labour-market expectations, as well as challenges in translating Charter principles into institutional practice:

- **Contextual Employability:** Employers value ECRs' analytical thinking, problem-solving and technical expertise. The evidence does not point to a general deficit in core competences; rather, it identifies experience-based gaps in communication, leadership, business awareness, and the translation of research competences into organisational and commercial contexts.
- **Experiential Academia-Industry Integration:** Stakeholders consistently reported that practical exposure complements doctoral training and supports career transitions. Mentoring, short internships, co-supervised applied projects, and joint cross-sector initiatives were identified as relevant mechanisms, although their comparative effectiveness still requires evaluation.
- **Translating ResearchComp into Practical Tools:** Prior employer awareness of ResearchComp was limited, but participants recognised its value as a common reference once it was introduced. Feedback on the ResearchComp Self-Assessment Tool called for clearer language, more tailored and actionable feedback, and flexibility across organisational and sectoral contexts.
- **Employability as a Co-constructed Outcome:** Interview evidence suggests that organisational capacity for onboarding and integration shapes how employers perceive transition risks, with respondents from organisations offering more structured support describing greater confidence in recruiting ECRs.
- **From Charter Principles to Institutional Practice:** The institutional needs assessment shows that implementation challenges persist across different stages of the HR Excellence in Research process, particularly in staff engagement, internal communication, resource capacity, and translating Charter principles into practice. While support needs vary by institutional maturity, respondents consistently favour practical and collaborative support, including best-practice exchange, templates, peer learning, site visits, and communities of practice.

4.1.4 NextTechTalents Project

The NextTechTalents project establishes an implementation-driven baseline, tracking a robust set of Key Performance Indicators (KPIs) to measure systemic impact across Austria, Romania, Latvia, Slovenia, and Ireland. The project's empirical foundation is anchored quantitatively by a systematic mapping of over 300 regional innovation stakeholders, a desk audit of more than 300 policy-relevant documents, and structured validation interviews with over 30 key experts and early-career researchers (ECRs). Triangulated with extensive qualitative data from deep-tech ecosystems, these findings reveal four critical structural friction points:

- The "Metabolic Rate" Mismatch: Qualitative data highlights a fundamental operational friction between the temporal structures of academia and the fast-paced Deep Tech industry. While doctoral and postdoctoral cycles typically operate on long-term 3–4 year timelines, Deep Tech market cycles pivot rapidly every 6–12 months. This "two-speed" reality creates an immediate skills lag; researchers trained in linear academic environments often struggle to adapt to the agile, iterative methodologies required by the private sector, despite possessing exceptionally high technical competence.
- The "Fiscal Cliff" in Widening Contexts: In consortium countries such as Romania, Latvia, and Slovenia, quantitative and qualitative data confirms that research career stability remains dangerously dependent on time-bound structural instruments, such as the European Regional Development Fund (ERDF). When these programming periods close, institutions hit a sudden "fiscal cliff," forcing them to shed highly skilled talent. This structural volatility serves as the primary driver of regional precarity and brain drain, directly undermining the ERA's goal of sustainable career pathways.
- The Invisible "Third Space" Professionals: Successful technology transfer and ecosystem performance rely heavily on hybrid professionals—such as innovation brokers, data stewards, and living lab managers—who operate in the "Third Space" between academia and industry. However, qualitative analysis reveals that these roles lack a defined European career path or clear R1–R4 equivalence. Frequently misclassified as mere administrative support, this critical "connective tissue" remains undervalued and structurally unsupported.
- Persistence of Bibliometric Lock-in: Despite institutional endorsement of CoARA, local recruitment and promotion processes remain strongly influenced by publication counts and journal-based indicators [18, 19]. In deep-tech fields, this can reduce the visibility of algorithms, datasets, prototypes, and patents within career progression.

To counteract these structural deficiencies, NextTechTalents is currently driving an implementation phase targeting at least 8 major training events and 20 mentoring sessions. This operational rollout aims to integrate at least 150 researchers or research-performing organizations into a collaborative support platform, actively utilizing the European Competence Framework for Researchers (ResearchComp) to build organic, obstacle-free pathways between academic research and industry execution.

4.1.5 ECROS Project

By summer 2026, the ECROS project has concluded two foundational studies across the nine member universities of the European University of Technology (EUT+) alliance. These comprise a systematic meta-analysis of early-career researcher (ECR) working conditions across all STEM and non-STEM disciplines in the European Research Area (ERA), alongside a critical capacity-building audit benchmarking institutional career development against ERA priorities. The combined qualitative mapping and literature triangulation pinpoint a clear friction between strategic governance and the daily lived experiences of researchers, structured around three major areas of concern:

- **The Systemic Determinants of ECR Wellbeing:** The systematic review of peer-reviewed and system-facing grey literature demonstrates that ECR success and mental health are dictated by a complex web of structural stressors. These include acute funding uncertainty, systemic effort-reward imbalances, work-life conflict, and heavy administrative, regulatory, and teaching burdens. Lived-experience signals in grey literature highlight severe occupational health risks, a persistent reliance on private family support due to inadequate salaries, low union membership, and deep-seated gender inequalities in career progression.
- **Operational Gaps in Supervision and Postdoctoral Tracking:** The institutional audit revealed critical structural gaps in training and monitoring infrastructures across the university alliance. Supervisor training is mandatory in only a few select institutions, postdoctoral mentoring is rarely formalized, and systematic monitoring of supervisor quality is largely non-existent. Furthermore, supervisor training on diversity, inclusion, and cultural differences is extremely limited. This lack of oversight is compounded by a severe tracking deficit: while institutions collect baseline administrative data on doctoral students, only one university out of the nine systematically collects tracking data on postdoctoral researchers.
- **Curricular Fragmentation and Policy Familiarity:** While the audit revealed strong formal institutional alignment with the European Charter for Researchers, a stark gap remains regarding the practical application of European tools, with very low familiarity reported for the ResearchComp framework. This policy-to-practice gap translates into severe curricular inconsistencies across key ERA priorities:

- *Contractual Fragmentation*: Doctoral candidates face wildly differing employment statuses; in several countries, they hold a non-employee status, leaving them entirely without social security, parental benefits, or pension contributions.
- *Bibliometric Mandates*: Most institutions still maintain mandatory publication requirements for doctoral completion, creating acute research integrity and data-manipulation risks.
- *Skill-Specific Immaturities*: While Open Science training is relatively well-institutionalized, it remains largely optional. Conversely, sustainability training demonstrates the lowest operational maturity, rarely treated as a general transversal competence. Similarly, advanced digital skills (such as AI application, open digital collaboration, and data literacy) are incorrectly assumed to be covered by basic disciplinary training, leaving major training gaps.

