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BIOECONOMY EXCELLENCE ALLIANCE FOR STIMULATING INNOVATIVE AND INCLUSIVE GREEN TRANSITION

BEAMING

D9.1
BEAMING Inclusive Innovation Culture Case Study Book

Lead Contractor: Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI)

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This document corresponds to D9.1 of the BEAMING project (contract no. 101137131) and to Work Package 9 (M21 – M36) led by AUP. This document contains the summarized findings of a series of case studies conducted on the Inclusive Innovation Culture practices of the 12 BEAMING partner HEI and research institutes, including roadmaps to successful implementation.

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Acronyms and Abbreviations

Acronyms	Explanation
AI	Artificial Intelligence
CoARA	Coalition for Advancing Research Assessment
HEI	Higher education institution, university
IIC	Inclusive innovation culture
PI	Principal investigator
RO	Research organisation

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Executive summary

This report presents a comprehensive analysis of Inclusive Innovation Culture (IIC) across the partner institutions of the BEAMING project. It is motivated by a growing recognition that Europe's capacity to address complex societal challenges depends not only on scientific excellence and funding, but on the culture within which research and innovation take place. **Inclusive Innovation Culture (IIC)** is the set of everyday norms, values and incentives within a research or higher education institution that determines whether diverse ideas and perspectives can emerge, be voiced, and be pursued — understood as both a culture and an ongoing process rather than a one-off strategy. The analysis is anchored in five pillars: **Openness and Collaboration, Psychological Safety, Freedom of Thought, Learning from Failure, and Cognitive Diversity and Inclusion**. These pillars provide the consistent framework for comparing strengths, barriers and gaps across institutions, stakeholder groups and regions.

The analysis is structured as three regional case studies reflecting distinct historical, economic and institutional development pathways within the European Research and Higher Education Area:

- **Group A – Established systems** Germany, Austria
- **Group B – EU Widening Countries** Bulgaria, Croatia, Czech Republic, Greece, Hungary, Romania, and Slovenia
- **Group C – EU Associated Countries/ Western Balkans** Albania, Bosnia and Herzegovina, Republic of North Macedonia, and Serbia.

The report pursues four interlocking goals: **1) to analyse the current state of IIC in each group; 2) to explain the structural, systemic and cultural root causes behind the observed patterns, and to 3) provide tailored recommendations calibrated to each context.** A dedicated forward-looking analysis examines **IIC in the age of Artificial Intelligence**.

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Cross-Regional Common Ground

All three groups share genuine strengths: high formal adoption of IIC strategies, commitment to external collaboration and broad goodwill toward IIC values. Yet these strengths are largely rhetorical in most organisations and uneven in practice. The evidence reveals a set of universal weaknesses: a **Translation Gap**, whereby strategic visions are perceived as too abstract to influence daily practice; a **Resource Gap**, where verbal encouragement of exploratory research is unmatched by dedicated funding or protected time; a persistent **Silo Problem**; the **dominance of hard metrics** (publications, external funding) over IIC-related criteria in recruitment and promotion; pervasive **supervisor dependency**, in which the IIC experience of early-career researchers hinges on individuals rather than institutional structures; and a systematic **leader–researcher perception gap**, whereby leaders consistently describe their institutions as more open and functional than researchers experience them to be. **Administrative burden** emerges as the single most universally shared constraint.

Regional Profiles

Group A (Germany & Austria) comprises mature, well-resourced institutions with strong formal structures, high interdisciplinary rhetoric and the highest psychological safety of the three groups. Here IIC is partially embedded but caught in an Efficiency Paradox: institutions optimised for hard-metric performance — funding acquisition, publications, project delivery and administrative compliance — become structurally resistant to the "creative chaos" that genuine innovation requires. Leaders are aware and supportive; researchers experience the gap between encouragement and daily practice, noting that Innovation Culture is encouraged "in principle" but often accompanied by no time, mentoring or recognition.

Group B (EU Widening Countries) displays genuine aspiration trapped by structural under-resourcing and cultural passivity. Enthusiasm is real, but the system lacks the mechanisms to convert aspiration into

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practice: IIC is driven by individual champions rather than systemic structures. A visible generational divide — younger researchers open to interdisciplinarity, senior staff discipline-oriented — creates barriers for early-career researchers. This is the most internally heterogeneous group, spanning the Czech Republic (closest to Western European IIC norms) through intermediate performers (Greece, Croatia, and Hungary) to Bulgaria and Romania, which face the most acute deficits.

Group C (Western Balkans) faces the most fundamental challenge, characterised by a profound "form versus essence" gap. It reports the highest formal weighting of IIC competencies yet exhibits the lowest actual resource support, the highest risk aversion, and the lowest psychological safety in the study. Most seriously, governance integrity risks — political interference in recruitment, nepotism, opaque career criteria and multi-layered bureaucratic approval systems — undermine the meritocratic foundations that IIC requires. Conformity has become normalised as a rational adaptation to an environment where initiative carries professional risk, and severe brain drain depletes the very talent pipeline on which innovation depends.

Recommendations

Recommendations are organised around five strategic pillars forming a coherent system: **1) reforming evaluation systems to recognise IIC contributions**, drawing on frameworks such as CoARA and the Leiden Manifesto; **2) establishing dedicated internal funding and protected time for exploratory research**; **3) introducing structural protections for early-career researchers**, including co-supervision and independent ombudsperson functions; **4) building leadership that actively models IIC** through practice-embedded training and peer learning; and 5**) embedding soft-skill development in daily practice**, grounded in psychological safety. These are differentiated by regional context: Group A requires structural alignment of existing goodwill; Group B requires building institutional infrastructure and awareness; Group C additionally requires foundational governance reform and

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transparency, elimination of administrative barriers, and curriculum integration as prerequisites for any meaningful change.

IIC in the Age of AI

Artificial intelligence is reshaping the conditions of research and intersects every IIC dimension. The central insight is counterintuitive but consistent across the literature: AI integration demands more investment in human IIC competencies, not less. Evidence reveals an AI–creativity paradox — generative AI raises individual creative performance yet homogenises collective output, threatening the diversity of ideas on which IIC depends — alongside risks to critical thinking through cognitive offloading. Cross-cutting recommendations for all groups include reframing AI literacy as an IIC competency (aligned with Article 4 of the EU AI Act), designing AI use to preserve human creative agency, and building metacognitive capacity for AI-augmented research.

Best Practices

Three proven models were benchmarked against partner realities to enable adoption without complex structural reform: Challenge-Based Learning (the Aalto University Design Factory model), which shifts students from passive reception to active problem-solving; Strategic Agility and Openness (Wageningen University's chair-group model), demonstrating how flexible structures foster responsiveness; and a systematic IIC implementation framework combining top-down and bottom-up strategies, drawn from the CO-CHANGE project.

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Project Overview

Beaming aims to raise excellence by enhancing innovation and knowledge valorisation within the bioeconomy domain through cooperation between higher education institutions, with a particular focus on EU Widening Countries in Central-Eastern (CEE) and South-Eastern European (SEE) EU Member States and the Western Balkans. Improved global competitiveness and visibility of higher education institutions (HEI) will be achieved through establishing effective technology and know-how transfer between EU Widening Countries and EU14 Member States with more developed bioeconomies and R&I ecosystems, exploring and adopting structural reforms, educational priorities, and a culture of excellence. The BEAMING Alliance works towards 7 Specific Objectives: 1) Build the capacity of early-career researchers in all aspects of bioeconomy research; 2) Facilitate the reform of institutional practices and policy frameworks towards excellence; 3) Foster networking, knowledge exchange, and cross-disciplinary collaboration by establishing sustainable Communities of Practice; 4) Design joint research and innovation strategies and launch joint research projects; 5) Design a complex portfolio of activities for adopting Open Science practices; 6) Strengthen the valorisation of research results by increasing tech transfer capacity; 7) Support the participating institutions to move towards inclusive institutional culture, including gender equality. We aim to foster the uptake of the Quadruple Helix (QH) innovation ecosystem approach to provide a framework for higher education institutions to work collaboratively with industry, government, and civil society. Thereby, we aim to enhance their innovation capacity and the applicability of research results. Local and regional implementation strategies and roadmaps will be developed regarding the relevant ERA Policy Agenda actions in the higher education sector, particularly in the bioeconomy and circular economy domains.

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Introduction and Goals of the Report

This report presents the comprehensive analysis of Inclusive Innovation Culture (IIC) across the BEAMING partner institutions, structured as regional case studies. The primary goal is to document, explain, and address the current state of IIC in three distinct groups of European higher education and research systems represented in the BEAMING project: **Established** (Germany and Austria), **EU Widening Countries** (Bulgaria, Croatia, Czech Republic, Greece, Hungary, Romania, and Slovenia), and **EU Associated Countries** of the Western Balkans (Albania, Bosnia and Herzegovina, Republic of North Macedonia, and Serbia). The evidence generated was used to elaborate actionable recommendations and tailored measures to address specific challenges that currently limit different aspects of innovation culture proven to be essential for innovation capabilities of academic and other organisations. In addition, a dedicated forward-looking analysis examines the intersection of IIC and artificial intelligence, yielding cross-cutting recommendations that apply to all three groups.

The study draws on a broad mixed-methods evidence base. A multi-stakeholder online survey captured the perceptions of leaders, researchers, and students (n=347) across twelve institutions, providing a broad comparative overview of IIC. In-depth, scenario-based interviews then explored the underlying causes of the patterns revealed. A dedicated workshop subsequently benchmarked the status quo at partner institutions against proven Best Practices, identifying barriers, structural advantages, and concrete adaptation routes. Throughout the study, desk research on national evaluation frameworks, funding mechanisms, governance traditions, and academic literature supplied the systemic context necessary to interpret the primary data and to ground the recommendations in established evidence.

The specific objectives of the regional case studies are threefold: **1)** to identify existing strengths, structural barriers, and implementation gaps in each group; **2)** to explain why these patterns exist by connecting cultural experiences to their institutional, systemic, and governance

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roots; and **3)** to inform and elaborate tailored recommendations that address the distinct challenges, needs, and opportunities of each regional context.

Structure of the Report

Following this introduction, the report describes the methodological approach in ***Chapter 0*** *Methodology*, detailing applied methodologies throughout the study. The subsequent ***Chapter 0*** establishes the conceptual foundation of Inclusive Innovation Culture (IIC), synthesising theoretical and empirical evidence on why it matters for innovation capacity and the bioeconomy transition. Building on this foundation, the report then presents comprehensive diagnostic case studies for three country groups — Group A: Germany & Austria (***Subsection 5.2.1 -*** *Germany & Austria (Group A)*), Group B: *EU Widening Countries* (***Subsection 0 -*** *EU Widening Countries (Group B)*, and Group C: *EU Associated Countries (Western Balkans)* (***Subsection 0 -*** *EU Associated Countries (Group C)*). These country groups were formed based on distinct shared structural, governance, and innovation-system characteristics to enable regionally differentiated analysis and tailored recommendations. Prior to this, the report outlines the cross-regional common ground (***Section 5.1 -*** *Cross-Regional Common Ground*), identifying the shared strengths and universal weaknesses that form the structural baseline across all groups, before profiling each regional case study in turn, examining the specific institutional context, cultural dynamics, and dominant barriers and enablers. On this comprehensive diagnostic basis, the report provides a set of tailored, evidence-based recommendations organised around five strategic pillars, addressing evaluation reform, dedicated funding, early-career researcher protections, leadership role modelling, and soft-skill development: (**see section** *Recommendations for Strengthening Inclusive Innovation Culture* **for Group A; section** *Recommendations for Strengthening Inclusive Innovation Culture* **for Group B and section** *Recommendations for Strengthening Inclusive Innovation Culture* **for Group C**). Finally, **chapter** *Strengthening Inclusive Innovation Culture in the Age of AI* synthesizes the AI-related findings and recommendations, ensuring the

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guidance remains forward-looking and relevant to the conditions an Inclusive Innovation Culture will actually face.

Chapter *Best Practices* is dedicated to accelerating the transition from diagnosis to lived practice by presenting proven Best Practices on IIC. The chapter reflects partner institutions' barriers, structural advantages, and concrete adaptation routes elaborating context-appropriate strategies that leverage low entry barriers to equip partners' institution for strengthening inclusive innovation culture.

The

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Appendix contains the detailed analysis of the survey and interviews to avoid information overload in the core text.

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Methodology

In-Depth Case Studies

The main goal of this work is to perform a comprehensive study on IIC profiles of BEAMING partner institutions referred as **Case Studies on IIC**. Case studies do not refer to a single institution but to a **regional institutional profile.** In line with the task description, they rest on a comprehensive assessment of current framework conditions that enable inclusive innovation environment as well as existing drawbacks and challenges that hamper them. The empirical basis comprises the IIC practices of the twelve BEAMING partner HEIs and one research institute, investigated through the survey, in-depth interviews and insights collected in a workshop.

Each of the country group that share distinct structural and cultural characteristics, largely defined by their historical and developmental pathway, form a Case Study for an in-depth analysis and derived recommendations tailored to their specific needs. This approach acknowledges different profiles of these country groups and the subsequent demand of differentiated solutions to account for their specifics, while generating a more robust evidence basis. Accordingly, three country groups were formed for this analysis:

A. **Advanced** - Austria and Germany
B. **EU Widening Countries** (Bulgaria, Croatia, Czech Republic, Greece, Hungary, Romania, and Slovenia)
C. **EU Associated Countries** (Albania, Bosnia and Herzegovina, Republic of North Macedonia, and Serbia).

Regional case studies are more representative than institution-level case studies. While this appears as a deviation from the DoA, it is a necessary and pragmatic methodological adjustment. Generating reliable, robust institution-level profiles proved unfeasible due to insufficient data volume per institution; proceeding with fragmented analyses would have produced anecdotal and unrepresentative

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conclusions. Aggregating all BEAMING partner institutions into three regional case studies (Established, Widening, and Associated) enhances robustness and representativeness while ensuring full partner integration.

This aggregation is conceptually well-justified: the primary enablers and barriers to an Inclusive Innovation Culture - such as evaluation frameworks, funding mechanisms, governance traditions, and cultural norms - operate predominantly at the national and regional level. Formal written innovation strategies are a poor proxy for lived IIC; institutional culture is deeply embedded in shared regional structural conditions and traditions, not exceptionally lived in isolation within single HEIs.

The selected approach enables systematic cross-case comparability through the IIC pillars. It also allows us to derive robust, transferable recommendations. Nevertheless, in the derived recommendations, we have explicitly taken into account the specific situations of individual countries in those cases where it is particularly relevant for practical implementation.

The goals of case studies are threefold. First, to **document the current state** of IIC across regional groups, identifying existing strengths, structural barriers, and implementation gaps. Second, to **explain why** these patterns exist — connecting cultural experiences to their institutional, systemic, and governance roots. Third, to **inform tailored recommendations** that address the distinct challenges, needs, and opportunities of each regional context, forming the evidence base for the BEAMING Inclusive Innovation Culture Case Study Book.

The empirically and theoretically grounded **five IIC pillars — Openness and Collaboration, Psychological Safety, Freedom of Thought, Learning from Failure, and Diversity and Inclusion** — provide the framework for the comprehensive analysis of IIC and ensure systematic cross-institutional comparability.

The three stakeholder perspectives – leaders (university or research organisation top management, professors, and principal investigators),

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researchers (post-docs and doctoral students) and students (bachelor and master students) - provided within the survey and interviews were analysed separately before being integrated into Case Studies. This multi-stakeholder design is particularly important to capture both institutional strategy as articulated by leaders and lived culture as experienced by researchers and students.

Beyond the primary evidence, the conclusions and recommendations draw systematically on **literature research**, as surveys and interviews only capture how IIC is experienced. They are limited in explaining ***why*** these patterns occur. Literature research was therefore necessary to provide the context and a better understanding of the innovation environment in each country under scrutiny that defines and contributes to their idiosyncratic innovation culture. This further supports a country-level differentiation against external benchmarks, underpinning the gap analysis, and ensures that the recommendations are well grounded and transferable. Table 1 provides a framework overview of methodologies applied across the study.

Element	***Description***
IIC Pillars **(analytical framework)**	Openness & Collaboration; Psychological safety; Freedom of Thought; Learning from Failure; Diversity & Inclusion
Stakeholder Perspectives **(applied across survey & interviews)**	Leaders (top management, professors, PIs); Researchers (post-docs, PhD candidates); Students (BA/MA)
Triangulation Logic	Survey (breadth/patterns) → Interviews (depth/causes) → Workshop (validation/practice exchange) → Literature (context) → Case Studies (synthesis) → Recommendations (action)

Table 1: Framework Underpinning Methods

In addition, a dedicated forward-looking analysis examines IIC in the context of **Artificial Intelligence**. This is essential, as AI is changing the very conditions under which research and innovation take place, and intersects every dimension of IIC — from creativity and critical thinking

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to collaboration, diversity of ideas, and openness. This analysis was grounded primarily in current literature and the emerging policy and regulatory landscape. On this basis, we synthesised the evidence into cross-cutting recommendations that apply to all three regional groups rather than to a single context, reflecting the fundamental impact of AI on IIC.