To address these eleven identified gaps, ECROS is leveraging its strong institutional readiness to transition into its next implementation phase. This next step will deploy focused mixed-method interviews with ECRs, Principal Investigators (PIs), and industry employers to evaluate national policy barriers and design joint mobility frameworks that tightly connect high-level strategy to the everyday reality of the research workforce.

4.1.6 BREATH Project

The qualitative results obtained from the interviews and workshops carried out in the BREATH project capture the main good practices currently applied across the participating ecosystems, as well as the key gaps and future actions related to the three sections of Pillar 4 of the European Charter for Researchers.

1. Continuous Professional Development (CPD)

Implementation of the European Charter for Researchers requires institutions to evolve from fragmented training offers toward a more coherent, competence-driven CPD ecosystems. Current gaps include misaligned training, limited supervisor support, and persistent misconceptions about transversal skills. However, existing good practices provide a strong foundation for reform. Structured transversal training programmes already demonstrate that competence development can be embedded across disciplines, while lifelong learning offers show the value of flexible, modular pathways. The emerging use of micro-credentials offers a scalable mechanism for recognising skills acquisition across sectors. The European doctoral framework, feedback-based development programmes, and mentoring approaches illustrate how personalised support can strengthen engagement and accountability. To advance CPD implementation, institutions should expand transversal training into institution-wide frameworks, integrate

micro-credentials into HR and promotion systems, establish mentoring and feedback as standard CPD components, and develop joint training programmes across academia, industry, and the public sector. These actions reinforce the Charter's principles of professional development, transparency, and researcher autonomy.

2. Career Development and Advice

The Charter emphasises the need for structured and accessible career guidance, yet many institutions still lack dedicated coordinators, rely on academic-centric support, and offer limited exposure to external sectors. Good practices already present such as career guidance programmes, researcher tutor systems, career weeks, internal mentoring, alumni engagement, and industry onboarding demonstrate that scalable models exist. To strengthen implementation, institutions should establish career development offices, reinforce alumni networks to provide cross-sector role models, develop career resources tailored to multiple pathways, introduce external mentors and intersectoral mentoring schemes, and create joint academia–industry career training programmes. These actions support the Charter's commitment to transparent career development, mobility, and equal access to opportunities.

3. Valuing Diverse Research Careers

The Charter calls for recognition of diverse career trajectories, yet visibility of non-academic paths remains low, mobility is weak, and assessment systems continue to rely heavily on publication-centric metrics. Constructive practices already exist like multisector career events, industrial PhDs, internships, job shadowing, narrative CVs, and competence-based evaluation, showing that cultural change is possible when institutions actively promote diverse pathways. To accelerate implementation, institutions should institutionalise multisector career events, ensure transparent access to internships and job shadowing, expand funded mobility opportunities, develop structured academia–industry exchanges, align assessment systems with competence-based frameworks, and promote cross-sector career pathway resources. These actions directly support the Charter's principles.

4.1.7 SECURE II Project

SECURE II assessed all 80 actions of the Research Career Framework across eight pilot institutions using a five-level maturity scale. The baseline distinguishes advanced, mid-range and early-stage pilots, demonstrating that organisations begin implementation from substantially different levels of capacity.

Across the cohort, Stability was the weakest action area, while Mobility and Interoperability were also underdeveloped. These results complement INSIGHT's respondent-reported implementation data but should not be compared as equivalent scores because the two projects use different instruments and units of analysis. SECURE

II provides an institutional maturity baseline against which change can be monitored during the pilots.

4.1.8 SMART Researchers Project

ESRs in Widening countries face persistent precarity, limited mobility and insufficient recognition of their competences. SMART Researchers addresses these barriers by building institutionalised talent-development ecosystems across seven organisations in Serbia, Croatia and Greece.

The project completed a Comprehensive Baseline Assessment to establish the starting point for institutional transformation, with the following project specific findings:

- **HR Audit and Capacity Assessment:** Seven academic and non-academic R&I-performing organisations in Serbia, Croatia and Greece were assessed against the European Charter for Researchers and ERA priorities. Pillar 4 - Research Careers and Talent Development - was the weakest area in six of seven organisations (0.17-1.58/5), while Pillar 3 - Working Conditions - was comparatively stronger. The recurring pattern was a gap between formal policy and documented, monitored practice. Organisations clustered into benchmark, basic and early-stage groups, reflecting different levels of HR structure, career support and monitoring capacity.
- **Early-Stage Researchers (ESRs) Survey** - *Comprehensive assessment of researchers' experiences, career development needs, institutional support and perceived barriers in line with the European Charter for Researchers.* Respondents completed the quantitative section of the questionnaires individually, while qualitative reflections were collected through facilitated group discussions and open-ended questions. The consolidated institutional survey report aggregates the results across all seven institutions and reports consortium-level mean scores of 3.78/5 for Pillar 1 (Ethics, Integrity, Gender and Open Science), 3.54/5 for Pillar 2 (Researchers' Assessment, Recruitment and Progression), 3.32/5 for Pillar 3 (Working Conditions and Practices) and 3.58/5 for Pillar 4 (Research Careers and Talent Development). All four pillars therefore fall in the 'partial implementation / area for improvement' band (3.0–3.9): no pillar reaches consortium-level good practice (≥ 4.0) and none falls into the weak range (< 3.0).