In the following, we briefly outline the methodological approach of the surveys, interviews and the workshop conducted to collect comprehensive evidence, on which the regional IIC Case Studies are based on.

Online Survey

A survey was developed based on the literature review of the concept and basic principles of an Inclusive Innovation Culture (**see chapter 0**). The objectives of the survey were:

- to assess the state of play of IIC
- to identify strengths and weaknesses of the innovation culture

in the BEAMING HEIs and ROs.

The results of this survey were intended to provide an evidence base for targeted feedback and recommendations on how to improve the inclusive innovation culture.

Based on the principles of the IIC concept that have been elaborated in chapter 4, we operationalized the IIC principles through translating them into concrete elements that could be used for the questionnaire. The following Table 2 shows how these specific elements of the questionnaire fed into the overall IIC principles:

IIC Principles	***Elements questionnaire***	***Indicators***
Inclusive leadership	Commitment to an IIC	• Creativity, free and critical thinking, autonomy

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IIC Principles	*Elements questionnaire*	*Indicators*
	Leadership in IIC	• Constructive criticism, collaborative research, valuing new ideas
Psychological Safety	Psychological Safety & Autonomy	• Expressing controversial ideas, admitting mistakes, constructive criticism
Learning orientation	Tolerance for Risk & Learning from Failure	• Failure as learning opportunity, exploratory research,
Openness and Collaboration	Collaboration, Inter- and Transdisciplinarity	• Non-academic expertise • Collaborating across different disciplines • Research and teaching are grounded in real-world needs
Diversity & Inclusion	Diversity, Inclusion, and Belonging	• Cognitive/disciplinary diversity integrated in teaching and research • Anti-discrimination, equal opportunities • Promoting diversity as shared responsibility

Table 2: Operationalization of the IIC principles into the survey

Three versions of the questionnaire were developed in English language, in which the questions and items were specifically targeted at the three groups:

- **Leaders,** i.e. university or research organisation top management, professors, and principal investigators,
- **Researchers**, i.e. post-docs and doctoral students (PhD candidates),
- **Students**, i.e. bachelor and master students.

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We deliberately distinguished between leaders, researchers, and students because they have fundamentally different roles in shaping and experiencing inclusive innovation culture. Leaders are positioned to develop and implement IIC strategies, and to act as visible role models. Researchers, observe the cultural environment, the behaviour of their superiors, and may themselves model IIC within their own groups. Students offer a further, ground-level perspective: how an innovation culture is actually lived in teaching, supervision, and daily academic life. By combining these three distinct perspectives, we aimed for a balanced and realistic assessment — one that captures both the institutional intent and the lived experience.

Each of the three questionnaires was translated into the languages of the BEAMING partner countries by using DeepL or similar tools, and each draft translation was cross-checked by a native speaker. The resulting questionnaires were implemented as online questionnaires using Google forms. Invitation emails to participate in the survey were sent by the BEAMING partners to the respective target groups in their HEI or RO. After 14 days, a reminder was sent. Responses were received in the period November 15 to December 20, 2025.

The received responses were analysed by descriptive statistics. Leaders, researchers, and students were analysed separately for each of the three regional groups — resulting in nine distinct analyses. This allowed us to compare how the same institutional environment is perceived from three different perspectives in three different regions. The participation statistics are given in Table 3. The detailed results and conclusions are presented **in the**

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Appendix.

Country group	Country	Number of respondents			
		Leaders	Researchers	Students	Total
A. Austria and Germany		19	25	14	58
	Austria	12	4	8	24
	Germany	7	21	6	34
B. EU Widening Countries		26	38	66	130
	Hungary	7	5	6	18
	Czech Republic	4	9	12	25
	Romania	1	2	0	3
	Bulgaria	3	13	32	48
	Croatia	11	8	15	34
	Greece		1		1
	Slovenia			1	1
C. EU Associated Countries		57	40	62	159
	Serbia	23	12	32	67
	Bosnia and Herzegovina	11	6	12	29
	Republic of North Macedonia	20	7	17	44
	Albania	3	15	1	19
All countries		102	103	142	347

Table 3: Survey respondents by country group, country, and target group

While total sample sizes vary, the alignment of trends across all three target groups (Leaders, Researchers, Students) provides a robust basis for the Case Study Book.

- **Group A (Germany & Austria):** Smaller sample (n=19 leaders, 25 researchers, 14 students). As the respondents represent only one organization in each country, the analysis provides only a snapshot of trends and developments in the context of IIC typical

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of these organizations yet representing some established structures within "more advanced" and mature EU countries.

- **Group B (EU Widening Countries):** Moderate sample (n=26 leaders, 38 researchers, 66 students). This group is the more balanced, providing a strong basis for generalizing the needs of growing HEIs.
- **Group C (EU Associated Countries):** High sample (n=57 leaders, 40 researchers, 62 students). This is the most statistically significant cohort; making the identified trends highly reliable.

Interviews

The interviews were conducted on the basis of a carefully designed, structured interview guideline developed specifically for the BEAMING project. The guideline was not a simple list of questions but a theoretically grounded, contextually informed instrument designed to move beyond the symptom findings of the preceding survey and diagnose the underlying causes of the patterns identified therein. The guideline is explicitly anchored in the IIC framework, introduced to all respondents to establish a good understanding about it among partners and interviewees. Importantly, IIC is framed in the guideline as something defined by daily practice, leadership behaviour, and individual attitudes rather than high-level strategy — a deliberate signal to respondents that the interview seeks honest accounts of lived reality rather than official narratives. Despite active engagement and mobilisation efforts, only 19 respondents participated and completed the interview (see **Error! Reference source not found.**).

Country Group	***Institution***	***Role***	***Participants***
A – Established	BOKU (Austria)	Leader / Senior Researcher	1
	BOKU (Austria)	Researcher (PhD student)	1
	Fraunhofer ISI (Germany)	Leader	1

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Country Group	Institution	Role	Participants
	Fraunhofer ISI (Germany)	Researcher (PhD student)	1
	Subtotal A	*(2 institutions)*	**4**
B – Widening	BME (Hungary)	Leader	1
	BME (Hungary)	Researcher	1
	University of Pannonia (Hungary)	Researchers	2
	University of Pannonia (Hungary)	PhD Students	2
	UNIOS, Faculty of Food Technology (Croatia)	Leader	2
	UNIOS, Faculty of Food Technology (Croatia)	Researcher (PhD student)	2
	Agricultural University – Plovdiv (Bulgaria)	Researcher (PhD student)	1
	Subtotal B	*(4 institutions)*	**11**
C — Associated	Univ. of Banja Luka, Faculty of Agriculture (BiH)	Researcher / Senior Associate	1
	Univ. of Banja Luka, Faculty of Agriculture (BiH)	Leader	1
	UKIM, Faculty of Agricultural Sciences and Food (North Macedonia)	Leader	1
	UKIM, Faculty of Agricultural Sciences and Food (North Macedonia)	Researcher (PhD student)	1

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Country Group	Institution	Role	Participants
	Subtotal C	*(2 institutions)*	**4**
GRAND TOTAL		**8 institutions**	**19**

Table 4: Interview Respondents

Structure of Interviews

The guideline is organised into three substantive parts:

- **Part 1** examines institutional commitment to IIC, reasons why individuals lack influence to drive change, leadership and training needs.
- **Part 2** examines psychological safety and autonomy, risk tolerance and learning from failure, collaboration and interdisciplinarity — using two carefully constructed scenario-based questions that transform abstract cultural questions into concrete behavioural assessments.
- **Part 3** examines support for creativity and critical thinking.

Each thematic cluster is preceded by a context statement drawn from survey findings, grounding questions in documented evidence.

Several methodological observations are relevant for interpreting the analysis:

- Role differentiation between respondent groups (leaders vs researchers) to include different perspectives
- Integration of Widening/Associated-specific questions;
- Progressive depth from institutional through cultural to individual levels
- Explicit documentation standards for interviewers
- Anonymisation: The interviews were conceptualized as fully anonymous. However, some respondents disclosed their identities voluntarily
- Interviewer variability: Interviews were conducted by different interviewers across institutions; despite documentation standards, response depth and specificity vary across records.

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- Language and translation effects: Several interviews were conducted in languages other than English and subsequently summarised in English, with potential loss of nuance and cultural specificity
- Social desirability bias: Despite scenario-based design, some responses — particularly from leaders — may still reflect self-presentation rather than fully candid assessment
- Limited within-institution sampling: With one or two respondents per institution, findings cannot be assumed to be representative.

Consolidated interview results are presented in the

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Appendix.

Workshop

On April 27, 2026, the online workshop "Good practice in inclusive innovation culture" took place. The workshop was conceptualised, organised and moderated by the Fraunhofer ISI team. 30 participants had registered for and participated in the workshop.

The workshop objectives were to:

- Take a deep dive into selected aspects of IIC
- Learn about good practices how to establish and live an IIC
- Reflect on the IIC situation in the own institution
- Identify opportunities on how to develop the IIC and adopt proven Best Practices in the BEAMING partners' institutions
- Exchange with peers on challenges and how to overcome them.

Overall approach

To achieve the goals defined, the workshop followed a two-stage "benchmark-then-reality-check" procedure, applied identically to each Best Practice.

Stage 1 — Presenting the Best Practice. Each Best Practice was identified through **desk research** and presented in detail to the workshop participants. The description sets out the essence of the practice, its origins and mechanics, the enabling conditions, and its impacts — including the contribution to an Inclusive Innovation Culture (IIC) — substantiated with literature. The purpose of this stage is to establish an **evidence-based benchmark**: a concrete picture of what is the essence of Best Practice, how it works and why.

Stage 2 — Benchmarking the Status quo at BEAMING institutions (group work). The results of the group work conducted on each Best Practice are then discussed. Here, partners benchmarked the **status quo at their own institutions** through

- identifying **main challenges** (barriers in their framework conditions to implement each Best Practice)

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- identifying **main opportunities / structural advantages** they can build on
- **brainstorming concrete routes** for how to overcome the challenges and exploit the opportunities within their own context.

Stage	*Source*	*Output*
1. Best Practice presentation	Desk research (+ literature)	Detailed practice + enabling conditions + IIC impact
2. Group work / benchmarking	Partner self assessment	Status quo + challenges, opportunities, implementation ideas

Table 5: Methodology overview applied in the workshop

Participants were allocated to three breakout groups according to the preferences that they had given in the registration for the workshop. In each breakout group, moderated group work and discussions were facilitated by using an interactive board. On this board, the breakout group topic was presented in a structured way which guided the discussion. Group work results were documented on the board. After the workshop, participants' feedback was collected using a feedback form.

The results of the workshop are documented in the chapter *Best Practices*.

Recommendations on how to improve IIC

The recommendations on how to improve IIC are derived systematically building on two foundations. First, the academic literature on innovation culture gives us the evidence base for what actually works. Second, the comprehensive BEAMING study that analyses the specific framework conditions and challenges each regional group faces. By combining both, we ensure that every recommendation is grounded in research and tailored to the root causes we uncovered, not just the symptoms. The five pillars that follow are the result of that synthesis. Our recommendations are organised around five strategic pillars (see **Error! Reference source not found.**). **These five pillars — reforming**

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evaluation, creating dedicated funding and protected time, introducing structural protections for early-career researchers, building leadership that models IIC, and embedding soft-skill development — directly target key barriers identified. They form a coherent system to support IIC.

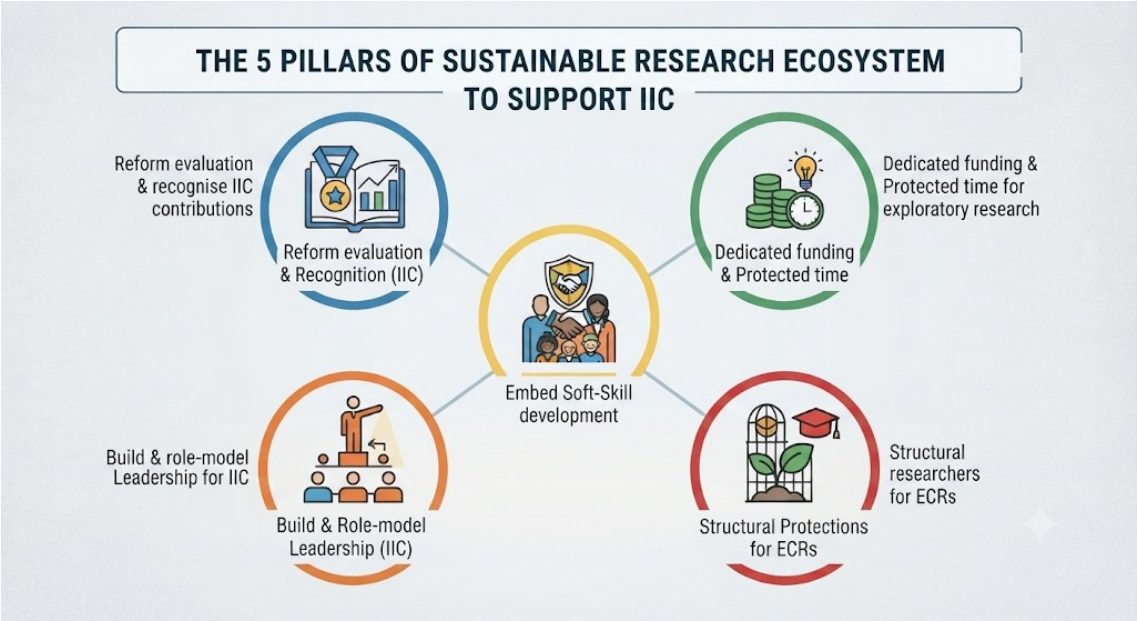


Figure 1: The 5 Pillars of a Sustainable Research Ecosystem
(Source: Fraunhofer ISI - The picture is AI generated)

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Concept of Inclusive Innovation Culture

Innovation is widely recognised in economic research as a central driver of sustained growth, most recently reaffirmed by the 2025 Nobel Prize in Economics awarded to Joel Mokyr, Philippe Aghion, and Peter Howitt. Crucially, their work shows that innovation is not a purely technical or resource-driven process, but a fundamentally cultural one: whether an economy innovates depends less on the availability of capital or technology per se than on whether its institutional environment tolerates disruption, rewards experimentation, and accepts failure — precisely the "culture of growth" that Mokyr identifies as historically decisive (Mokyr 2018) .

This dynamic carries particular relevance for catching-up economies. There is a broad consensus in innovation research that less advanced economies can only realise their catch-up potential where such framework conditions for innovation capability exist (Fagerberg 1994; Fagerberg and Godinho). Where they are absent, catching-up economies risk stagnating below their convergence potential — a concern that directly motivates the EU's Widening participation strategy under Horizon Europe, which treats the strengthening of regional innovation systems as a precondition for economic convergence ((Freeman 1987; Lundvall 1992).



Figure 2: Role of Innovation Culture (Source: Fraunhofer ISI)

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Innovation culture in its basic terms must be considered therefore as a philosophy and procedure at the same time. As highlighted by Dobni (2008), culture influences creativity and innovation in different ways, such as socialization processes and value proposition that is communicated through structures, policies and daily practices. Culture in Organizations must be understood as deeply seated value and beliefs that are shared by employees at all levels and is communicated and expressed by symbolism, feelings, relationships, language or behaviour. However, due to the volatile environment in which conditions can change rapidly, cultures must be able to change and evolve in a movable state (Verdu-Jover et al. 2018). In this regard, culture can shape innovation in two main ways:

- Socialization
- Basic values, assumptions and beliefs

Based on these preliminary assumptions of culture and innovation capacity, it can be concluded that a culture that supports innovation engage behaviour towards the value of creativity, risk taking, freedom, teamwork or communication, including trust and respect (Dobni 2008).

Before the main pillars or principles of Inclusive Innovation Culture (IIC) are delineated, it must be clarified to what extent innovation culture can shape performance outcomes in higher education institutions. This is crucial as it allows an in-depth understanding of the capacity of HEIs to build up innovation cultures. It has been emphasised that an innovation-oriented culture encourages inclusive behaviour, such as risk-taking, change, experimentation, innovation, and uncertainty tolerance, which are important characteristics of an Inclusive Innovation Culture (Katimertzopoulos et al. 2023). Organisational culture in a broader sense can thereby animating collaboration, knowledge exchange, experiences or ideas (Katimertzopoulos et al. 2023).

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Three levels of analytical approach

To obtain a better understanding of how Inclusive Innovation Culture can be analytically approached, the following provides an overview of the most important systemic, organisational, and individual-level conditions that shape innovation culture in higher education institutions. Figure 3 below shows the overall rationale of the IIC concept applied in this deliverable to provide a better understanding of how international and organisational conditions shape the individual level, at which the IIC principles are located. Besides international, organisational, and individual conditions, it is important to note that also national systemic conditions play a superior role for inclusive innovation culture (IIC).

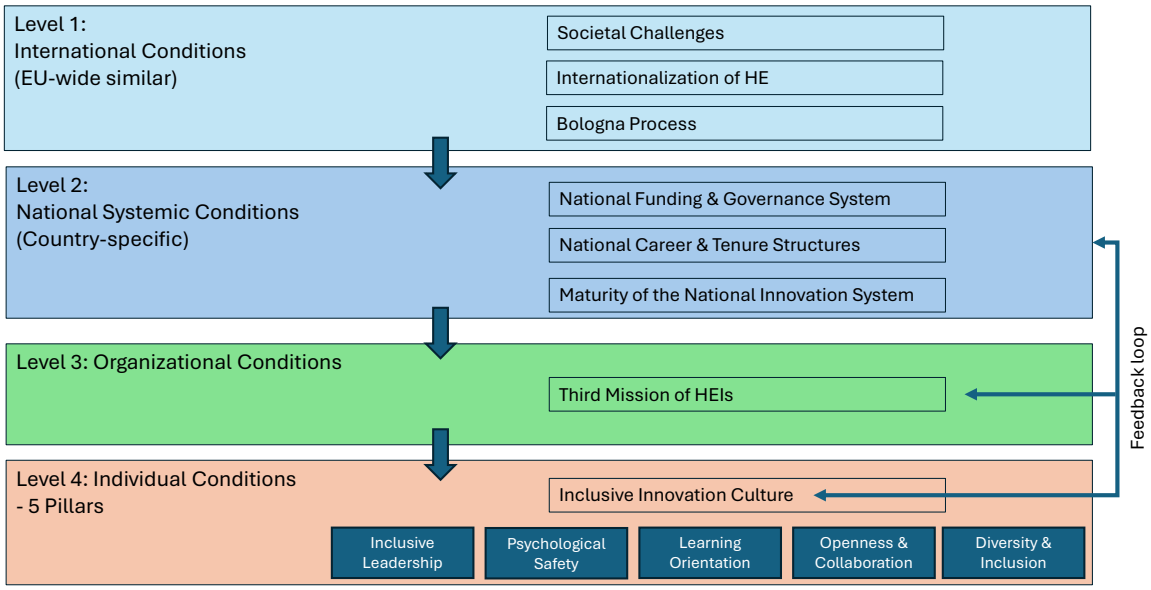


Figure 3: Overall rationale of the IIC concept applied

This level comprises country-specific conditions, such as the national funding and governance system, career and tenure structures as well as the maturity of the national innovation system. On the other hand,

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individual conditions, such as the IIC principles feed back to the organizational and the national system conditions by gradually changing these conditions. That is why the implementation of inclusive innovation culture (IIC) is considered important for altering the innovation culture at HEIs. Furthermore, altering an innovation culture is not possible in short-term durations. As every country follows its own distinct cultural and historical conditions, innovation culture is path-dependent and deeply embedded in institutional structures and mentalities of the national innovation systems, specifically in Higher Education Institutions (HEIs).

Systemic level

The international conditions comprise international developments and trends that have been played an influential role on the identity of higher education institutions (HEIs). Especially, three developments can be seen as overall developments that shaped the new role of the university in the twenty-first century. These developments had crucial impacts on principles of Inclusive Innovation Culture (IIC) and must therefore be critically reflected.

Societal challenges

As can be seen in climate change, changing demographic conditions, migration trends, the ageing of our populations, artificial intelligence or geopolitical shifts, the nature of societal challenges we are confronted with today, has changed. The wickedness and intertwining effects of societal challenges put increasing pressure on the role of higher education institutions (HEIs). Key characteristics of these challenges are among others complex human-environmental systems that are not comprehensively understood, especially regarding possible solutions they would necessitate. The international Organization for Economic Cooperation and Development (OECD) has, in this regard, launched the project OECD Education for Inclusive Societies, that aimed at outlining the consequences of this changing systemic and external conditions and what kind of tools higher education institutions have to cope with this changing environment (Brussino 2021). These shifts can help to

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understand better why Inclusive Innovation Culture concepts include important principles, such as diversity, equity or transdisciplinary research into their agenda.

Globalization and internationalisation of higher education

A further trend that needs to be highlighted and are intertwined with the importance of societal challenges, are trends of globalisation and internationalisation of higher education. It is important to note how globalisation and internationalisation of higher education relate to each other and which antecedents and consequences they have for innovation culture. Internationalisation refers to diverse activities of HEIs, such as mobility of faculty staff or students, but also partnerships and linkages between nations through joint study programmes or international-research projects. Higher internationalisation of education is therefore a direct consequence of the globalisation trend (Yousefi and Devi 2021). This internationalisation of higher education shapes the innovation culture of universities to a significant extent as these developments make higher education between countries more fluid and permeable, thus, opening it for attitudes, cultures and beliefs of other countries.

Bologna-Process

A further international trend that shaped especially higher education in the European Union, is the Bologna-process started in 1999 that aimed at creating a European Higher Education Area (EHEA). A dedicated goal of this reform project was, among others, to increase student and staff mobility for increasing the attractiveness of European higher education. A direct impact has been the rising cultural interpenetration that resulted from Bologna. Furthermore, the bologna process had also ramifications on the way teaching and research is applied. Among the wider impacts are learning cultures with high degrees of freedom. Students are considered individuals that conduct their research in an independent way and do not need close supervision by lecturers. Table

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6 below shows the analytical levels described in this deliverable with its main characteristics.

Analytical levels		
Systemic level	Organizational level	Individual level
Societal challenges • Wicked and intractable problems • Demand for inclusive societies Internationalization of Higher Education • Permeability between HEIs Bologna • European Higher Education Area • Increasing mobility • Common European Identity	First mission: Teaching Second mission: Research Third mission: HEIs as innovation-driven entities Focus: • Entrepreneurship, • Collaboration • Sustainability • Social engagement	Inclusive capacity IIC principles: • Psychological safety/inclusive leadership • Learning orientation • Adaptive processes • Boundary-spanning/external partnerships • Cognitive diversity

Table 6: Analytical levels for innovation culture

Organisational level

Inclusive Innovation Culture (IIC) must be seen in a wider paradigmatic shift of higher education institutions towards more directionality and solutions for societal challenges. As outlined before, internationalisation and the Bologna-process led to a ground-breaking transformation towards more coherent and harmonised education systems in Europe. As an immediate outcome of these transformational processes, universities had shifted from knowledge dissemination institutions to innovation-driven entities focusing on entrepreneurship, collaboration,

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sustainability or social engagement (Haj Taieb 2024). This shift had consequences for the organisational structure of universities. HEIs responded with the establishment of institutional and organisational interactions between universities, companies, or public research institutions. For instance, they launched technology transfer offices or used organisational instruments, such as mission statements to develop individual profiles and to support their branding activities. The way the third mission of universities is defined varies conceptually but can be separated in a narrow and a broad understanding. According to the narrow conceptualisation, third mission is primarily aimed at regional economic development including commercialisation activities and cooperation with local industry partners (Berghaeuser and Hoelscher 2020). The broader term captures not only economic functions of university engagement but also certain social contributions, such as social, entrepreneurial and innovative activities (Berghaeuser and Hoelscher 2020).

Besides its traditional role of teaching (first mission) and research (second mission), universities are increasingly considered places in which societal challenges are addressed, and diverse societal actors take responsibility for society. This paradigmatic shift has been labelled third mission and implies activities, such as social and civic engagement, technology and innovation transfer or entrepreneurial measures (Brandt et al. 2018). Furthermore, inherent in the third mission of universities is the assumption that university, industry, civil society and government (quadruple helix) have an intertwined relationship and mutually reinforce each other's performance with the goal to foster innovation in the knowledge-based society (Haj Taieb 2024). Based on this paradigmatic shift of the role of higher education institutions, specifically universities, Inclusive Innovation Culture (IIC) can be considered a logical consequence and must be seen in this wider systemic context. At the core of this concept stands the individual that actively shape its environment in relationship to other individuals.

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Individual level

Individuals at higher education institutions (HEIs) and principles for inclusive innovation culture (IIC)

Besides the important role of international and organisational trends that have shaped innovation culture, also individuals are considered change-makers that can actively promote inclusiveness at higher education institutions (HEIs). In the following, main principles of Inclusive Innovation Culture (IIC) applied to higher education institutions are discussed to obtain a better understanding why IIC is important for higher education institutions (HEIs) and to delineate its diverse applications in HEIs and research institutes. These principles served as the foundation for the IIC concept and were operationalised through specific indicators that have been applied in the survey. The methodological chapter provides an overview how the principles were applied in the survey (chapter 3.2.).

Inclusive leadership

With inclusive leadership, we understand the commitment as well as necessary capabilities (resources) and competences (skills) to promote inclusive innovation culture. As especially academic leaders are responsible for budgets, resources and responsibilities, individuals at higher hierarchies can lay the ground for changing an innovation culture towards an intended outcome. These individuals comprise academic professorship, such as assistant professor, associate professor or full professor, but also the higher management of HEIs, such as deans or chancellors. Leadership in that sense means that these leaders establish direction (developing a vision), align people (communicating a direction) and motivating (keeping people in the right direction) (Middlehurst 2012). But keeping people in the right direction does not imply that these people are not autonomous, all individuals along the whole hierarchy can contribute to inclusiveness at higher education institutions. Without suitable resources or investments that can be spend in inclusiveness, academic leaders cannot establish the adequate structural conditions for IIC. These can comprise specific

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trained staff for promoting the concept, such as equal opportunity coordinator or allocating necessary time or trainings for the staff. According to Brussino (2021) among the main challenges in inclusive teaching is the different understanding of diversity and inclusion that constrain the development of a comprehensive and well-developed IIC. At the same time, the OECD report highlights insufficient preparation and training for inclusive teaching (Brussino 2021). These challenges point to the importance of specific competences that are needed and does not only include gender and diversity, but more abstract and granular skills, such as critical reflection, global competence (capacity to examine local, global and intercultural issues), dismantling hidden bias or developing a growth mindset (Brussino 2021). To gain these core competences, necessitates that individuals, especially teachers and lecturers are capable to question their own assumptions and beliefs to critically reflect their mindsets. Especially regarding inherent attitudes and stereotypes (hidden bias) which influences beliefs and decision-making. Such hidden bias can be mitigated if these teachers and lecturers learn about the experiences and backgrounds of the students they teach and becoming aware of dominant subconscious behaviour (Brussino 2021). Inclusive leadership can therefore be seen as the cross-cutting characteristic of all principles as only hierarchical leaders in higher education institutions can initiate and communicate IIC principles grounded with resources and responsibilities.

Psychological safety

An important principle of Inclusive Innovation Culture (IIC) is psychological safety and inclusive leadership. Individuals in higher education institutions, either students or lecturers need to work in safe spaces in which they can freely speak about academic contexts without fearing that their voices are suppressed by supervisors or lecturers. Originating from organisational psychology, this principle is increasingly applied in global higher education and depends on the degree individuals feel respected, supported and accepted in their educational environment. In this regard, Kahn (1990) considered it a key psychological condition that form the dynamic and interactive

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relationship between individuals and the environment. The ideas of Kahn (1990) have been adopted by Edmondson (1999b) and defined psychological safety as a shared belief between team members who can freely express opinions and take risks without any fear of being sanctioned. Psychological safety is thereby an important requisite that must be ensured by inclusive leadership by hierarchical leaders.

Learning orientation (learning from failure)

Holistic and systemic concepts, such as the bioeconomy require that the future workforce has the necessary skills to implement bioeconomy within the global knowledge economy. In this regard, inter- and transdisciplinary teamwork for developing meaningful solutions to societal problems are crucial and necessitates inter- and transdisciplinary capacity (Klein 2023). Enabling such teamwork requires a culture that emphasises a shared conception of goals, common ground, mutual trust and a climate of cooperation between all involved team members. According to Klein (2023), following attributes for transdisciplinary orientation are paramount and affects inclusive innovation culture:

- Core Values
- Beliefs
- Attitudes
- Conceptual skills and knowledge
- behaviours

Hence, learning orientation by higher education institutions plays a pivotal role for equipping and skilling up students and researchers for their future jobs. Learning orientation has been extensively discussed in the literature. Here, we follow Vermunt (1996) who followed a definition comprising learning orientation as the whole domain of individual goals, intentions attitudes including worries and doubts of students (Spronken-Smith et al. 2015). Similarly, to the requirement of a certain extent of inclusive leadership, hierarchical leaders in higher education institutions must establish necessary structures enabling learning orientation. These structures might include certain learning platforms

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that integrate knowledge, experiences, dialogues and mentoring (Rusok et al. 2021). Concurrently, educators, such as lecturers must be supported in developing a learning culture to promote academic and professional qualifications. Several innovative concepts have been developed to nurture learning orientation in the age of digitalisation. A pathbreaking example is technology enhanced learning (TEL) which comprises the application of information and communication technologies to teaching and learning practices. The following Table 7 shows the main IIC principles that were applied in this deliverable and their characteristics.

IIC principles	***Characteristics***
Psychological safety/Inclusive leadership	• Shared belief between team members, safe spaces for individuals in HEIs, freedom of speaking up • Inclusive leadership as cross-cutting principle, important role of academic leaders
Learning orientation (learning from failure)	• Inter- and transdisciplinary teamwork • Climate of cooperation between team members • Learning platforms for knowledge, experiences, dialogues and mentoring
Adaptive processes & Creativity	• Conducting research that anticipates impacts for society • Supporting experimentation, (re)adjusting priorities, resources and objectives
Openness & Collaboration (Boundary-spanning)	• Individuals that promote network-oriented culture • Intermediaries between HEIs and establishment of collaborations and alliances (local communities, businesses, civil society)
Diversity & Inclusion	• Diversity and inclusion at higher education institutions

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	• Citizenship and common values of freedom, tolerance, and non-discrimination

Table 7: Characteristics of IIV Principles

For learning-oriented outcomes, creativity in terms of adaptive processes are considered critical for the successful development of an Inclusive Innovation Culture (IIC). This may comprise doing research that anticipate how its impact might affect people and society. Adaptive processes enable flexibility to support experimentation and allow organisations, such as HEIs to adjust priorities, reallocate resources and refine objectives for inclusive innovation culture. It has proven that learning-oriented adaptability strengthens collaboration, accelerate learning cycles and drives collective ownership of innovation outcomes (Qureshi and Nasir 2025). In this regard, adaptive models point to the increasing importance of iterative planning, data-driven decision-making and decentralised governance.

Openness & Collaboration (boundary-spanning)

Boundary-spanners refer to individual actors that pro-actively promote openness and collaboration through a network-oriented culture and act as intermediaries between higher education institutions and societal actors (Wahyuni et al. 2024). This is crucial as the nature of the societal challenges led to high complex adaptive systems in which a variety of actors are involved shaping how solutions at higher education institutions (HEI) can be developed. To develop a better understanding between these actors requires a strong network-oriented culture in which these actors co-create innovative solutions in joint undertaking and partnerships. The basic role and function of such individuals lie in the establishment of collaborations and alliances between an academic institution and the surrounding community. The following roles can be taken as reference point for a better understanding on boundary-spanning in higher education: (Wahyuni et al. 2024):

- Community-based problem-solver
- Engagement champion

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- Technical expert
- Internal engagement advocate

Boundary-spanner can therefore pro-actively shape and build networks internally as well as externally. In the context of higher education institutions (HEI), internal networks refer to partnerships with other disciplines and faculties to co-create innovation in bioeconomy-related contexts. However, networks can also be formed externally with societal actors, such as local communities, businesses or civil society organisations. Relevant instances are real-world laboratories, innovation labs or citizen labs in which different societal actors work closely together.

Diversity & Inclusion

Besides the foregoing principles of Inclusive Innovation Culture (IIC), diversity & inclusion has gained increasing traction in higher education. Due to wider international developments, such as demographic change, digitalisation or the use of artificial intelligence, borders between nation states as well as borders between disciplines become increasingly fluid. Migration has fundamentally transformed our societies and made higher education institutions more heterogeneous regarding the origins of students, researchers and professors. In this regard, Internationalisation of Higher Education is increasingly considered by universities developing strategies to cope with more diversity in the student's body. European countries have responded to this increasing demand with policy responses, such as with the Paris Declaration in 2015 to promote citizenship and common values of freedom, tolerance and non-discrimination or through the Bologna process (Claeys-Kulik et al. 2019). However, at the political level, so far only a few countries have developed concrete actionable measures to promote social inclusion at universities. Universities, in sharp contrast, have initiated several programmes for diversity and inclusion. This comprises institutional structures at universities and specific functions for promoting diversity and inclusion among the workforces.

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After the most important principles of inclusive innovation culture (IIC) have been critically reflected, it becomes clear how IIC can shape scientific excellence at higher education institutions (IIC). Through critical thinking, open feedback culture or individuals that are able to integrate businesses, local communities or civil society, the innovation potential of HEIs can significantly improve and up-scale. Through diversity and inclusion, HEIs can ensure that diverse minds are populated at HEIs and that different perspectives are included in developing solutions for grand challenges.