Strategic response: Based on these findings and comparison between HR Audit and Capacity Assessment and ESRs Survey, tailored Strategic Action Plans (SAPs) for ESRs career development were developed at seven institutions and validated through participatory process with ESRs and institutional management.

- **Baseline assessment and competency mapping** - A multi-country analysis compared competency importance and institutional support among 247 ESRs and 183 mentors/supervisors, consolidated in the Multi-Country ResearchComp

Report. It integrates the full ResearchComp framework, quantitative Importance–Support gap analysis, cross-country comparisons, extended competence interpretations, and qualitative reflections. All three countries show a systematic pattern of high importance but insufficient support across all seven domains. Serbia and Croatia record higher gap levels (ESR averages 0.81 and 0.79) than Greece (0.59). Mentor perspectives broadly confirm ESR findings, except in Croatia where mentor gaps (0.84) exceed ESR gaps (0.79), driven by Self-Management and Working with Others. Universal high-priority competences (gaps ≥ 0.70): SM4 – Cope with pressure (1.23); SM3 – Plan self-organisation (1.13); WO4 – Ensure wellbeing at work (0.88); SM1 – Manage personal professional development (0.95); MR1 – Mobilise resources (0.89); MI6 – Promote open innovation (0.81); CA6 – Problem solving (0.81). MR1 is the only competence confirmed as a top priority across ESR and mentor perspectives in all three countries. Most ESRs operate at or near Foundational proficiency for these competences, while European expectations require Intermediate or Advanced levels. SMART Researchers aims to support ESRs’ progression from Foundational to Intermediate in the short term, with pathways toward Advanced proficiency in the medium term.

In ResearchComp proficiency terms, the gap analysis reveals that most ESRs across the three countries are operating at or near the Foundational level for the highest-priority competences, while both perceived importance and European research career expectations require Intermediate or Advanced level development. The SMART Researchers project aims to enable the transition from Foundational to Intermediate level as the primary short-term target, with pathways toward Advanced level as a medium-term goal.

4.1.9 INSIGHT Project

INSIGHT finds that the European Charter for Researchers is generally perceived as relevant and potentially useful, while its practical uptake remains uneven. Its organisational gap analysis draws on 173 validated responses from 17 European countries and points to limited internal visibility, uneven embedding and differences in organisational capacity rather than rejection of the Charter itself.

Awareness of the Charter. Across the survey sample, awareness of the Charter proved to be relatively low. 40.3% of respondents reported no knowledge of the Charter at all, and a further 11.0% stated that they knew it only to a small extent. In addition, 44.5% indicated that they did not know whether their own institution had formally joined or committed to the Charter. Awareness was not evenly distributed within organizations. It tended to be concentrated in HR, leadership, and research support functions, whereas doctoral researchers and research staff reported considerably lower levels of familiarity. This

suggests that in many institutions the Charter still functions more as an administrative or strategic reference point than as a broadly recognized framework for researchers.

Strategic relevance of the Charter. Among respondents who were sufficiently familiar with the Charter to assess its institutional relevance, the overall picture was clearly positive. The Charter was associated with stronger institutional attractiveness, improved European and international visibility, and support for good governance and transparency. In the overall dataset, 82% of this subgroup agreed that the Charter strengthens the institutional profile as an attractive employer, while 86% saw it as contributing to increased European or international visibility. This indicates that the Charter is not perceived merely as a compliance requirement, but also as a strategic instrument that can reinforce institutional positioning. At the same time, respondents pointed to the resources needed for implementation, especially in terms of time, staffing, and funding. The main challenge appears not to be a lack of strategic interest, but limited implementation capacity.

Uneven Implementation across Principles: Respondents reported higher implementation for Ethics and Research Integrity (97.8%), Dissemination and Exploitation of Results (93.5%), Contractual and Legal Obligations (89.1%), and Supervision and Mentoring (87.0%). Lower levels were reported for Career Development and Advice (69.6%), Free Circulation of Researchers (71.7%), Sustainability of Research Careers (73.9%), and Working Conditions, Funding and Salaries (73.9%). These respondent-reported percentages are not directly comparable with SECURE II's institutional maturity scores because the projects use different instruments, samples and units of analysis.

Conditions shaping implementation. INSIGHT also highlights the organisational conditions that facilitate or hinder implementation. Respondents identified leadership commitment, clear responsibilities, and cooperation between research, HR, and administration as important enabling factors for implementing the Charter. At the same time, limited financial and personnel resources emerged as a central barrier for implementing the Charter. In the survey, 64.3% agreed that insufficient financial or personnel resources hinder implementation, 56.5% pointed to a lack of integration into core institutional processes, and 55.7% referred to insufficient communication and awareness-raising within their organizations. These findings indicate that implementation depends not only on institutional commitment in principle, but on whether the Charter is embedded in operational routines, support structures, and internal governance.

Skills needs and career support. The results of the organisational gap analysis show broad agreement that successful research careers require a competence profile extending beyond disciplinary expertise alone. Respondents assigned high importance to skills related to high-quality and ethical research, critical and creative thinking, collaboration,

project management, and communication, as well as to the ability to translate research into societal or economic impact. Between 83.2% and 91.9% rated the listed skill areas as highly important. This underlines that, from the perspective of the Charter, institutional HR reform needs to be connected to practical support for researcher development, including training, mentoring, and career guidance for pathways both within and beyond academia.