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Regional Profiles of Inclusive Innovation Culture (IIC) Case Studies:

While the regional case studies draw on evidence from all three stakeholder groups across all regional contexts, the degree of representativeness varies considerably between groups. The findings for EU Widening Countries and EU Associated Countries rest on broader and more diverse institutional bases, with survey and interview contributions from multiple institutions across several countries, giving these profiles a reasonable degree of regional representativeness. However, the findings for Germany & Austria, by contrast, should be interpreted with caution. The survey and interview sample are drawn from only two organisations and is strongly dominated by a single research institute — Fraunhofer ISI. The findings are therefore best understood as illustrative of IIC conditions in a particular type of well-established, project-oriented research environments rather than as representative of established institutions more broadly.

Cross-Regional Common Ground

Before presenting regional profiles, it is essential to establish what all three country groups share. These commonalities form the structural baseline from which regional differentiation departs.

Universal Strengths:

- High formal adoption of IIC strategies (56–71% across all groups and stakeholder levels in the survey; confirmed as universal by interview evidence);
- Shared rhetorical commitment to IIC values: openness, creativity, interdisciplinarity, gender equality, scientific ethics
- Strong external collaboration and networking as the most consistently positive cultural experience
- General goodwill toward IIC among leaders, researchers, and students alike.

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While these strengths are shared across all regional groups, their nature and depth differ. The **high formal adoption of IIC strategies** reflects institutional awareness and alignment with European research priorities rather than deep cultural embedding in most EU Widening and EU Associated Countries— as the translation gap demonstrates. Strategy adoption is a starting point, not an indicator of implementation. Similarly, the shared **rhetorical commitment to IIC** values is genuine but uneven in practice: values such as **openness and creativity are more visibly enacted in Established institutions,** while **in Widening and Associated institutions, they remain more aspirational** than operational. External collaboration is the most consistently positive finding across all groups and stakeholder levels, yet the **quality and institutionalisation of collaboration varies** — from well-structured partnerships in Established institutions to more project-dependent and informally maintained relationships in Widening and Associated contexts. The general **goodwill toward IIC** expressed is a good foundation for change, but it currently exists largely at the level of individual motivation rather than systemic support, especially in the Widening and Associated institutions. The following Table 8 summarises strengths that are shared by all institutions yet highlighting their specifics.

Strength	***Universal Pattern (All Groups)***	***Group A: Established (AT, DE)***	***Group B: Widening***	***Group C: Associated***
Formal IIC Strategy Adoption	High formal adoption (56–71% across all stakeholder levels)	Genuine alignment with mature research priorities	Institutional awareness, not deep cultural embedding	Institutional awareness, not deep cultural embedding
Rhetorical Commitment to IIC Values	Commitment to Openness, creativity, interdisciplinarity, gender equality, ethics widely endorsed	Values more visibly *enacted* in practice	Values remain more *aspirational* than operational	Values remain *aspirational "on paper"* than operational, co-exist with

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Strength	*Universal Pattern (All Groups)*	*Group A: Established (AT, DE)*	*Group B: Widening*	*Group C: Associated*
				informal practices
External Collaboration & Networking	Reported positive cultural experience across all groups	Well-structured, institutionalised partnerships	More project-dependent, informally maintained	Occasional, informally maintained
General Goodwill Toward IIC	Shared across leaders, researchers, students	Expressed consistently across all groups and is reinforced by institutional structures	Exists mainly at individual motivation level, lacks systemic support	Exists mainly at individual motivation level, lacks systemic support. the gap between individual goodwill and systemic support is more pronounced,

Table 8: Universal Strengths — Shared Baseline vs. Regional Specifics

Universal Weaknesses:

- **The Translation Gap**: Strategic visions exist but are perceived as too abstract to influence daily practice (56–70% of survey respondents across all groups; confirmed as universal in interviews)
- **The Resource Gap**: Verbal encouragement of exploratory research is not matched by dedicated funding, time, or structured support
- **The Silo Problem**: 50–65% of survey respondents in all groups identify departmental silos as the primary barrier to cultural

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change; interviews confirm five reinforcing root causes (structural, administrative, incentive-based, cultural, relational)

- **D&I Undervaluation**: The deliberate pursuit of diversity and inclusion is consistently not existent in performance reviews across all groups and regions.
- **Conflict Resolution Deficit**: Only 23–42% of survey respondents across all groups fully agree that conflicts are resolved constructively and fairly; interviews reveal that the dominant pattern across all institutions is conflict avoidance rather than substantive resolution
- **Hard Metric Dominance**: Publications, external funding acquisition, and educational titles are rated by far higher than IIC-related criteria in recruitment and performance reviews; respondents indicated that researchers with conventional outputs are much more likely to receive career advancement than those who actively promote innovation culture.
- **The Soft Skill Gap:** Creativity, constructive feedback, and conflict resolution are consistently the least institutionally supported skills across all groups.
- **Supervisor Dependency**: Across all groups, the IIC experience of early-career researchers is overwhelmingly determined by the individual supervisor rather than by institutional structures, policies, or culture
- **Administrative Burden:** The single most universally shared constraint across all institutions, consuming researcher time, deterring initiative, and privileging the status quo.[1]

[1] Administrative burden is a constraint shared across all institutions, but its manifestation differs by regional context. In established institutions in Germany and Austria, it takes the form of heavy procedural task loads that leave leaders and researchers with insufficient time and space for IIC practice — "deadlines and project successes outweigh all other issues." In Widening institutions, weak or absent research support mean that administrative demands fall directly on researchers, disproportionately affecting those without the experience or networks to navigate them efficiently. In Associated institutions, the burden is most severe: multi-layered governance and approval processes are so complex that individuals "are horrified by

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- **The Cognitive Diversity Gap:** Across virtually all institutions, diversity is primarily conceptualised in terms of gender, nationality, and disability[2] — a significant limitation for bioeconomy research requiring integration of natural scientific, social scientific, economic, and technological perspectives.
- **The Leader-Researcher Perception Gap:** A systematic discrepancy between leader and researcher accounts of the same institutional environments is the most consistent methodological and substantive finding across both survey and interview evidence — leaders consistently describe institutions as more open, functional, and strategically aligned than researchers experience them to be.[3]

However, while these weaknesses are shared across all regional groups, their nature, severity, and root causes differ significantly — and their cumulative effect is not uniform. While the Translation Gap is universal, it seems to have different backgrounds: in Established institutions it

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these procedures and often give up," and administrative rules can actively undermine IIC goals. Across all groups, the effect is consistent: administrative demands consume the time and energy required for creative, collaborative, and culturally transformative work.

[2] Related dimensions — including neurodiversity, disabilities, and psychological safety for students and early-career researchers — are recognised as highly relevant to an Inclusive Innovation Culture and were reflected in the IIC survey. However, a systematic analysis of these dimensions was beyond the primary scope of this report, which prioritises the disciplinary/epistemic diversity gap as the most pressing barrier specific to bioeconomy research. It should be noted that "cognitive diversity" in this analysis is understood specifically as the integration of disciplinary and epistemic perspectives (scientific, social, economic, and technological) necessary for bioeconomy research, rather than the broader spectrum of diversity dimensions covered elsewhere in the IIC framework (e.g., gender, nationality, disability).

[3] The leader-researcher perception gap is not primarily a matter of dishonesty but of positional visibility — leaders have limited access to the private dynamics of supervisory relationships and daily working conditions and may be subject to social desirability effects. Researchers, particularly early-career researchers, experience IIC from a position of structural vulnerability that makes its failures more visible and more consequential.

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reflects a disconnect between well-articulated strategies and operational practice, constrained by project pressure and administrative load. In Widening institutions, it is compounded by limited awareness and absent implementation tools. In Associated institutions it is most severe — with 70% of researchers finding visions too abstract and, in some cases, IIC not a known concept prior to BEAMING engagement.

The Resource Gap is equally universal, yet only one genuine internal funding mechanism for risk-taking was identified at a single Established institution. Everywhere else, exploratory research depends entirely on external competitive funding, which by design rewards risk mitigation.

The silo problem is present across all groups but rooted in different combinations of structural, administrative, incentive-based, cultural, and relational causes. In Established institutions, silos are sometimes incentive-driven, sustained by disciplinary funding streams and promotion criteria. In Widening institutions, a generational divide compounds structural barriers.[4] In Associated institutions, administrative rules represent a burden to collaborative projects, as joint project applications are too resource consuming because of this.

The **undervaluation of D&I in performance reviews** is a consistent finding across all groups, yet its nature differs. In Established institutions, D&I is rhetorically present but absent from evaluation criteria. In Widening institutions, a transparency deficit means many respondents cannot assess how D&I functions in formal processes. In Associated institutions, informal power structures — political influence and personal

[4] In Widening institutions, younger researchers seem to be more open to interdisciplinary collaboration and more aligned with IIC values, while senior staff remain primarily discipline oriented. Since funding, promotion criteria, and departmental structures are shaped by the preferences and established practices of the senior generation, early-career researchers who seek to build interdisciplinary expertise must rely on an environment that does not recognise or reward this orientation — and they lack the institutional support to change it.

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connections in hiring — represent a more fundamental threat to the meritocratic foundations that any meaningful D&I requires.

The **Conflict Resolution Deficit** takes different forms across groups. In Established institutions, trainings and formal mechanisms exist but are inconsistently applied. In Widening institutions, the absence of formal training in communication and conflict management might undermine supervisory quality. In Associated institutions, resolution is largely informal and case-specific, with a tendency of disadvantaging those with less institutional standing.

Hard Metric Dominance is universal, but its specifics vary. In Established institutions, external funding acquisition sometimes outweighs even scientific achievement itself. In Widening institutions, teaching performance and educational titles dominate. In Associated institutions, formal criteria are further distorted by informal power structures, making metric dominance not merely a cultural preference but a governance problem.[5]

The **Soft Skill Gap** is most acute where it is least acknowledged. In Established institutions, leaders are aware of the gap but face structural barriers (lack of time, incentives). In Widening and Associated institutions, the gap is aggravated by a definition of "support" that does not recognise creativity, conflict resolution, or constructive feedback as institutional development needs.

The Cognitive Diversity Gap — the tendency to conceptualise diversity primarily in terms of gender, nationality, and disability — is present across virtually all institutions. It is particularly consequential for bioeconomy research, which requires integration of different disciplines - natural scientific, social scientific, economic, and technological -, and which cannot be achieved through demographic diversity policies

[5] Qualitative survey feedback indicates that sometimes family connections, political affiliations, and personal networks are key in hiring and career advancement decisions. This means that even where formal merit-based criteria exist on paper, their application cannot be assumed to be consistent or impartial.

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alone. Table 9 summarises main universal weaknesses shared by all groups and their specifics.

Weakness	***Universal Pattern (All Groups)***	***Group A: Established (AT, DE)***	***Group B: Widening***	***Group C: Associated***
Translation Gap	Majority finds strategy too abstract for daily practice	Disconnect driven by project pressure & admin load	Compounded by limited awareness & absent implementation tools	Most severe; IIC sometimes unknown pre-BEAMING
Resource Gap	Verbal encouragement not matched by funding/time	Only 1 genuine internal risk-funding mechanism identified (single institution)	Exploratory research depends mostly on external competitive (mostly EU) funding	Exploratory research depends entirely on external competitive (EU) funding
Silo Problem	50–65% cite departmental silos as primary barrier	Sometimes incentive-driven (disciplinary funding/ promotion criteria)	Compounded by generational divide	Limited awareness, administrative rules burden joint applications
D&I Under-valuation	Not present in performance reviews, any group	Rhetorically present, but absent from evaluation criteria	Transparency deficit — unclear how D&I functions formally	Informal power/ political influence undermines meritocratic basis
Conflict Resolution Deficit	Only 23–42% agree conflicts resolved fairly; avoidance dominant	Formal mechanisms exist but inconsistently applied	No formal training in communication /conflict management	Largely informal, case-specific; disadvantages those with less standing
Hard Metric Dominance	Publications/ funding/	External funding acquisition	Teaching performance &	Further distorted by informal

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Weakness	Universal Pattern (All Groups)	Group A: Established (AT, DE)	Group B: Widening	Group C: Associated
	titles outweigh IIC criteria	sometimes outweighs scientific merit	educational titles dominate	power structures (governance issue)
Soft Skill Gap	Creativity, feedback, conflict resolution	Leaders aware, but structurally constrained (time, incentives)	"Support" doesn't recognise these as development needs	"Support" doesn't recognise these as development needs

Table 9: Universal Weaknesses — Shared Barrier vs. Regional Specifics

Regional Case Studies

Germany & Austria (Group A)

Group A institutions are well-established, operating in a stable, resource-rich national research environment. The interview sample covers two Established institutions across Germany and Austria. The survey group "leader" (n=19) is dominated by economics, coordination and innovation research (30%), environmental sciences and circular economy (22%), biotechnology (20%), and forestry (15%). The group "researcher" (n=25) is strongly shaped by economics and social sciences (80%), with the sample dominated by respondents from Fraunhofer ISI (84% of researcher respondents). The group "students" (n=14) is the smallest in the survey. A notable structural heterogeneity exists between the two Established institutions: one demonstrates stronger structural IIC embedding at the research level; the other shows stronger embedding at the educational level.

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Commitment to IIC

Across all three stakeholder groups in the survey, Group A demonstrates the highest level of internal alignment regarding IIC awareness and the clearest understanding of what IIC entails.

Leaders report strong senior management commitment: 75–90% state that senior management actively communicates IIC values, acts as role models, and encourages others. Approximately 85% confirm that individuals support IIC. However, a notable knowledge gap exists regarding whether an official IIC strategy or vision is in place and what it contains. Training, practical guidelines, and tools lag behind, with 37% of leaders reporting they do not receive such support.

Researchers present a more critical picture. While 56% acknowledge an official IIC strategy, an equal 56% find these visions too abstract to influence daily practice. The majority note that **individuals striving for IIC typically lack the influence to drive institution-wide change**.

Students paint a broadly positive but nuanced picture. They acknowledge key leadership functions — role modelling (57.1%), encouraging IIC practice (50%), providing support and guidance (35.7%). Communication of IIC strategies received the lowest acknowledgment (28.6%).

Interview evidence deepens this picture. From a leadership perspective, formal structures are described as functioning and institutional commitment to IIC is genuine. Leaders acknowledge specific gaps but frame these as operational rather than structural failures. From an early-career researcher perspective, however, IIC is not yet experienced as a coherent organisation-wide framework. The dominant most structural constraint — third-party funding dominance — is felt acutely by those whose work is entirely project-bound project timelines and deliverables leave little room for exploratory thinking, and the pressure to deliver within project parameters is experienced as a daily reality rather than a strategic choice. Junior researchers note that creativity is encouraged in principle but that no time, mentoring, or institutional

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recognition accompanies that encouragement — people are pushed to try new things but *"left alone with their new way of work."*

Leadership Role

Leaders in Group A are perceived as broadly supportive and encouraging, but a significant disconnect exists between encouragement and active role modelling. While supervisors are seen as generally encouraging, 28% feel their supervisors do not demonstrate IIC principles in their daily actions.

Interview evidence provides structural explanation. **The problem is not only skill but incentive**: leaders lack the time and institutional support to apply new competencies even when they acquire them. An important observation from this group is that conventional training formats are described as ineffective when decoupled from everyday situations. *"Learning-by-doing with structured reflection"* is proposed as more effective.

The demand for structural support of IIC is high: 80% of survey researchers call for specific training or mentoring for leaders, 72% want to learn from other institutions, and 72% request clear action plans. Researchers also call for structural space, noting that current financing models set incentives that conflict with IIC, and that critical discussions on institutional weaknesses are needed. Leaders call for training in communication skills, clear IIC information, and on the strategic level, staff mentoring, learning from good practice, and guidance for IIC strategy development.

Cultural Experiences

Psychological Safety: Group A demonstrates the highest levels of psychological safety among the three groups. Survey leaders report 80–90% agreement with feeling valued, safe to express ideas, and comfortable admitting mistakes. Researchers confirm relatively high safety for unconventional ideas (68%) and constructive criticism (64%). However, conflict resolution is a persistent weakness: only 40% of

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researchers fully agree that conflicts are resolved fairly, and 48% feel comfortable admitting mistakes only "to a certain extent."

Discussions are described as active, critical, and constructive, with relatively flat hierarchies — and crucially, this account is consistent across both leaders and researchers, a convergence suggesting genuine rather than merely claimed openness. However, constraints are primarily structural rather than interpersonal: autonomy exists in thesis work but not in project work with tight schedules. Successfully challenging established approaches still requires *"leverage, reputation, and confidence"* — resources that PhD students often lack. A formal institutional safeguard body exists in at least one Established institution, yet persistent unresolved conflicts are acknowledged, with staff departure as a documented consequence.

Risk Tolerance and Learning from Failure: Survey leaders show the highest tolerance for risk among all groups: 68% state their institution encourages risk-taking through exploratory innovative research, and approximately 47% state that failure in such projects does not harm the researcher's career. However, researchers tell a more cautious story: only 40% believe failed projects will not harm their career, and 28% "don't know" — suggesting that career consequences of failure remain opaque for many. Despite 80% total agreement that organisations encourage innovative research, 48% explicitly state that no specific funding or time is provided for exploratory projects. Only 20% feel unsuccessful projects are treated as learning opportunities.