Taken together, the results of INSIGHT's organisational gap analysis suggest that implementation of the European Charter for Researchers is currently marked by a persistent gap between formal commitment and operational embeddedness. The Charter is widely regarded as meaningful and legitimate, but often remains insufficiently visible within institutions and only partially integrated into the structures that shape research careers in practice. Strengthening implementation will therefore require not only continued policy support, but also better internal communication, stronger career development structures, targeted support for mobility, and sustained investment in the organisational conditions that make Charter principles actionable.

4.1.10 AttractAdria Project

AttractAdria has translated the principles of the European Charter for Researchers into practical institutional and career-support mechanisms across academic, healthcare and industrial environments in Bosnia and Herzegovina and Croatia. Two Research Support Hubs have been established at the University of Sarajevo and Genos, providing researchers with structured support in research proposal development, project administration, financial monitoring and reporting. These hubs directly address the excessive administrative burden placed on researchers, particularly Early Career Researchers, and provide an operational model that can be replicated by other research-performing organisations in the region.

A structured catalogue of job-shadowing opportunities has also been developed, connecting Early Career Researchers with positions and professional environments in research-intensive companies and healthcare institutions. This creates a practical framework for researchers to gain exposure to industrial and clinical careers and supports the Charter principles related to continuous professional development, recognition of diverse career paths and intersectoral mobility.

In parallel, AttractAdria completed institutional mapping for all participating institutions and conducted corresponding gap analyses against the principles of the European Charter for Researchers and HRS4R requirements. The results provide an institution-specific evidence base for identifying strengths, implementation gaps and priority areas for policy and organisational improvement. The assessment covers universities, research-intensive companies, healthcare organisations and public bodies, enabling the project to examine

implementation across different organisational and regulatory contexts. The resulting evidence provides the basis for institutional policy improvements and for the development of broader support mechanisms for attractive and sustainable research careers.

The AttractAdria findings indicate that the main challenge is not the formal acceptance of the European Charter for Researchers, but the limited availability of operational structures through which its principles can be implemented in researchers' everyday working environments. Career development, project-management assistance, mentoring, and mobility support are frequently fragmented across departments or depend on individual supervisors and temporary project resources. As a result, access to career support may vary considerably between institutions and sectors.

The establishment of the Research Support Hubs demonstrates that Charter implementation becomes more effective when institutional commitments are connected to permanent and clearly identifiable services. By providing direct assistance with proposal preparation, project management and administrative procedures, the hubs allow researchers to dedicate more time to scientific work, competence development and career progression. They also strengthen the professional role of research managers and administrators as essential components of a sustainable research ecosystem.

The development of job-shadowing opportunities further shows that intersectoral mobility requires more than general encouragement. Researchers need structured access to industrial and clinical workplaces, clearly described positions, defined learning objectives, and institutional recognition of the competences acquired outside academia. The involvement of universities, a university hospital, research-intensive SMEs and a pharmaceutical company enables AttractAdria to test such pathways in real professional environments within personalised preventive healthcare.

Another important feature is the direct participation of ministries, research-funding organisations and regional-development bodies. Their involvement links institutional Charter implementation with the wider policy and funding environment and creates a pathway for successful practices to be transferred beyond individual project partners. Overall, AttractAdria demonstrates that meaningful implementation of the Charter requires an integrated combination of institutional policy reform, professional research-support services, intersectoral career opportunities and engagement of public authorities.

4.2 Cross-Project Synthesis of Systemic Structural Gaps

The cross-project synthesis identifies recurring structural gaps that hinder sustainable research careers across the ERA. These patterns appear across multiple methods and settings, although their prevalence and intensity vary by region, sector, and institution.

Five interlocking macro-gaps emerge from the evidence:

- **Policy-Practice Decoupling:** Formal endorsement is generally stronger than operational embedding. Recruitment procedures, equality plans and research-integrity rules are often in place, while internal monitoring, career services, communication and implementation capacity remain uneven. The result is a persistent gap between institutional policy and researchers' day-to-day experience.
- **Systemic Precarity and Funding Discontinuity:** Short-term project contracts and limited continuity mechanisms weaken career predictability. In several Widening settings, dependence on time-bound funding programmes intensifies the risk of abrupt staff losses at the end of funding cycles and can contribute to outward mobility and regional capacity loss.
- **Intersectoral Translation and Competence-Support Gap:** ECRs possess strong technical and analytical capabilities, but often lack structured opportunities to apply and communicate those competences in non-academic settings. Evidence highlights gaps in practical exposure, business awareness, leadership, IP literacy and organisational onboarding. ResearchComp provides a useful common framework, but its practical tools require clearer language and context-sensitive adaptation for employers.
- **Recognition and Reward Misalignment:** Publication-based indicators remain influential in recruitment and promotion, while applied research, technology transfer, patents, Open Science, mentoring, and industry collaboration receive uneven recognition. This weakens incentives for activities that contribute to societal and economic impact.
- **Uneven Regional Capacity and Inclusion:** Implementation conditions differ substantially across institutions and regions. Widening settings report lower support capacity and greater dependence on project funding, while ARCOE and ECROS identify gender, employment-status and career-stage disparities. These factors cut across the other four gaps and shape who can access mobility, training, security and progression.

As illustrated in Figure 1: Empirical Discrepancy Between Perceived Competence Importance and Institutional Support Across ResearchComp Domains, quantitative survey findings from *SMART Researchers* and *DeepTechSeeds* reveal a pronounced "Competence-Support Gap" across key European Research Framework (ResearchComp) domains. While ECRs consistently rate horizontal skills such as intellectual property management, stress regulation, and intersectoral navigation as highly essential for career progression, institutional support structures lag significantly. The most acute institutional deficits are observed in *Coping with Pressure* (mean gap of 1.23) and *IP/Patent Regulation* (scoring 2.51 out of 5 in support). This empirical mismatch underscores that ECR precarity is not merely a

funding issue, but a structural lack of dedicated capacity building within research performing organizations.