Interview evidence confirms and explains this gap. The internal funding mechanism for risk-taking was indicated for one established institution. However, all advanced institutions disproportionally rely on external competitive funding that by design favours lower-risk, more predictable research designs.

Collaboration and Interdisciplinarity: All survey leaders confirm that external research collaborations are actively supported and valued, and interdisciplinary exchange is well-established. Researchers confirm strong external ties (64% full agreement), with formal

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interdisciplinary structures present for 32% and partially present for 40%. Students broadly acknowledge interdisciplinary opportunities.

Interview evidence adds an important corrective. More interdisciplinary platforms do not automatically produce better interdisciplinarity. The constraint may not be the absence of platforms but the lack of time and incentive to participate in them. **External collaboration is described as very strong to strong, but predominantly project-based and individually driven.**

Diversity, Inclusion, and Belonging: Survey leaders see diversity and inclusion as a shared responsibility, and active anti-discrimination promotion is confirmed by most respondents. Researchers show high communication rates (68%) and shared responsibility (76%), with 52% reporting active recruitment of diverse staff. Students, however, present a more critical view: 35.7% do not perceive diversity among the teaching and supervisory body, and the same proportion do not perceive diversity among student bodies in courses and study programmes.

Interview evidence highlights a specific integration challenge. **The most comprehensive formal D&I framework in the entire interview sample is found in the Established group**. But even here, staff report difficulties integrating despite formal welcome mechanisms, suggesting that cultural inclusion requires ongoing attention beyond formal procedures.

Role-Specific Experiences

In recruitment and performance reviews, IIC-related competencies are systematically undervalued relative to scientific achievement across all stakeholder groups.

Survey leaders report that interdisciplinarity is given equal weight by only 42.1%, with 47.3% rating it as less or much less important. Creativity is seen as equal by only 26.3%, with nearly 58% rating it as secondary. The deliberate pursuit of D&I fares worst: 63.2% rate it as less or much less weighted. Qualitative feedback highlights that commercial

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understanding and management skills for third-party funded research are dominant evaluation criteria, crowding out IIC-related qualities.

Survey researchers confirm this: D&I is the most marginalised competency (72% report it receives less or much less weight). **Crucially, researchers identify *"bringing in external funding"* as the primary competency — outweighing even scientific achievement itself —** shifting weight toward project leadership and acquisition skills. Critical thinking, interdisciplinarity, and the "will to change something" are seen as individually important but absent from formal assessment structures.

Interview evidence provides further explanation**. With two exceptions across, respondents identified the researcher with conventional, predictable outputs as more likely to receive career advancement** than the researcher who took risks, failed, and learned. Senior researchers and leaders frame this as a systemic problem external to the institution — national evaluation frameworks, European metrics culture, competitive funding structures.

Students acknowledge that mentoring, coaching, inter- and transdisciplinary research, and corresponding methodology are actively pursued in courses. However, 28.6% find skill development support difficult to access, 35.7% report a lack of creativity methods, and 28.6% note that constructive conflict resolution is not available.

Support for IIC Skill Development

Group A institutions show strong support for operational and project-based skills — project management, didactics, leadership mentoring (79% reported support availability), and inter- and transdisciplinary methods. **However, the soft skill deficit is pronounced**:

- Creativity and critical thinking are institutionally supported definitively according to 15.8% of leaders and 4% and 12% of researchers
- Conflict resolution shows a low definitive "Yes" (12% among researchers), with 20% reporting no support

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- Constructive feedback support is not provided for 28% of researchers
- High "Don't know" (8%-12%) rates among researchers suggest that soft skill development is not clearly formalised as an organisational resource.

The most acute needs identified by survey researchers are: clear information on what IIC is, communication and soft skills training, application-oriented research methods, and creativity techniques.

Theme	***Leaders (n=19)***	***Researchers (n=25)***	***Students (n=14)***	***Interview Evidence (Qualitative)***
Commitment to IIC	75–90% report senior management actively communicates/ models IIC; 85% confirm individual support; 37% report lack of training/ tools	56% acknowledge official IIC strategy exists; 56% find it too abstract for daily practice	Role modelling: 57.1%; Encouragement: 50%; Strategy communication: only 28.6% acknowledged	Leaders: structures "functioning," gaps framed as operational. Early-career researchers: IIC not experienced as coherent framework; project-bound work leaves no room for exploration ("left alone with their new way of work")

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Theme	*Leaders (n=19)*	*Researchers (n=25)*	*Students (n=14)*	*Interview Evidence (Qualitative)*
Leadership Role	—	28% feel supervisors do not model IIC in daily actions		Leaders lack time/institutional support to apply new competencies; conventional training seen as ineffective; "learning-by-doing with structured reflection" proposed
Structural Support Demand	Leaders request: communication training, clear IIC info, strategy guidance	80% want leader training/mentoring; 72% want peer learning; 72% want clear action plans		Researchers note financing models create incentives conflicting with IIC

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Theme	*Leaders (n=19)*	*Researchers (n=25)*	*Students (n=14)*	*Interview Evidence (Qualitative)*
Psychological Safety	80–90% feel valued/safe to express ideas/admit mistakes	68% safety for unconventional ideas; 64% for constructive criticism; only 40% agree conflicts resolved fairly; 48% admit mistakes only "to a certain extent"		Discussions described as active/critical/ flat hierarchy — consistent across leaders & researchers (genuine, not performative). Autonomy limited in project (vs. thesis) work; challenging norms requires "leverage, reputation, confidence"
Risk Tolerance & Learning from Failure	68% report risk-taking encouraged; ~47% say failure doesn't harm career	Only 40% believe failure won't harm career; 28% "don't know"; 48% report no dedicated funding/ time for exploration; only 20% see failed projects as learning opportunities		Only 1 institution has an internal risk-funding mechanism; all rely disproportion-ately on external competitive funding (favours low-risk designs)

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Theme	Leaders (n=19)	Researchers (n=25)	Students (n=14)	Interview Evidence (Qualitative)
Collaboration & Interdisciplinarity	100% confirm external collaboration valued/ supported	64% full agreement on strong external ties; formal interdisciplinary structures: 32% full / 40% partial	Broadly acknowledge interdisciplinary opportunities	More platforms ≠ better interdisciplinarity; constraint is time/incentive to participate, not platform availability; collaboration mostly project-based, individually driven
Diversity, Inclusion & Belonging	Majority confirm shared responsibility + anti-discrimination promotion	68% communication of D&I; 76% shared responsibility; 52% active diverse recruitment	35.7% do not perceive diversity in teaching/supervisory staff; 35.7% do not perceive diversity among student peers	Most comprehensive formal D&I framework in entire sample found here — yet staff still report integration difficulties despite formal mechanisms

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Theme	Leaders (n=19)	Researchers (n=25)	Students (n=14)	Interview Evidence (Qualitative)
Evaluation Criteria (Recruitment/Performance)	Interdisciplin-arity weighted equally: only 42.1% (47.3% rate it lower); Creativity equal: 26.3% (58% lower); D&I: 63.2% rate lower/much lower	D&I most marginalised (72% lower/much lower); "external funding acquisition" identified as top competency — above scientific achievement itself	28.6% find skill-development support hard to access; 35.7% report lack of creativity methods; 28.6% lack conflict-resolution support	Except 2 cases, all respondents: researchers with conventional outputs advance faster than risk-taking researchers; framed as systemic (national frameworks, EU metrics, competitive funding) — not institution-specific
Skill Development Support	Creativity/ critical thinking definitively supported: 15.8%	Creativity support: 4% (definitive); Conflict resolution: 12% (definitive), 20% report none; Constructive feedback: 28% report none; "Don't know" rate: 8–12%	Project/ operational skills (mentoring, didactics) well supported: 79%	Most acute researcher needs: clear IIC information, communication/ soft-skills training, application-oriented methods, creativity techniques

Table 10: Universal Weaknesses — Shared Barrier vs. Regional Specifics

Integrated Regional Profile

Key characteristics of IIC in group A organisations (Germany and Austria

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The data across all three survey groups and the interview evidence tells a coherent and internally consistent story for Group A. These are mature, relatively well-resourced institutions with strong formal structures, high interdisciplinary rhetoric, and relatively high psychological safety. IIC is institutionally acknowledged and partially embedded. Yet the system is caught in what might be described as the **Efficiency Paradox**: institutions optimised for hard-metric performance (funding acquisition, publications, project delivery, administrative compliance) become structurally resistant to "creative chaos" required for true innovation. Culture. The results of leaders, researchers, and students are mutually reinforcing. Leaders are aware of IIC and broadly supportive; researchers experience the gap between this support and daily practice; students appreciate the innovative environment but identify the same soft-skill and diversity gaps.
Key Challenges
• Administrative overload and third-party funding dominance crowd out time and space for IIC practice • Reward systems incentivise funding acquisition over innovation culture • Soft skills (creativity, conflict resolution, constructive feedback) are under-supported despite high awareness • Leadership encourages IIC but does not consistently model it; training formats are sometimes decoupled from daily practice • The cognitive diversity gap limits the genuine interdisciplinarity required for bioeconomy research
Key Opportunities
• High baseline of psychological safety and interdisciplinary culture to build upon • Strong external collaboration networks and genuine openness to improvement • Existing mentoring and leadership support structures can be extended to better integrate IIC skills • Relatively flat hierarchies

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- The most developed formal D&I and safeguard infrastructure in the sample provide a model for other groups
- High awareness and genuine goodwill create receptive conditions for targeted intervention.

Recommendations for Strengthening Inclusive Innovation Culture

Improving Inclusive Innovation Culture in Group A institutions is not primarily a matter of values or goodwill — both are already present in both organisations. **It is a matter of structural alignment**: ensuring that the institutional conditions, incentive systems, and daily practices support.

1. Reform Evaluation Systems to Recognise IIC Contributions

One of the structural barriers to IIC in Group A is the dominance of hard metrics — external funding acquisition, publication counts — in performance reviews. As long as researchers are evaluated exclusively on these conventional outputs, the pursuit of IIC-related priorities remains rhetoric. Research on incentive alignment in knowledge organisations consistently shows that what is measured and rewarded shapes behaviour more powerfully than what is merely encouraged (Kerr 1975); (Rijcke et al. 2016); (Muller 2018). Without evaluation reform advanced by the responsible-metrics movement (Hicks et al. 2015); CoARA, 2022[6]), all other IIC interventions risk being structurally undermined.

What IIC-relevant performance metrics should be integrated alongside scientific and technological metrics:

[6] https://www.coara.org/wp-content/uploads/2025/11/2022_07_19_rra_agreement_final.pdf-3.pdf

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Research on innovation culture, team performance, and organisational learning identifies a consistent set of metrics that are both measurable and predictive of innovation performance. **The following dimensions can be explicitly incorporated into performance review frameworks for researchers and leaders in HEIs and research organisations**:

Collaboration and Knowledge Exchange
• Active participation in interdisciplinary and cross-departmental projects, measured by project composition and co-authorship diversity[7]. • Contribution to external knowledge transfer — industry collaboration, stakeholder engagement (Perkmann et al. 2013), (Spaapen and van Drooge 2011). • Mentoring and supervision contributions, including quality of supervisory relationships assessed through structured feedback from supervisees (Eby et al. 2008; Eby et al. 2013).
Psychological Safety and Team Climate
• Feedback on leadership behaviours specifically related to IIC — openness to challenge, constructive feedback practices, and inclusive decision-making[8].
Creative and Exploratory Contribution
• Participation in exploratory and innovative research — including projects that did not produce conventional outputs — recognising the role of exploration (March 1991) and the innovation value of intelligent, "productive" failure (McGrath 1999; Edmondson 2011).
Learning and Development Contribution
• Establishment of, participation in, and active contribution to institutional learning activities — peer-learning networks,

[7] Team-based research and knowledge combinations are associated with higher-impact work Wuchty et al. 2007; Uzzi et al. 2013, and diverse teams in particular produce more novel, higher-impact science Yang et al. 2022.

[8] Recognising directly that psychological safety is empirically validated driver of team learning and innovation Edmondson 1999b; Frazier et al. 2017, and that inclusive leadership behaviours foster it Carmeli et al. 2010, Nembhard and Edmondson 2006.

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knowledge-sharing events, training facilitation.[9] It can be effectively realised through communities of practice (Wenger 2013).

The **Coalition for Advancing Research Assessment (CoARA, 2022)**[10], provides a ready-made, European-level framework for moving beyond exclusive reliance on bibliometric indicators.[11] Complement this with the **Dutch Recognition and Rewards programme**[12], which has operationalised a five-domain evaluation framework. Further, the **Leiden Manifesto** (Hicks et al. 2015) provides the scientific basis for responsible metric use and is widely cited in European research policy. Critical for the implementation of new metrics is that they must be introduced gradually and transparently.

2. Establish Dedicated Internal Funding and Protected Time for Exploratory Research

[9] This acknowledges the fact that an organisation's capacity to absorb and diffuse knowledge internally is a driver of collective innovation capacity Cohen and Levinthal 1990; Argote and Ingram 2000.

[10] CoARA – Coalition for Advancing Research Assessment

[11] CoARA does not abolish established metrics but requires that they be used responsibly and contextually, alongside qualitative assessment. Its ten core commitments ask signatory institutions to: recognise the full diversity of research contributions beyond publications — including datasets, methods, mentoring, public engagement, and knowledge transfer; base assessment primarily on qualitative peer judgement rather than proxy indicators; abandon the inappropriate use of journal impact factors and h-indices as measures of individual researcher quality; and invest in transparent, inclusive assessment processes that account for diverse career trajectories.

For HEIs and research organisations seeking to strengthen IIC, CoARA provides the most practically accessible and institutionally legitimate entry point for evaluation reform currently available in the European context.

[12] https://sfdora.org/2025/02/18/netherlands-recognition-rewards-program-and-its-implementation-at-erasmus-university-rotterdam/

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Research on organisational innovation indicates that resources — time and funding not tied to immediate deliverables — support exploratory thinking and the novel recombination of ideas (Nohria and Gulati 1996). Critically, funding structures that grant autonomy and tolerate early failure produce more breakthroughs than short-horizon, deliverable-driven schemes (Azoulay et al. 2011; Manso 2011), making exploratory funding necessary (Wang et al. 2017).

This can be done through introducing small internal seed funding schemes — dedicated budget lines for exploratory, high-risk, and interdisciplinary research that does not yet fit external funding calls. **Ideally, a defined proportion of researcher time (10–15%) should be dedicated to self-directed exploratory work**. Debriefing processes for unsuccessful projects can be formalised using **After-Action Review methodology** (Morrison, J.E. & Meliza, L.L. 1999), converting failure into documented institutional learning without attributing blame.

3. Embed Soft Skill Development in Daily Practice

Reviews and meta-analyses of team innovation research identify psychological safety, constructive dissent, and creative thinking as strong contributors to team-level innovation performance (Hülsheger et al. 2009; Anderson et al. 2014; Dreu and West 2001). Conventional training formats are described as ineffective when decoupled from daily practice — consistent with the experiential-learning and training-transfer literatures (Sitzmann and Weinhardt 2018).

There are different approaches and methodologies on how to improve creativity depending on the goal pursued — whether improving individual creative thinking, enhancing team ideation, solving specific technical problems, or building a sustained organisational innovation culture — and the resources and time available for implementation. **The fundamental precondition for this is psychological safety:** no creativity method produces sustained results where people do not fear judgement or career consequences for

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unconventional ideas (Edmondson 2019). Once this foundation is in place, institutions can progress through:

How to improve creativity and critical thinking
• **At the operational level**, proven creative techniques — such as **Brainwriting** (Paulus and Yang 2000)[13]**, Six Thinking Hats** (Bono 1985)[14]**, and pre-mortem analysis (**Klein 2008)[15] — can be integrated into existing formats to improve the quality and diversity of ideas generated in daily work;
• **At the developmental level,** more structured methodologies, such as **Design Thinking** (Brown 2009)[16] for interdisciplinary and user-centred

[13] Brainwriting: A structured brainstorming in which participants first generate ideas individually and in writing, before these ideas are shared, discussed, or built upon as a group. This method addresses well-documented weaknesses of traditional group brainstorming — such as production blocking (waiting for one's turn to speak) and evaluation apprehension (fear of criticism) — which tend to suppress idea quantity and diversity, particularly among more junior or less vocal participants. Paulus and Yang's research demonstrated that generating ideas individually before group discussion produces a greater number and diversity of ideas than group brainstorming alone.

[14] Six Thinking Hats: Technique, in which a group deliberately considers a problem from six distinct perspectives, symbolized by six coloured "hats" — e.g., factual/neutral information (white), critical judgment (black), optimistic benefits (yellow), creative alternatives (green), emotional reactions (red), and process/meta-level thinking (blue). By having the entire group adopt the same "hat" (perspective) at the same time, rather than debating from fixed, conflicting viewpoints, the method reduces adversarial discussion and encourages parallel, structured exploration of an idea from multiple angles before conclusions are drawn.

[15] Pre-Mortem Analysis: Developed by cognitive psychologist Gary Klein, a pre-mortem is a structured technique conducted *before* a project or decision is finalized, in which team members imagine that the project has already failed and work backward to identify plausible reasons for that failure. By legitimizing critical, failure-oriented thinking in advance — rather than only after a setback occurs — the technique surfaces risks and blind spots that participants might otherwise avoid raising for fear of appearing overly negative or challenging group consensus, thereby improving decision quality and risk anticipation.