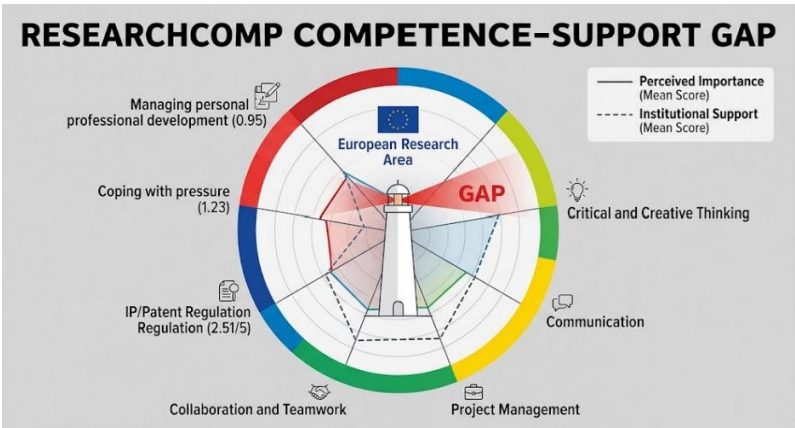


Figure 1: Empirical Discrepancy Between Perceived Competence Importance and Institutional Support Across ResearchComp Domains

Figure 2: Interlocking Structural Gaps and Systemic Bottlenecks Constraining Career Pathways in the European Research Area maps the five core structural bottlenecks identified through the cross-analytical synthesis of the 10 Horizon Europe WIDERA projects. The ecosystem operates under an "interlocking gap" dynamic: policy-practice decoupling (Gap 1) fuels reliance on short-term project-based funding, leading to widespread systemic precarity (Gap 2). This precarity directly hampers intersectoral mobility and IP translation (Gap 3), as researchers are incentivized to prioritize traditional bibliometric outputs over applied innovation due to misaligned reward systems (Gap 4). Consequently, these dynamics exacerbate regional capacity disparities (Gap 5), widening the performance divide between Leader Innovators and Widening countries.

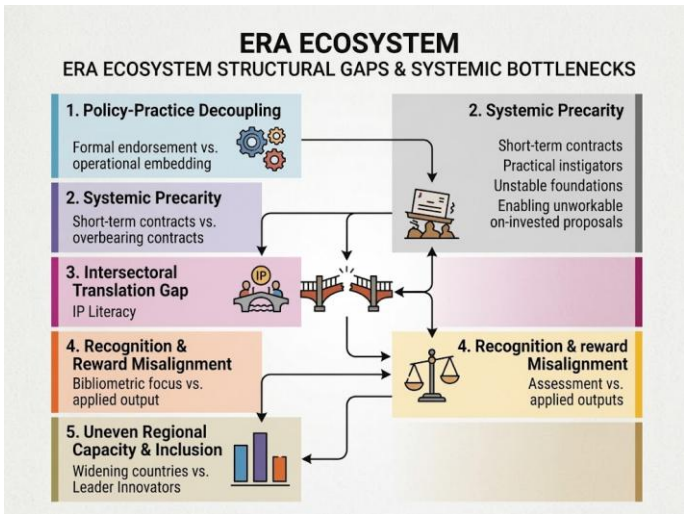


Figure 2: Interlocking Structural Gaps and Systemic Bottlenecks Constraining Career Pathways in the European Research Area

5. Comparative Analysis and Evidence for Policy Briefs across ERA Projects

5.1 Comparative Analysis across ERA projects

Across the Horizon WIDERA portfolio, the recurring bottleneck is not formal policy adoption alone but operational execution. ARCOE, INSIGHT, SMART Researchers and SECURE II show that implementation varies with institutional awareness, resources, governance and service capacity. CROSS, DeepTechSeeds, AttractAdria, NextTechTalents and BREATH further show that employer engagement and practical exposure are central to intersectoral career development. The comparative analysis is organised around four evidence themes.

5.1.1 Shift from Formal Compliance to Institutional Capacity and Culture

Formal endorsement of Charter principles is generally stronger than their operational embedding. ARCOE reports weak scores for career guidance, institutional career strategies and supervisor training; INSIGHT identifies low awareness and resource constraints; SMART Researchers finds Pillar 4 weakest in six of seven audited organisations; SECURE II identifies Stability, Mobility and Interoperability as underdeveloped areas across its pilot cohort, and CROSS shows that institutional support needs persist across different stages of the HR Excellence in Research process. Together, the findings indicate that implementation depends on dedicated responsibilities, service structures, monitoring, and sustained institutional capacity.

5.1.2 Contextual Employability and the Primacy of Practice Over Competence Alone

The joint evidence challenges a deficit-only view of researcher employability. CROSS labour-market interviews showed that researchers' technical and analytical capabilities are highly valued, while challenges remain in translating these competencies into organisational contexts. SMART Researchers and BREATH show the value of granular competence diagnostics, while CROSS demonstrates the importance of language and usability when ResearchComp is presented to employers. The evidence therefore supports combining competence development with mentoring, workplace exposure and organisational onboarding; it does not yet establish that any single training format is sufficient.

5.1.3 Ecosystem-Based Implementation and Deep Tech Talent Retention

DeepTechSeeds, AttractAdria and NextTechTalents show that sustainable deep-tech careers depend on relationships among universities, RPOs, employers, hospitals, incubators, public authorities and intermediaries. Evidence on IP literacy, fragmented support, job-shadowing and employer expectations indicates that ecosystem structures can address barriers that individual training cannot. However, many implementation figures remain project targets, so effects on retention, mobility and venture creation require longitudinal evaluation.

5.1.4 Systemic Alignment of Evaluation Frameworks and Reward Structures

ARCOE and DeepTechSeeds identify a persistent gap between the stated value of mobility, Open Science and societal impact and the criteria used in recruitment and promotion. Applied outputs, patents, prototypes, mentoring and intersectoral experience remain inconsistently recognised. CoARA offers a relevant reform direction, but the portfolio has not yet established which assessment models produce durable behavioural or career outcomes. Future policy briefs should therefore distinguish evidence of the recognition gap from hypotheses about specific evaluation designs.