[16] Design Thinking: A structured, iterative problem-solving methodology that centers human needs throughout the innovation process. It typically progresses through five

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problem-solving, or **TRIZ (**Ilevbare et al. 2013);[17] for systematic technical innovation,— provide evidence-based frameworks for building creativity as a teachable, transferable skill ; .

- **At the structural level,** protected time for exploratory work, built-in incubation periods, and institutionally reinforced mindset — that innovative capacity develops through practice and that failure is a learning opportunity rather than a career risk — provide the conditions under which lasting change is expected.

For conflict resolution and feedback, the **nonviolent communication framework**[18] (Wacker and Dziobek 2018), has demonstrated

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phases: *empathize* (understanding user needs through observation and engagement), *define* (framing the core problem), *ideate* (generating a broad range of potential solutions), *prototype* (building low-fidelity representations of solutions), and *test* (gathering user feedback to refine solutions). Design Thinking deliberately brings together diverse disciplinary perspectives (e.g., engineering, social science, business) around a shared user-centered framework rather than a single technical logic. Because it starts from empathizing with end-users rather than from disciplinary assumptions, it provides a common language and process that different fields can use jointly — making it particularly suited to complex, cross-disciplinary challenges such as those found in bioeconomy research, where technological, social, and economic perspectives must be integrated around shared stakeholder needs.

[17] TRIZ (Theory of Inventive Problem Solving): A systematic, algorithmic methodology for technical innovation, based on his analysis of hundreds of thousands of patents. TRIZ identifies recurring patterns of *inventive principles* (e.g., 40 standardized principles such as segmentation, asymmetry, or "the other way round") and contradiction-resolution techniques that engineers can systematically apply to technical problems, rather than relying on unstructured trial-and-error or purely intuitive brainstorming. Unlike open-ended ideation techniques, TRIZ provides a structured, repeatable framework specifically for resolving *technical contradictions* (e.g., a design requirement that improving one parameter worsens another). This makes it especially applicable to engineering- and technology-heavy innovation contexts — such as bioprocessing, materials development, or technical scale-up in bioeconomy applications — where solutions must satisfy concrete technical constraints rather than purely conceptual or user-experience goals.

[18] **Nonviolent Communication (NVC)** is a structured communication framework designed to foster empathetic dialogue and resolve conflict without blame, judgment,

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effectiveness in academic environments and can be implemented there.

4. Strengthen Leadership Role Modelling

Leadership behaviour is a strong predictor of team psychological safety and innovation climate (Frazier et al. 2017; Nembhard and Edmondson 2006; Hülsheger et al. 2009). Training leaders on what IIC means in practice and how to actively foster it in their work with researchers and students is therefore a precondition for any meaningful IIC improvement. **This can be achieved through targeted, practice-oriented IIC training covering aspects, such as**:

- what IIC concretely means in a research and teaching environment;
- how to create psychological safety in supervisory relationships and team meetings;
- how to give constructive feedback; and
- how to actively foster creativity, interdisciplinarity, and diversity in their teams.

Training must be embedded in real work contexts rather than delivered as standalone workshops, following the evidence that decoupled training produces have no lasting behavioural change (Sitzmann and

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or coercion. It is built around four core components: **Observation** — describing a specific situation factually, without evaluation or judgment. **Feelings** — expressing the emotional response to that observation. **Needs** — identifying the underlying unmet need driving that feeling. **Requests** — making a clear, concrete, actionable request rather than a demand. The framework also emphasizes **empathetic listening** — applying the same four components to understand the other party's observations, feelings, needs, and requests — making it a two-directional dialogue tool rather than a one-sided feedback technique. Because NVC provides a low-risk, structured way to express disagreement or dissatisfaction without personal accusation, it is particularly suited to hierarchical academic settings where junior researchers may otherwise avoid raising concerns with supervisors.

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Weinhardt 2018). **Effective formats involve a structured peer learning network** — regular, facilitated exchanges between leaders on concrete IIC challenges in their own work (Wenger 2013; Marquardt 2011) — **complemented by a feedback on IIC-related leadership dimensions** to create accountability for role modelling (David Boud 2012).

5. Introduce Structural Protections for Early-Career Researchers

The most novel ideas often emerge from those with fresh perspectives and a willingness to challenge orthodoxies — and outsiders to a field can be disproportionately effective problem-solvers (Jeppesen and Lakhani 2010). Yet researchers early in their careers are most structurally vulnerable to supervisory power asymmetries, which can suppress their innovation potential.

This can be addressed through:

- **Mandating co-supervision or team-based supervisory structures for all doctoral researchers** — an approach increasingly adopted internationally to distribute supervisory power and improve oversight (Halse and Malfroy 2010; Guerin and Green 2015).
- **Establishing or strengthening accessible, confidential, and structurally independent ombudsperson or integrity-officer functions,** providing early-career researchers with a safe reporting channel for concerns. **The *DFG Guidelines for Safeguarding Good Research Practice*** (DFG, 2019/2022)[19] provide a directly applicable and institutionally legitimate framework, and the *European* ***Code of***

19 https://www.dfg.de/en/basics-topics/basics-and-principles-of-funding/good-research-practice

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***Conduct for Research Integrity* (ALLEA, 2023)**[20] provides the broader normative foundation.[21]
• **Independent progress reviews:** All doctoral and postdoctoral researchers should undergo regular (e.g. annually) independent progress reviews conducted by a committee including at least one external member.[22] ***The Concordat to Support the Career Development of Researchers***[23] offers a practical, widely adopted implementation framework directly applicable to HEI contexts.

Table 11 summarises the strategic measures described above to help improve IIC in Advanced Countries.

	Recommendation	***Problem Addressed***	***Key Actions***
1	Reform Evaluation Systems to Recognise IIC Contributions	Hard metrics (funding acquisition, publication counts) dominate performance reviews, making IIC-related priorities purely rhetorical	• Integrate collaboration/ knowledge-exchange metrics (interdisciplinary project participation, co-authorship diversity, industry engagement, mentoring quality) • Add psychological safety/team climate feedback on leadership behaviours

[20] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/european-code-of-conduct-for-research-integrity_horizon_en.pdf

[21] Accessible, well-communicated reporting mechanisms are a recognised precondition for staff to raise concerns without fear of reprisal — a core component of psychological safety and employee voice Edmondson 2019.

[22] This creates a structured, low-threshold opportunity for early-career researchers to raise concerns, makes supervisory-relationship quality periodically visible to the institution, and provides a formal mechanism for identifying problems before they escalate.

[23] https://researcherdevelopmentconcordat.ac.uk/wp-content/uploads/2022/01/Researcher-Development-Concordat_Sept2019-1.pdf

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	Recommendation	Problem Addressed	Key Actions
			• Recognise exploratory/ high-risk research, including "productive failure" • Recognise learning & development contributions (peer-learning networks, training facilitation) • Introduce metrics gradually and transparently
2	Establish Dedicated Internal Funding & Protected Time for Exploratory Research	Lack of resources (time/funding) for exploratory, high-risk, interdisciplinary work not yet fundable externally	• Introduce small internal seed-funding schemes for exploratory/high-risk/ interdisciplinary research • Dedicate 10–15% of researcher time to self-directed exploratory work • Formalise debriefing of unsuccessful projects via After-Action Review methodology (blame-free institutional learning)
3	Embed Soft Skill Development in Daily Practice	Creativity, conflict resolution, and constructive feedback are under-supported; conventional training is ineffective when decoupled from daily practice	• Precondition: Psychological safety must exist first Operational level: Integrate creativity, ideation, critical thinking methodologies, such as Brainwriting, Six Thinking Hats, pre-mortem analysis into existing formats • Developmental level: apply Design Thinking, TRIZ as proven methodologies • Structural level: Protected time, incubation periods, institutional mindset that failure = learning • Nonviolent Communication framework for conflict resolution/feedback

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	Recommendation	Problem Addressed	Key Actions
4	Strengthen Leadership Role Modelling	Leaders encourage IIC but do not consistently model it; training is often generic and decoupled from practice	• Practice-oriented IIC training: what IIC means concretely; creating psychological safety in supervision/meetings; giving constructive feedback; fostering creativity/ interdisciplinarity/ diversity • Embed training in real work contexts, not standalone workshops • Structured peer-learning networks among leaders • Feedback mechanisms on IIC-related leadership behaviours for accountability
5	Introduce Structural Protections for Early-Career Researchers	Power asymmetries in supervisory relationships suppress the innovation potential of early-career researchers, who are structurally most vulnerable	• Mandate co-supervision/ team-based supervisory structures for doctoral researchers • Establish/strengthen independent, confidential ombudsperson/integrity-officer functions • Introduce independent progress reviews incl. external committee member

Table 11: Overview of Strategic Measures to Strengthen Inclusive Innovation Culture (Group A)

EU Widening Countries (Group B)

Institutional and Demographic Context

Group B institutions (mostly in Bulgaria, Czech Republic, Hungary, and Croatia and a few respondents from Romania and Greece) are located in EU Widening Countries. The disciplinary profile of survey leaders is

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dominated by biotechnology (38%), environmental sciences and circular economy (20%), and economics/coordination (20%). Survey researchers are led by circular economy (34%), environmental science (29%), and agriculture (26%). Students primarily study economics, environmental science, and food science.

Among leaders, the majority have more than ten years of experience. Among researchers, nearly 40% have held their positions for over ten years, but 26% have less than two years — indicating a more heterogeneous experience base.

Commitment to IIC

Survey leaders report that 58% of institutions have adopted strategies (at least to a certain extent) emphasising IIC aspects (gender equality, continuous learning, creativity, openness, cooperation). However, implementation is hampered by several factors: individuals who actively support IIC mostly cannot drive institution-wide change, faculties operate to a higher degree in silos, resources and incentives for change are lower, and a strong focus on scientific-technological aspects crowds out "soft" cultural dimensions.

Survey researchers show a higher formal adoption rate (71% acknowledge an official IIC strategy), but 58% find these visions too abstract. Some researchers report hearing about IIC for the first time through the survey. Departmental silos are identified as a primary barrier by 50% of respondents, and 73.7% feel the institutional focus remains strictly on scientific-technological aspects. Creative freedom is perceived as limited: new ideas can be realised only "to a certain extent."

Survey students show a slightly different pattern: 40–50% acknowledge key leadership functions, with around 9% unable to give a clear answer. Communication received the lowest acknowledgement (40.9%), and approximately 10% denied effective communication by supervisors.

Interview evidence deepens this picture. From a leadership perspective, strategic commitment to IIC is generally present and articulated with

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reference to EU frameworks, Horizon Europe participation, and national research priorities. **Leaders tend to describe a broadly positive strategic environment and identify the primary barriers as resource constraints and evaluation system misalignment** — structural problems they frame as external to their own practice.

From an early-career researcher's perspective, the daily reality is considerably more constrained. The quality of the IIC experience depends heavily on which research group and supervisor one belongs to. Junior researchers describe limited awareness of formal IIC practices, limited access to decision-making, and a sense that innovation culture is something that happens around motivated individuals rather than as an institutional condition they can rely on.

A generational dynamic is visible in the interview data: **younger researchers are more open to interdisciplinary collaboration, while senior staff remain primarily discipline oriented.** This creates a structural barrier for early-career researchers seeking to build interdisciplinary identities — they must navigate an environment shaped by the preferences of the senior generation while lacking the institutional support to change it.

Further important observation from the interviews: the primary barrier to IIC may not always be structural constraint but cultural passivity — individuals recognise the need for change but wait for management to provide solutions. This is a leader's framing, and it is not wrong, but it requires qualification: hesitation to take initiative is often rational in hierarchical environments where doing so might carry some professional risks. Both the structural and the cultural dimensions need to be addressed simultaneously.

Leadership Role

42.1% of survey researchers agree that supervisors demonstrate IIC principles in daily actions, but free-text responses reveal that IIC strategies are frequently not actively practised. Only 26.3% feel they receive adequate training to develop their own IIC skills. **The demand**

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for support is high: over 92% of researchers seek concrete guidance or action plans. Free-text responses highlight two critical missing components: dedicated funding for IIC and joint European projects to link IIC efforts with broader research frameworks.

Interview evidence provides structural explanation. In some cases, the primary requirement is not a specific skill but basic leadership commitment to inclusivity — an orientation currently absent at institutional level in at least some Widening institutions. **The ability to translate strategic innovation goals into everyday practice is identified as the most critical missing competency.** A candid observation from one leader in this group — that she cannot identify her own missing competencies *"probably because I am part of the management"* — points to the value of external advisory support and peer learning. Researchers in this group experience the leadership gap most directly through the absence of structured mentoring, conflict management, and supervisory support.

The call for institutionalised support — practical workshops, formalised mentoring — rather than reliance on individual initiative is a recurring theme across both survey and interview evidence. The signing of CoARA by one Widening institution is the most concrete reform signal in the entire interview sample.

Cultural Experiences

Psychological Safety: Survey leaders report lower valuation of work and contributions compared to the Group A. High share of respondents (27%) who feel conflicts are NOT addressed constructively, and fewer respondents are comfortable admitting mistakes compared to Group A. Only 23% of leaders feel safe in expressing controversial ideas and a remarkable 42% respond "Don't know" to the question of whether they feel safe expressing controversial ideas. This can be interpreted as an indicator that unconventional ideas are simply not a topic in senior management interactions.

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Among survey researchers, 57.9% feel safe expressing unconventional ideas, and 52.6% find constructive criticism welcomed, but 18.4% explicitly feel uncomfortable admitting mistakes.

In interviews, researchers consistently describe outcomes as dependent on the team and supervisor. This is a structural finding: the absence of systematic protections means that PhD experience quality is determined by individual supervisor personality rather than institutional culture.

Leaders describe their own teams as open and collaborative; researchers confirm this in some cases but describe hierarchical dynamics in others. At least one institution illustrates directly how hierarchical position shapes discussion outcomes: ideas carry more weight depending on who proposes them, regardless of formal meeting openness.

Survey students show higher psychological safety than Group A students, with more than half agreeing that contributions are appreciated and conflicts are resolved constructively. Disagreement rates remain below 20%.

Risk Tolerance and Learning from Failure: Survey leaders report significantly lower encouragement for risk-taking than Group A (39% vs. 68% in Group A), and approximately 23% state that failure in such projects does not harm the researcher's career. Survey researchers show the highest total encouragement for exploratory research – at least to a certain extent - (84.2%) but only 31.6% receive specific funding or time for it. Only 29% feel unsuccessful projects are treated as learning opportunities, and 21.1% state they are not.

Interview evidence confirms the structural paradox. Although interviewees report strategic encouragement of exploratory research, a structural support for it is rare. Institutions most committed to innovation are using funding mechanisms — external competitive funding — that systematically reward risk aversion. The qualitative survey feedback identifies a "hidden penalty" for innovation pioneers, who are *"left alone with it... they just end up with more work."*

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Collaboration and Interdisciplinarity: Survey leaders confirm that external collaboration and interdisciplinary exchange are supported, though at a lower level than Group A. Among survey researchers, 60.5% report active support for external collaboration, but only 28.9% have established formal interdisciplinary structures, with 31.6% explicitly stating these do not exist. Informal opportunities are the primary mechanism (71% total positive).

Interview evidence adds important nuance. External collaboration is predominantly project-based and individually driven. A critical knowledge gap — insufficient experience in IP management, contract negotiation, and commercialisation — is typical of many organisations. Junior researchers may enter industry collaborations without the knowledge or institutional support to negotiate equitable terms. When asked whether the primary barrier to stakeholder integration is external or internal, the majority identify internal factors as primary — academic KPI systems, incentive structures favouring publications, administrative rigidity. This shifts responsibility for change to the institutions themselves.

The generational dynamic documented in the interviews — younger researchers more open to interdisciplinary collaboration, senior staff primarily discipline-oriented — creates a structural barrier for early-career researchers seeking to build interdisciplinary identities.

Diversity, Inclusion, and Belonging: Survey leaders show a notable implementation gap: 31% either do not know or deny and only 34.6% definitely acknowledge that diversity and inclusion are a shared responsibility. However, almost 80% confirm active promotion of anti-discrimination and diversity, at least to a certain extent. Among survey researchers, shared responsibility is high (76.3%), but active recruitment of diverse staff is confirmed by only 34.2%, with 21.1% "don't know" and almost 16% explicitly denying diverse recruitment.

Interview evidence confirms heterogeneity. At least one institution reveals low IIC prioritisation at the leadership level. Others have formal policies but limited lived practice. Junior researchers in this group are

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less likely to be aware of D&I policies. The cognitive diversity gap is present: diversity is primarily conceptualised in terms of gender, nationality, and disability, limiting its relevance for genuinely interdisciplinary bioeconomy research.