5.2 Evidence for Policy Recommendations across ERA projects

This section organises the given evidence by stakeholder group. Each subsection distinguishes (i) findings supported by completed data, (ii) implications that can inform policy briefs, and (iii) questions that require further testing. This evidence-first structure reflects the portfolio's current maturity: most projects have completed approximately one year of implementation, so baseline findings are stronger than causal claims about impact [20].

To transition from structural diagnosis to systemic reform, Figure 3: Multi-Stakeholder Actionable Flywheel for Systemic ERA Reform and Career Sustainability outlines a cohesive policy flywheel connecting four critical stakeholder levels. Systemic momentum is achieved when targeted interventions at the ECR level (tailored career services, micro-credentials, mentorship) are reinforced by Academic Institutions embedding dedicated HR frameworks and CoARA-aligned evaluation standards. This institutional shift enables meaningful engagement with Industry & Intersectoral partners through industrial PhDs and IP brokerage, which collectively scales up the broader ERA Ecosystem via maturity-based funding and longitudinal tracking metrics. Each quadrant acts as a catalyst for the next, ensuring sustainable and repeatable policy impact.

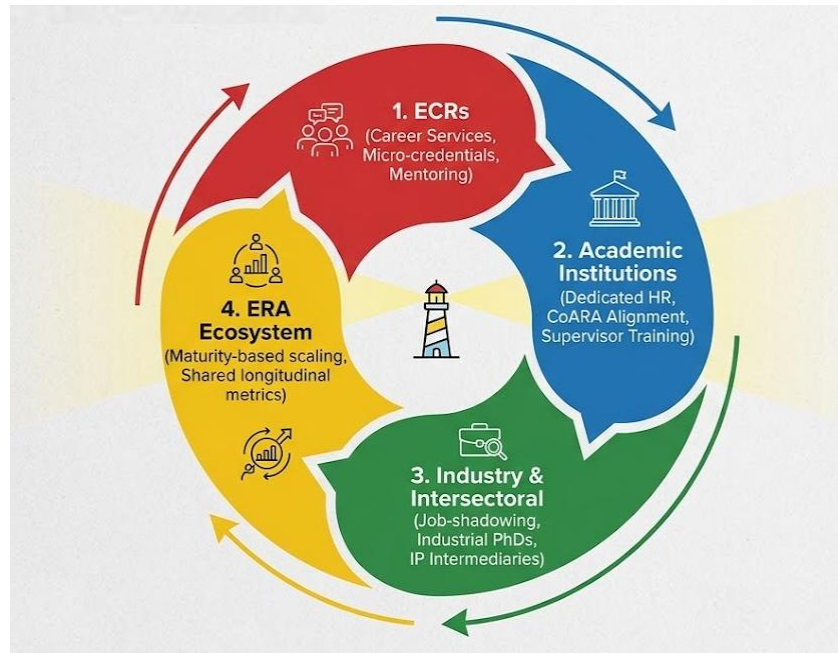


Figure 3: Multi-Stakeholder Actionable Flywheel for Systemic ERA Reform and Career Sustainability

5.2.1 Evidence concerning ECRs

Evidence on ECR career sustainability converges across several instruments. In DeepTechSeeds, 48.6% of 218 ECR respondents identified the absence of clear progression pathways as a major barrier, despite a high score for transparent recruitment (4.21/5). SMART Researchers found high importance but insufficient support across all seven ResearchComp domains among 247 ESRs and 183 mentors/supervisors, with the largest gaps in coping with pressure (1.23) and self-organisation (1.13). SECURE II's eight-pilot baseline identified Stability, Mobility and Interoperability as recurring areas of low maturity. These findings support the diagnosis that ECR precarity and career friction are structural and institutional, not simply individual competence deficits.

- **Evidence statement 1.1:** Career continuity depends on funding and employment structures, but also on institutional career services, mentoring, supervision and transparent progression pathways. The current evidence supports this combined diagnosis; it does not yet identify a single tenure-track or bridge-funding model that is effective across all national systems.
- **Evidence statement 1.2:** ResearchComp-based diagnostics can identify priority development needs, while modular learning and micro-credentials offer a plausible delivery and recognition mechanism. Their effect on portability, employment transitions, and long-term career outcomes remains to be established through pilot and follow-up data.

5.2.2 Evidence concerning Academic Institutions

Institutional evidence consistently shows stronger formal compliance than operational career-support capacity. ARCOE's weakest indicators concerned career-guidance services (2.78/5), institutional career strategies (2.85/5) and mandatory supervisor training (2.89/5). INSIGHT found that 64.3% of respondents identified insufficient financial or personnel resources as a barrier, 56.5% cited weak integration into core processes, and 55.7% cited insufficient communication. CROSS adds evidence that institutional support needs persist throughout the HR Excellence in Research process, vary with institutional maturity, and favour practical and collaborative support formats. AttractAdria's research-support hubs demonstrate an operational response to fragmented project-administration and career-support functions, while SMART Researchers and SECURE II show that institutions begin from markedly different maturity levels.

- **Evidence statement 2.1:** Dedicated institutional capacity - clear responsibilities, career-support services, trained supervisors, monitoring, and cross-functional cooperation - is associated with stronger operational embedding of the Charter. Comparative evidence is still needed on the most sustainable governance and financing models after project funding ends.
- **Evidence statement 2.2:** The portfolio confirms a recognition gap for applied outputs, mobility, mentoring, and Open Science. It supports testing broader assessment approaches aligned with CoARA, but it does not yet validate a universal scoring model, panel composition or funding conditionality.

5.2.3 Evidence concerning Industry and Intersectoral Pathways

Industry-facing evidence points to a translation and interface problem rather than a general lack of researcher capability. CROSS interviews with 42 non-academic employers found limited prior awareness of ResearchComp, but respondents recognised its value once introduced and highlighted the need for clearer language and more actionable feedback. DeepTechSeeds found low confidence in patent regulation (2.51/5) and formal IP training among only 22.9% of ECR respondents. AttractAdria, BREATH and NextTechTalents identify mentoring, job-shadowing, co-supervised projects and workplace exposure as relevant mechanisms for connecting research competences with organisational settings.

- **Evidence statement 3.1:** Intersectoral mobility is more likely to become operational when employers and HR professionals participate in pathway design and when mobility includes defined learning objectives, support and institutional recognition. The relative effectiveness of industrial PhDs, secondments, job-shadowing, and virtual formats remains to be compared.
- **Evidence statement 3.2:** IP literacy and recognition of prototypes, datasets, patents and entrepreneurial activity are recurrent gaps. Standardised agreements

and specialist intermediary roles are credible policy options, but their effects on collaboration speed, equitable value sharing and career progression require evaluation.

5.2.4 Evidence concerning the ERA Ecosystem

The evidence shows substantial variation across regions and institutions. INSIGHT's 173 responses across 17 countries reveal low internal awareness of the Charter alongside broad recognition of its strategic value among informed respondents. SECURE II's maturity assessment distinguishes advanced, mid-range and early-stage pilots, while SMART Researchers reports country differences in average competence-support gaps: 0.81 in Serbia, 0.79 in Croatia and 0.59 in Greece. BREATH's comparative design across three innovation regions and its international career-guidance benchmark provide additional evidence that context matters when transferring practices.

- **Evidence statement 4.1:** Portfolio-wide scaling should account for institutional maturity, regional capacity, and sectoral context. Common indicators are needed to compare awareness, implementation, service uptake, mobility, competence development, recognition and career outcomes without assuming that one model will fit every setting.
- **Evidence statement 4.2:** Future grants can build on the portfolio's tools, platforms and implementation experience, but planned targets must remain distinct from achieved results. Continued clustering and shared longitudinal monitoring would allow later calls to reuse validated practices, avoid duplication, and assess whether interventions improve retention, balanced circulation and sustainable careers.

6. Conclusions & Way Forward

6.1 Insights on ERA Policy Evidence

The cross-analytical synthesis of the WIDERA projects demonstrates that structural precarity and institutional gaps within the European Research Area (ERA) cannot be solved through isolated, project-level interventions alone. The empirical evidence across all participating initiatives points to a deeply interconnected ecosystem where policy intentions often disconnect from institutional practices on the ground. Key insights reveal that while Early Career Researchers (ECRs) recognize the urgent need for intersectoral competencies, commercialization skills, and stress management, research-performing organizations frequently lack the structural capacity and funding mechanisms to deliver target-driven support. Furthermore, persistent evaluation models over-relying on conventional bibliometric outputs continue to disincentivize intersectoral mobility, open science adoption, and regional knowledge transfer. Addressing these systemic bottlenecks requires transitioning from fragmented pilot solutions to standardized, cross-border HR frameworks and inclusive assessment protocols that reward diverse research contributions across all Member States.

6.2 Opportunities & Way Forward

To build a resilient, competitive, and inclusive ERA ecosystem, future policy design and institutional practices must align around four strategic avenues for action:

- **Institutional Capacity Building & Standardized HR Frameworks:** Academic and research institutions must embed dedicated HR structures, institutionalizing CoARA-aligned evaluation standards and offering micro-credentials and structured mentorship programs tailored to ECR career progression.
- **Intersectoral Innovation Intermediaries:** Policy frameworks should actively facilitate cross-sectoral mobility by expanding industrial PhD programs, IP brokerage mechanisms, and job-shadowing schemes that bridge the translation gap between academia and industry.
- **Cohesive ERA Ecosystem Integration:** Horizon Europe and national funding bodies must move toward maturity-based scaling of successful project outcomes, utilizing shared longitudinal metrics to track career trajectories and regional capacity building over time.
- **Bridging Regional Disparities:** Targeted structural investments and collaborative networks must be scaled up to ensure that Widening countries are fully integrated into European knowledge chains, mitigating the brain drain and promoting balanced excellence across the entire research ecosystem.

References

- [1] European Commission, CORDIS – EU Results, Talent ecosystems for attractive early research careers – pilot, https://cordis.europa.eu/programme/id/HORIZON_HORIZON-WIDERA-2024-ERA-02-03
- [2] European Commission, EU Funding & Tender Portals, Talent ecosystems for attractive early research careers – pilot, HORIZON-WIDERA-2024-ERA-02-03, <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/HORIZON-WIDERA-2024-ERA-02-03?isExactMatch=true&status=31094501,31094503,31094502&callIdentifier=HORIZON-WIDERA-2024-ERA-02&order=ASC&pageNumber=1&pageSize=50&sortBy=identifier>
- [3] Council of the European Union, Council Recommendation of 18 December 2023 on a European framework to attract and retain research, innovation and entrepreneurial talents in Europe, C/2023/1640, Official Journal of the European Union, 29 December 2023, <https://eur-lex.europa.eu/eli/C/2023/1640/oj>
- [4] European Union, Publications Office of the European Union, European Charter for researchers – Supporting attractive careers in the public and private sectors, <https://op.europa.eu/en/publication-detail/-/publication/1160d397-d63e-11fo-8da2-01aa75ed71a1/language-en>, 2025
- [5] European Union, Publications Office of the European Union, Cost-benefit analysis for FAIR research data, <https://op.europa.eu/en/publication-detail/-/publication/d375368c-1a0a-11e9-8d04-01aa75ed71a1/language-en>, 2018
- [6] European Union, HR Excellence in Research Award, <https://euraxess.ec.europa.eu/hrexcellenceaward>
- [7] European Commission, HORIZON Europe Work Programme 2023-2025, Widening participation and strengthening the European Research Area, https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-11-widening-participation-and-strengthening-the-european-research-area_horizon-2023-2024_en.pdf, 2024
- [8] ARCOE HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Advancing Research Careers through Organizational Excellence, <https://arcoe.eu/>
- [9] AttractAdria HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Attractive Research Ecosystem in the Adria Region in the Field of Personalised Preventive Healthcare, <https://attract-adria.eu/>