Role-Specific Experiences

Group B shows the most acute **undervaluation of interdisciplinarity** in performance reviews among all groups. Only 19.2% of survey leaders report equal weighting for interdisciplinarity — the lowest score across all groups — with 65.4% rating it as less or much less important. **Creativity is secondary for 54% of leaders. D&I is rated as less or much less weighted by 61.6%.**

Among survey researchers, interdisciplinarity is given equal weight by 34.2%, with 52.7% rating it as less or much less important. Creativity is secondary for 55.2%. A particularly striking qualitative finding is pointing to informal social structures that influence evaluations beyond formal merit criteria. The qualitative comment *"I cannot assess any of this… nor do I have any overview of the employees being hired"* mirrors the high "Don't know" rate for D&I weight, highlighting a major transparency gap.

Interview evidence provides some systemic explanation. Evaluation systems reward conventional outputs; the signing of CoARA by one institution is the most concrete reform signal in the sample. Career progression is strictly tied to traditional, quantifiable outputs — teaching, scientific results, and publication performance. The rational response by researchers — pursuing conventional outputs — is not a failure of ambition but an adaptation to the incentive environment.

Survey students broadly acknowledge IIC-fostering activities in courses (50%+ confirmation across categories), with disagreement rates below 15% — a more positive picture than the researcher and leader survey data, consistent with the pattern across all groups of students experiencing a more protected and structured learning environment.

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Support for IIC Skill Development

Group B shows a relatively uniform baseline of institutional support across core research skills. Survey leaders report a moderate 19.2% definitive "Yes" for support in leadership, interdisciplinary methods, creativity methods and critical thinking. Total support reaches approximately 73% for interdisciplinary methods and critical thinking. However, interpersonal and innovation-specific skills are significantly under-supported:

- Conflict resolution: 38.5% of leaders report no support,
- Constructive feedback: 26.9% of leaders report no support,
- Creativity: 19.2% "Don't know" and 19.2% "No" — underserved and poorly defined institutionally.

According to researchers, fundamental research skills are well-supported (inter- and transdisciplinary methods: 73.7% total; critical thinking: 68.4%), but creativity methods show a transparency deficit and conflict resolution has a high "No" rate (26.3%).

Interview evidence confirms the training gap. Training must be accompanied by incentives and reduced administrative burdens to produce lasting behavioural change — training without structural support generates short-term awareness but not sustained practice change. Specific needs identified in the interviews include **interdisciplinary research methods and management, communication skills, mentoring and supervision skills, leadership for cultural change, RRI, project management and proposal writing, industry collaboration and technology transfer, IP management, and open science and data management** — a considerably broader set of needs than in the Established group, reflecting the more fundamental innovation capacity-building challenge.

The most acute needs identified by survey researchers are: **clear IIC information (86.8%), application-oriented research methods, RRI, interdisciplinary research methods (86.8%), and communication and creativity training (between 85% and 92%).**

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Topic	*Leaders (n=26)*	*Researchers (n=38)*	*Students (n=66)*	*Interview Evidence*
Commitment to IIC	58% report institution adopted IIC-related strategy, to a certain extent	71% of the researchers acknowledge official strategy (31.6% Yes, 39.5% to a certain extent); 58% find it too abstract; 50% cite silos as primary barrier; 73.7% feel focus remains scientific-technological; 58% say IIC champions lack influence to drive change	(See Leadership Role row — no separate strategy-awareness question was asked of students)	Leadership: commitment articulated via EU frameworks/Horizon Europe; barriers framed as external (resources, evaluation misalignment). Early-career: IIC quality depends on which research group/ supervisor ("structural lottery"); some heard of IIC "for the first time through the survey." Generational divide: younger researchers more open to interdisciplinarity; senior staff discipline-oriented. Cultural passivity ("wait for management") qualified as often a rational response to hierarchical risk

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Topic	Leaders (n=26)	Researchers (n=38)	Students (n=66)	Interview Evidence
Leadership Role	—	42.1% agree supervisors demonstrate IIC; free-text reveals strategies "not really actively practiced"; only 26.3% feel adequately trained; >92% want concrete guidance/action plans; free-text cites dedicated IIC funding and joint European projects as critical missing components	Role/leadership functions (support, encouragement as well as communication) acknowledged by 40–50%; ~9% "don't know"; communication lowest (40.9%); ~10% deny effective communication	Basic leadership commitment to inclusivity sometimes absent at institutional level; ability to translate strategy into practice = most critical missing competency; one leader admits inability to identify own gaps ("probably because I am part of the management"). Researchers experience gap through absence of structured mentoring, conflict management, supervisory support
Structural Support Demand	70% indicate need for support across all items (strategic level)	Interdisciplinary research methods: 60.5% (high need); Individual mentoring/ coaching: 55.3% (high need); Conceptual clarity on IIC: 86.8% (high+moderate); Communication skills/creativity/ application-oriented methods/RRI: ~50% (high need)	Qualitative (Open Feedback): more teacher support on developing new ideas; mixed-discipline teams in courses; best-practice examples, aligned study materials, online lectures by young professors	Call for institutionalised support (workshops, formal mentoring) rather than individual-initiative reliance. CoARA signing by one institution = most concrete reform signal in entire sample

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Topic	Leaders (n=26)	Researchers (n=38)	Students (n=66)	Interview Evidence
Psychological Safety	Lowest valuation of contributions across all leader groups; highest share feeling conflicts NOT addressed constructively; only 23% feel safe expressing controversial ideas; 42% "Don't know"	57.9% feel safe expressing unconventional ideas; 52.6% find criticism welcomed; 42.1% agree conflicts resolved constructively (39.5% "to a certain extent"); 52.6% feel valued (42.1% "to a certain extent"); 47.4% comfortable admitting mistakes (18.4% explicitly not)	>50% agree contributions appreciated/ conflicts resolved constructively; disagreement <20%; up to 7.6% "don't know"	PhD-scenario finding: outcomes described as team/supervisor-dependent — personal openness at leadership level does not translate into institutional safety for those below; PhD experience quality determined by individual supervisor personality, not institutional culture
Risk Tolerance & Learning from Failure	Only 39% report risk-taking encouraged (vs. 68% Group A); ~23–25% state failure doesn't harm career	84.2% report exploratory research encouraged (highest of all groups); only 31.6% receive dedicated funding/time (23.7% explicitly none); only 28.9% see failed projects as learning opportunities (21.1% explicitly disagree); 36.8% believe failure won't harm career, 31.6% "don't know"	Not measured — question not included in student questionnaire	Structural paradox confirmed: strategic encouragement exists, but structural support is rare; institutions rely on external competitive funding rewarding risk aversion; "hidden penalty" for innovation pioneers — "left alone with it… they just end up with more work"

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Topic	Leaders (n=26)	Researchers (n=38)	Students (n=66)	Interview Evidence
Collaboration & Interdisciplinarity	Support confirmed, but at lower level than Group A; widening more advanced than associated on this dimension	60.5% report active support for external collaboration; only 28.9% have formal interdisciplinary structures (31.6% state none exist); informal channels dominant (71.1%)	~50% agree opportunities exist to connect/ collaborate across disciplines; 15.2% state no such opportunities exist (both connecting and collaborating); ~33% agree only "to a certain extent"	Collaboration mostly project-based/ individually driven; knowledge gap in IP management, contract negotiation, commercialisation identified primarily in Widening institutions; majority identify internal factors (KPIs, publication incentives, admin rigidity) as primary barrier; generational divide reinforces structural barrier for early-career researchers
Diversity, Inclusion & Belonging	Only 34.6% definitely confirm D&I as shared responsibility; 30% don't know/deny; ~80% confirm anti-discriminatio n promotion to a certain extent	50% agree organization promotes D&I in communication; 76.3% confirm shared responsibility (50% Yes, 26.3% to a certain extent); only 34.2% confirm active diverse recruitment; 21.1% "don't know"; ~16% explicitly deny	65.2% confirm faculty encourages diverse scientific perspectives/ methods; lowest agreement (39.4%) on diversity of teaching/ supervisory body	Heterogeneous: at least one institution shows low D&I prioritisation at leadership level; others have formal policy without lived practice; junior researchers less aware of D&I policies. Cognitive Diversity Gap present (gender/nationality/ disability focus limits relevance for interdisciplinary bioeconomy research)

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Topic	Leaders (n=26)	Researchers (n=38)	Students (n=66)	Interview Evidence
Evaluation Criteria (Recruitment/Performance)	Interdisciplin-arity equal weighting: only 19.2% (65.4% lower — lowest across all 3 groups); Creativity equal: 34.6% (54% secondary); D&I equal: 26.9% (61.6% lower/much lower); qualitative: "tribal affiliation" cited as informal factor influencing assessments	Interdisciplinarity equal: 34.2% (52.7% lower); Creativity secondary: 55.2%; D&I equal: 31.6% (47.3% lower/much lower); qualitative: "I cannot assess any of this... nor do I have any overview of the employees being hired"	Not applicable — students not subject to recruitment/ performance review	Evaluation systems reward conventional outputs; CoARA signing = most concrete reform signal; career progression tied strictly to traditional outputs; researchers' focus on conventional outputs framed as rational adaptation, not lack of ambition

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Topic	Leaders (n=26)	Researchers (n=38)	Students (n=66)	Interview Evidence
Skill Development Support	Uniform moderate baseline: 19.2% definitive "Yes" for leadership/ interdisciplin-ary methods/ critical thinking (identical — suggests standardised, top-down baseline); ~73% total support for inter/ transdisciplin-ary methods & critical thinking; Conflict resolution: 38.5% no support; Constructive feedback: 26.9% no support; Creativity: 19.2% "Don't know," 19.2% "No"	Inter-/ transdisciplinary methods: 73.7% total support (39.5% Yes); Critical thinking: 68.4% total (36.8% Yes); Constructive feedback: 68.4% some support; Creativity methods: 50% some support (21.1% "Don't know," 21.1% none — transparency deficit); Conflict resolution: 57.9% some support, 26.3% explicit "No"	Broad acknowledge-ment overall; several categories confirmed by >50% of respondents; support for skills, inter-/trans-disciplinary research, and conflict resolution: 40–50% approval; disagreement <15%; ~10% "don't know"	Broader capacity-building needs than Group A: interdisciplinary methods/ management, communication, mentoring/ supervision, leadership for cultural change, RRI, project management/ proposal writing, industry collaboration, IP management, open science/data management. Most acute researcher needs: clear IIC information (86.8%), interdisciplinary methods (86.8%), communication

Table 12: Summary of Main Results on the IIC Profile of Group B (Widening)

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Integrated Regional Profile

Key characteristics of IIC in Group B organisations (EU Widening Countries)
The data across all three survey groups and the interview evidence tell a story of genuine aspiration trapped by structural under-resourcing and cultural passivity. The enthusiasm is real — students and researchers express goodwill and openness; leaders have adopted strategies and acknowledge the importance of IIC. But the system lacks effective structures and mechanisms to systematically convert aspiration into practice. Leaders are mostly aware of the barriers (silos, resource scarcity, focus on scientific-technological aspects). Researchers experience these barriers directly and identify a "hidden penalty" for IIC pioneers. Students are broadly positive but identify gaps in cross-disciplinary collaboration and diversity of teaching staff. Interview evidence deepens this picture by revealing the structural supervisor dependency, the generational divide on interdisciplinarity, and the cultural passivity dynamic — which is simultaneously a cultural challenge and a rational response to structural risk.
Key challenges are characteristic for this group:
• IIC is driven by individual champions rather than systemic structures • Lack of dedicated funding and time for exploratory research and IIC activities • Transparency deficits in hiring and performance assessment; informal social structures influence evaluations • Generational divide: younger researchers are more open to interdisciplinarity, senior staff primarily discipline-oriented • Cultural passivity: individuals recognise the need for change but wait for management to provide solutions • IP management, lack of application-oriented research methods, technology transfer, and open science knowledge gaps create vulnerabilities in industry collaboration

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• The most internally heterogeneous group: some institutions significantly more advanced than others
Opportunities that can be used for the establishment of IIC
• High enthusiasm and goodwill among all stakeholder groups • Active desire to align with international standards and European research frameworks • Strong understanding and aspiration for external collaboration • CoARA engagement by at least one institution signals reform readiness • The most advanced institutions in the group can serve as internal models for others.

Recommendations for Strengthening Inclusive Innovation Culture

Group B: EU Widening Countries

Improving Inclusive Innovation Culture (IIC) in Group B institutions is fundamentally different from the challenge facing Group A. It is not primarily a matter of refining existing structures or closing implementation gaps — it is a matter of **building the institutional structures and mechanisms for IIC**, in contexts where resources are constrained, awareness is uneven, and the cultural conditions for innovation are still being established.

This challenge is not uniform across the group. Group B is the most internally heterogeneous of all three regional groups, and this heterogeneity has an important country-level dimension. The group spans institutions from the **Czech Republic** — which, by most innovation metrics, stands considerably closer to the Western European research tradition — through **Greece, Hungary** and **Croatia**, which occupy intermediate positions, to **Bulgaria** and **Romania**, which face the most acute structural deficits in research capacity, innovation culture, and institutional development. The European Innovation Scoreboard (European Commission 2025) classifies these countries in different

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innovation performance categories: the Czech Republic as a "Moderate Innovator" approaching the EU average, Hungary as "Emerging Innovator," and Greece and Croatia as "Moderate Innovator" well below the EU average. However, Bulgaria and Romania[24] as "Emerging Innovators" are significantly below the EU average (see **Error! Reference source not found.**). The European Innovation Scoreboard (EIS) data presented in Table 13 provides external, independent validation of the innovation capacity gap, confirming that innovation and catch-up potential of many countries remain substantially unrealised. Crucially, the EIS methodology itself supports this report's central argument: national innovation performance is not determined by R&D spending or infrastructure alone, but substantially by the *framework conditions* this report investigates at institutional level — human capital, collaboration intensity, and the broader enabling environment for innovation, which the Innovation Culture encompass. This reflects different institutional traditions, governance cultures, and research system histories that shape how IIC challenges manifest and what interventions are most likely to be effective. Weak psychological safety, risk-averse funding structures, disciplinary silos, and evaluation systems that penalise creativity and experimentation are precisely the kind of cultural and institutional conditions that translate into lower national innovation performance over time.

Country	2025 Index	Performance Level	Relative Visual
Czechia	80.6	Moderate	
Greece	75.8	Moderate	
Croatia	71.6	Moderate	
Hungary	69.5	Emerging	
Bulgaria	45.8	Emerging	
Romania	37.7	Emerging	

Source: The European Innovation Scoreboard (European Commission 2025)

Table 13: Innovation Performance (EU-average = 100)

[24] https://ec.europa.eu/assets/rtd/eis/2025/ec_rtd_eis-country-profile-ro.pdf

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Overall, Central and Eastern European research systems share a common structural pattern — relatively strong formal research infrastructure combined with significantly weaker innovation culture, knowledge transfer capacity, and industry-academia linkages. However, this severity varies substantially across countries, with Bulgaria and Romania facing the most acute deficits and the Czech Republic being most close to Western European norms (Radosevic and Lepori 2009; Kravtsova and Radosevic 2012). Addressing IIC in this context therefore requires targeted capacity building that addresses structural deficits specific to each national research environment.

The recommendations below address the most severe gaps and the most accessible opportunities, with explicit attention to where recommendations need to be differentiated by country context. Where recommendations overlap with those for Group A, reference to these recommendations will provide the detailed elaboration.

1. Build IIC Awareness and Shared Understanding of IIC

The IIC awareness gap is not uniform across the group. In **Czech institutions**, which have longer exposure to European research frameworks and stronger integration into international research networks, IIC awareness is considerably higher, and the primary gap is implementation rather than conceptual understanding. In **Hungarian institutions**, awareness is uneven: internationally connected researchers are familiar with IIC-adjacent concepts through EU project participation, while those in more domestically oriented departments may not be. In **Croatian institutions**, EU accession and subsequent integration into European research frameworks has increased awareness, but implementation capacity and quality remain limited (OECD 2025b). In **Bulgarian and Romanian institutions**, the awareness gap is most fundamental. Despite reforms and progress achieved, the innovation culture **in Bulgaria** remains rigid, siloed, and structurally constrained (OECD 2025a). Romania's higher education system is characterized as structurally outdated, deeply underfunded, and

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struggling with severe urban-rural and ethnic inequalities (OECD 2025c). To conclude: The result is precisely the pattern that the survey and interviews reveal: high formal adoption rates combined with low operational embedding.

Therefore, there is a need to develop and implement a concise, institution-specific **IIC practice guide** — a short, operational document that translates IIC values into concrete daily behaviours relevant to the specific disciplinary and institutional context of each institution. This can be complemented with structured **IIC awareness workshops** — short, facilitated sessions that introduce the concept, its evidence base, and its practical relevance to research performance — delivered at departmental level and integrated into existing institutional events.

2. Reform Evaluation Systems to Recognise IIC Contributions

Career progression in Group B is strictly tied to traditional outputs — teaching performance, scientific results, and publication counts. There is an indication of informal social structures that distort formal evaluation criteria. As long as this incentive structure remains unchanged, IIC will be rationally deprioritised regardless of institutional rhetoric.