- [10] BREATH HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Empowering Research Talent: Building R&I Talent Ecosystems to Advance Careers in Health Innovation, <https://breathproject.eu/>
- [11] CROSS HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Career Management Services for European Talents, <https://cross.vscht.cz/>
- [12] DeepTechSeeds HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Fostering Talent Ecosystems for Early-Stage Researchers in DeepTech, <https://deeptechseeds.eu/>
- [13] ECROS HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Empowering Early Career Researchers with new Opportunities and Skills, <https://ecros.univ-tech.eu/>
- [14] INSIGHT HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Institutional Networks for Strengthening Innovation and Growth of Early Research Careers, <https://insighthorizon.eu/>
- [15] NextTechTalents HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Establish a Talent Ecosystem to Increase the Competences and Future Employability of Early-Stage Researchers Emphasising the Deep Tech Sector, <https://www.nexttechtalents.eu/>
- [16] SECURE II HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Sustainable Careers for Research Empowerment 2, <https://secureproject.eu/>
- [17] SMART Researchers HORIZON-WIDERA-2024-ERA-02-03-Talent ecosystems for attractive early research careers-pilot Project, Strategic Micro-Credentialing and Skills Recognition for a Dynamic ESRs Talent Ecosystem, <https://smartresearchers.eu/>
- [18] Coalition for Advancing Research Assessment, CoARA, Action Plans, <https://www.coara.org/action-plan/>
- [19] Official CoARA launch 2022, <https://scienceeurope.org/news/coara-officially-launched/>
- [20] European Research Executive Agency, Talent Ecosystems: Building sustainable research careers, 29 September 2026, https://rea.ec.europa.eu/events/talent-ecosystems-building-sustainable-research-careers-2026-09-29_en
- [21] European Charter for Researchers, European Commission, 2025, https://euraxess.ec.europa.eu/system/files/2025-12/EC-European%20Charter%20for%20Researchers%20FINAL_WEB.pdf

- [22] SECURE WIDERA Project, <https://eurodoc.net/proj/secure>
- [23] DocTalent4EU WIDERA Project, <https://cordis.europa.eu/project/id/101095292>
- [24] SKILLSPAN WIDERA Project, <https://cordis.europa.eu/project/id/101188141>
- [25] RESAVER WIDERA Project, <https://cordis.europa.eu/project/id/101230875>
- [26] FORSEE WIDERA Project, <https://forseeproject.eu/>

Contacts

White Paper Main Editors:

1. Harilaos Koumaras, koumaras@iit.demokritos.gr, DeepTechSeeds project
2. Janina Fengel, janina.fengel@h-da.de, ECROS project
3. Marina Koulaloglou, mkoulaloglou@infolysis.gr, DeepTechSeeds project
4. Stefanos Plastras, s.plastras@iit.demokritos.gr, DeepTechSeeds project

White Paper Reviewers:

1. Suad Krilašević, suad@annt.ba, INSIGHT project
2. Elisa Boeri, elisa.boeri@fondazioneamaldi.it, ARCOE
3. Danijela Ciric Lalic, danijela.ciric@uns.ac.rs, SMART Researchers

ERA WG1: Innovative Frameworks and Tools for Strengthening Research Careers in ERA

Chair: Harilaos Koumaras, koumaras@iit.demokritos.gr, Coordinator of DeepTechSeeds project

Co-chair: Danijela Ciric Lalic, danijela.ciric@uns.ac.rs, Coordinator of the SMART Researchers project

ERA Representative: Silvia Abad, Silvia.ABAD@ec.europa.eu

ERA WG2: Talent Platforms and Matchmaking Activities for ERA Ecosystem

Chair: Christina Skoubridou, christina.skoubridou@envolveglobal.org, member of DeepTechSeeds project

Co-chair: Ivana Gulisija, ivana.gulisija@glycanage.com, member of the AttractAdria project

ERA Representative: Molina Martinez Jorge, Jorge.MOLINA-MARTINEZ@ec.europa.eu

ERA WG3: Communication, Impact, and Policy Feedback of ERA Ecosystem

Chair: Marina Koulaloglou, mkoulaloglou@infolysis.gr, member of DeepTechSeeds project

Co-chair: Martin Grund, martin.grund@vdivde-it.de, member of the SECURE II project

ERA Representative: Moungou Athanasia, Athanasia.MOUNGOU1@ec.europa.eu

The European Charter for Researchers in Modern Talent Ecosystems: Structural Gaps and Policy Pathways across the ERA

Institutional Acknowledgments

The authors express their sincere gratitude to the representatives of DG RTD.A2 and REA.C4 for their strategic oversight, valuable guidance, and policy insights throughout the preparation of this White Paper. Special thanks are extended to:

- European Commission (DG RTD.A2): Dario CAPEZZUTO, Raffaella ABBATE, Maria MECENERO, Michele ROSA-CLOT, and Slaven MISLJENCEVIC.
- European Research Executive Agency (REA.C4): Athanasia MOUNGOU, Silvia ABAD, Jorge MOLINA-MARTINEZ, Maria CARVALHO DIAS, and Stijn DELAURE.

Their constructive feedback and subject-matter expertise significantly contributed to refining the thematic policy alignment of this document.

This White Paper has been developed within the framework of the Horizon Europe WIDERA project portfolio.



**Funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the granting authority (European Research Executive Agency - REA). Neither the European Union nor the granting authority can be held responsible for them.

ERA Working Groups

September 2026