The detailed **framework for evaluation reform — including IIC-relevant performance metrics, the CoARA framework, the Dutch Recognition and Rewards programme, and the Leiden Manifesto** — is elaborated in the Group A recommendations (Section 0 – see recommendation 1) and applies equally here. The specific adaptations required for Group B are:

- **Provide transparency in criteria:** Making criteria explicit, publicly communicated, and consistently applied is a necessary precondition for any metric reform.
- **Engage with CoARA and implement balanced assessment approaches**, drawing on existing reform momentum and stronger alignment with Western European assessment

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practices. The signing of CoARA by one Widening institution provides a model for others in the group.

3. Convert Individual IIC Champions into Institutional Infrastructure

The most defining structural characteristic of IIC in Group B is that it is driven by individual champions rather than institutional systems. In their seminal work, (Fagerberg and Srholec 2008) demonstrate that the primary constraint on innovation capacity in catching-up economies is the absence of the systemic capabilities that convert individual effort into collective innovation performance.

The country-level dimension is important here. In **Czech institutions**, where individual IIC champions are more likely to be embedded in internationally connected research groups, the primary need is formalising and scaling what already works informally. In **Bulgarian and Romanian institutions**, where IIC champions are more isolated and suffer from the lack of structural support, the need is more fundamental: creating the institutional standing, resources, and protection that make sustained individual initiative viable.

Therefore, it is conducive to establish **formal IIC coordination roles** — dedicated, recognised positions responsible for IIC strategy implementation, awareness-building, and progress monitoring at institutional level. It is necessary to develop **formal IIC Action Plans** — concrete, time-bound, and publicly communicated documents translating institutional IIC strategies into specific activities, responsibilities, timelines, and measurable outcomes, as 92% of Group B researchers identify clear guidance and action plans as a priority support need.

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4. Establish Dedicated Funding and Protected Time for Exploratory Research

EU Widening Country institutions are disproportionately dependent on external funding. However, (Radosevic 2017) showed that this funding structure has contributed to a pattern of "innovation without R&D" in Central and Eastern European economies. Research on Central and Eastern European economies has characterised a pattern of upgrading that relies on imported technology and external inputs rather than domestic research capabilities, and has questioned the efficiency with which these systems convert inputs into innovation (Kravtsova and Radosevic 2012).

This problem is most acute in **Bulgarian and Romanian institutions**, where national research funding is most limited and EU structural funds — which carry strict output requirements — are the primary research resource. **Czech institutions** have greater access to national competitive funding through the Czech Science Foundation (GAČR, https://gacr.cz/en/) and the Technology Agency of the Czech Republic (TAČR, https://www.tacr.cz/en/), both of which provide dedicated competitive grant schemes for investigator-driven and exploratory research. **Hungarian institutions** have access to the National Research, Development and Innovation Office (NKFIH, https://nkfih.gov.hu/english) for competitive research funding, though governance changes in Hungarian higher education have raised concerns about institutional autonomy and the independence of research priority-setting. **Croatian institutions** can draw on the Croatian Science Foundation (HRZZ, https://hrzz.hr/en/), which has introduced competitive grant schemes aligned with European standards since EU accession.

The detailed framework for internal funding, protected researcher time, and After-Action Review debriefing is elaborated in the Group A recommendations (Section 0 – see recommendation 2). The specific adaptation for Group B is to **leverage Horizon Europe Widening instruments** — particularly Twinning, Teaming, and ERA Chairs — as

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vehicles for establishing exploratory research capacity that is externally funded but internally embedded.

5. Build Leadership Capacity for IIC

The leadership gap in Group B is more fundamental than in Group A. It is not primarily a gap in specific IIC skills but in some cases a gap in basic leadership commitment to IIC. This reflects the persistence of hierarchical, authority-based leadership models in Central and Eastern European HEIs that have been well-documented in the literature (Suutari and Riusala 2001; DOBBINS and KNILL 2009). In these environments, leadership is understood primarily in terms of positional authority rather than facilitative or inclusive practice.

The country-level dimension is significant. **Czech academic leaders** are more likely to have exposure to Western European leadership development frameworks through international collaboration and stronger EU project participation[25]. **Bulgarian and Romanian leaders** are more likely to operate within strongly hierarchical institutional cultures (Curaj et al. 2022). **Hungarian leaders** face the additional challenge of operating in a governance environment where institutional autonomy had been significantly curtailed, limiting the scope for leadership-driven cultural change. **Croatian leaders** occupy an intermediate position in terms of exposure to European leadership and research culture frameworks — reflected in Croatia's intermediate innovation performance classification (European Commission, 2025, European Innovation Scoreboard)[26].

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[25] https://www.horizontevropa.cz/en/you-might-interested/evaluation-framework-programmes/national-studies-monitoring/information/yiifnews/2767; https://dashboard.tech.ec.europa.eu/qs_digit_dashboard_mt/public/sense/app/1213b8cd-3ebe-4730-b0f5-fa4e326df2e2/sheet/0c8af38b-b73c-4da2-ba41-73ea34ab7ac4/state/analysis/select/Programme/HORIZON%20EUROPE/select/Country%20Code/CZ

[26] https://ec.europa.eu/assets/rtd/eis/2025/ec_rtd_eis-country-profile-hr.pdf

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The detailed framework for targeted, practice-oriented IIC leadership training, peer learning networks, and structured feedback is elaborated in the Group A recommendations (Section – 0, see recommendation 4) and applies here with the following specific adaptations:

- **Prioritise basic IIC orientation for leaders** beginning with a clear, evidence-based introduction to what IIC is and what it concretely requires of leaders in daily practice.
- **Leverage BEAMING and Horizon Europe networks for peer learning**, connecting Group B leaders with more advanced institutions both within the consortium and through Horizon Europe Twinning partnerships.
- **Address the generational leadership divide** through training. Leadership training should explicitly address how to recognise and support the interdisciplinary ambitions of early-career researchers — framing this as a strategic institutional investment in future innovation capacity.

6. Embed Soft Skill Development

presses the productive dissent that can be a precondition for creative breakthrough (Dreu and Weingart 2003). The absence of constructive feedback culture limits organisational learning and adaptive innovation capacity (Edmondson 1999b). The institutional non-recognition of creativity as a legitimate development need directly suppresses intrinsic motivation and creative engagement, reducing innovation performance at both individual and team levels (Anderson et al. 2014).

The detailed framework for soft skill development is elaborated in the Group A recommendations (Section 0– see recommendation 2) and applies equally here. The specific adaptation for Group B is to **explicitly frame soft skill development as a research performance investment** rather than a HR initiative. Critically, **soft skill development will only gain institutional traction if presented with a clear evidence base demonstrating its impact on research quality and innovation output**.

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7. Introduce Structural Protections for Early-Career Researchers

Supervisory dependency, generational divide, and absence of formal protection mechanisms — is documented across the group and is consistent with the literature (Halse and Malfroy 2010).

The detailed framework for co-supervision mandates, ombudsperson structures, and independent progress reviews is elaborated in the Group A recommendations (Section 0) and applies fully here. The specific adaptation for Group B is to **address the generational divide as a structural protection issue** across all institutions, particularly in Bulgarian, Romanian, and Hungarian contexts. Protecting early-career researchers requires not only co-supervision and ombudsperson structures but **explicit institutional recognition of interdisciplinary research trajectories** in career development frameworks.

Table 14 summarises the strategic measures described above to help improve IIC in the EU Associated Countries.

	Recommend-ation	***Problem Addressed***	***Key Actions***
1	Build IIC Awareness and Shared Understanding of IIC	Awareness gap is uneven across countries: highest in Czechia (implementation, not conceptual, gap); uneven in Hungary (varies by international vs. domestic orientation); improving but limited-capacity in Croatia; most fundamental in Bulgaria/Romania (structurally rigid, siloed, underfunded systems) — high formal adoption but low operational embedding across the group	• Develop concise, institution-specific IIC practice guides translating values into concrete daily behaviours per disciplinary/ institutional context • Deliver structured IIC awareness workshops (short, facilitated, evidence-based) at the departmental level, integrated into existing institutional events
2	Reform Evaluation	Career progression strictly tied to teaching	• (Full framework: see Group A, Recommendation 1)

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	Recommend-ation	Problem Addressed	Key Actions
	Systems to Recognise IIC Contributions	performance, publications, and scientific output; informal social structures distort formal criteria; IIC rationally deprioritised under current incentives	• Group B-specific: ensure transparency — criteria explicit, publicly communicated, consistently applied • Engage with CoARA and implement balanced assessment approaches, building on the reform signal from the one Widening institution that has already signed CoARA
3	Convert Individual IIC Champions into Institutional Infrastructure	IIC is currently driven by isolated individual champions, not institutional systems — absence of systemic capabilities to convert individual effort into collective innovation performance; severity varies (e.g. Czechia: formalise/scale what works informally; Bulgaria/Romania: build basic institutional standing/protection for champions)	• Establish formal IIC coordination roles (dedicated, recognised positions for strategy implementation, awareness-building, progress monitoring) • Develop formal, time-bound, publicly communicated IIC Action Plans with concrete activities, responsibilities, timelines, and measurable outcomes (92% of researchers identify this as a priority need)
4	Establish Dedicated Funding and Protected Time for Exploratory Research	Disproportionate dependence on external funding produces "innovation without R&D" pattern; most acute in Bulgaria/Romania (reliant on EU structural funds with strict output requirements); varies by national funding landscape (Czechia: GAČR/TAČR; Hungary:	• (Full framework: see Group A, Recommendation 2) • Group B-specific: leverage Horizon Europe Widening instruments — Twinning, Teaming, ERA Chairs — to build exploratory research capacity that is externally funded but internally embedded

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	Recommend-ation	Problem Addressed	Key Actions
		NKFIH, with autonomy concerns; Croatia: HRZZ)	
5	Build Leadership Capacity for IIC	Leadership gap is more fundamental than in Group A — often a gap in basic commitment to IIC, not just skills; reflects persistent hierarchical, authority-based leadership models; varies by country (Czechia: more Western exposure; Hungary: constrained institutional autonomy; Bulgaria/Romania: strongly hierarchical cultures; Croatia: intermediate position)	• (Full framework: see Group A, Recommendation 4) • Group B-specific: prioritise basic IIC orientation for leaders (what IIC is, what it requires in daily practice) • Leverage BEAMING/Horizon Europe networks (incl. Twinning) for peer learning with more advanced institutions • Address generational leadership divide explicitly — train leaders to recognise/support early-career researchers' interdisciplinary ambitions as a strategic investment
6	Embed Soft Skill Development	Lack of constructive feedback culture limits organisational learning; non-recognition of creativity as a legitimate development need suppresses intrinsic motivation and innovation performance	• (Full framework: see Group A, Recommendation 3) • Group B-specific: frame soft skill development explicitly as a research performance investment, not an HR initiative — must be backed by clear evidence of impact on research quality/innovation output to gain institutional traction
7	Introduce Structural Protections for Early-Career Researchers	Supervisor dependency, generational divide, and absence of formal protection mechanisms documented across the group	• (Full framework: see Group A, Recommendation 5 — co-supervision mandates, ombudsperson structures, independent progress reviews) • Group B-specific: address the generational divide as a structural protection issue

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	Recommend-ation	Problem Addressed	Key Actions
			(particularly Bulgaria, Romania, Hungary); explicitly recognise interdisciplinary research trajectories in career development frameworks

Table 14: Overview of Strategic Measures to Strengthen Inclusive Innovation Culture (Group B — EU Widening Countries)

EU Associated Countries (Group C)

Institutional and Demographic Context

Group C is the largest group in the survey (n=57 leaders, n=40 researchers, n=62 students), with contributions primarily from Albania, Serbia, North Macedonia, and Bosnia and Herzegovina. The interview sample covers institutions across Bosnia & Herzegovina, North Macedonia, and Serbia. The disciplinary profile of survey leaders closely mirrors the overall survey sample: agriculture (35%), biotechnology (30%), environmental sciences (11%), forestry (9%), and food science (7%). Researchers are primarily in agriculture, forestry, and biotechnology. Students are predominantly in forestry, agriculture, and economics.

The seniority profile is high: the majority of leaders (n=41) and most researchers have more than ten years of experience. This long-tenured leadership profile suggests established institutional cultures that may be resistant to rapid change. Students are mostly enrolled for 2–5 years, bringing fresh perspectives and aspirations.

Commitment to IIC

Survey leaders report a 57% strategy adoption rate, with IIC aspects including gender equality, internationalisation, cooperation, openness, creativity, and interdisciplinarity — but more in a fragmented than coherent manner. Implementation is hampered by factors including silo

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structures perceived as even more pronounced than in Group B, limited resources, and few active change drivers. A remarkably high percentage of leaders state that senior management communicates the IIC vision (84%) and encourages staff to live an IIC (75%) — but this encouragement is not accompanied by practical support or tools.

Survey researchers show 65% IIC strategy acknowledgment, but 70% find these visions too abstract — the highest rate across all groups. The existing strategies emphasise collaborative R&D, creativity, and new ideas, but researchers note that freedom and critical thinking are significantly less represented. A substantial 70% feel that IIC champions lack the influence to drive change. Communication gaps are severe, with some researchers entirely unaware of IIC strategies.

Survey students show the highest acknowledgment of leadership functions among all groups, with approval rates ranging from 66.1% to 74.2% — a striking contrast to the more critical assessments of leaders and researchers.

Interview evidence provides some structural explanations. From a leadership perspective, external collaboration achievements, strategic alignment with EU priorities, and genuine openness at the personal level are emphasised. Several leaders describe themselves as personally committed to IIC and to protecting junior researchers. However, leaders in this group also tend to have limited visibility into what actually happens in supervisory relationships below them. This might result in their understating the barriers experienced by those in more vulnerable positions.

From an early-career researcher perspective, the picture is considerably more difficult. They report e.g. about multi-layered governance systems that deter initiatives through the sheer complexity and time cost of approval processes — individuals *"are horrified by these procedures and often give up."* Conformity culture has become normalised: *"many individuals are happy to live in the zone of conformity."* Junior researchers who want to drive change lack supporting structures and mechanisms to do so.

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One institution in this group demonstrates that strong external collaboration is achievable within these constraints. However, even here, access to innovation opportunities depends on *"being connected to active mentors, project teams, or supportive senior staff"* — a form of informal gatekeeping that systematically disadvantages researchers without established networks, reproducing existing hierarchies.

In summary, the commitment to IIC in Group C is characterised by a profound "form vs. essence" gap. Strategies are reportedly adopted, senior management communicates visions, and students perceive leadership positively — yet researchers, who are most directly embedded in the daily operational reality, report the highest abstraction rates, most severe awareness and implementation gaps. One researcher's comment captures the institutional reality with striking honesty: *"Everything that is the subject of this questionnaire is ahead of the prevailing practice of my institution.*

Leadership Role

Survey leadership in Group C is perceived as present and communicative at the surface level but not deeply embedded in daily practice. Among survey researchers, supervisor encouragement (40% full agreement) and role modelling (50% full agreement) predominantly fall into the "to a certain extent" category. Only 17.5% feel they receive adequate support and training to develop IIC skills — the lowest rate across all groups.

The demand for support is the most urgent of all groups: 95% of survey researchers call for training or mentoring for leaders (the highest rate across all groups), 97.5% want to learn from institutions with established IICs, and 97.5% request clear guidance or action plans. There is also a call to integrate IIC into official HR strategy and modern teaching principles.

Interview evidence reveals qualitative insights. The most critical need identified is leadership that actively protect junior researchers when they challenge established approaches. This framing of protection as a

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leadership competency is significant: it acknowledges that psychological safety for junior researchers is not a culturally given but an active leadership responsibility.

Cultural Experiences

Psychological Safety: Group C demonstrates the lowest psychological safety across all groups. Among survey leaders, the highest share in the survey feel their work is undervalued, and the highest share deny that conflicts are addressed constructively. Among survey researchers, only 37.5% feel safe expressing unconventional ideas, with 22.5% explicitly feeling unsafe — the highest rate of explicit psychological insecurity in the study. Only 37.5% feel comfortable admitting mistakes.

Interview evidence reveals further qualitative insights. The scenario exploring how a PhD researcher proposing an innovative method that contradicts their supervisor's established approach would be received produces contradictory findings. Senior researchers and leaders describe environments as relatively open and supportive. Junior researchers describe a different reality: direct acknowledgement that PhD candidates *"may suffer consequences in terms of poor grades, delayed procedures, and career impact"* confirms that formal protections do not translate into practical safety. The most serious finding — a junior researcher's account describing cases where student ideas were later presented as the supervisor's own. It is important to note that this represents a reported experience rather than a verified institutional fact; nonetheless, illustrating how profoundly different the institutional experience can be depending on one's position in the hierarchy.

Discussion culture is most hierarchically influenced in this group. Leaders describe discussion and meetings as open; junior researchers describe top-down communication and a culture where challenging or contradicting is avoided. This is a further pronounced manifestation of the leader-researcher perception gap in the entire dataset.

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Survey students, however, report the highest psychological safety of all student groups, with 61.3–72.6% agreement across all safety indicators. It may, however, need to be interpreted with caution: students may report higher psychological safety partly because they have limited awareness of IIC competences and criteria in the first place, and are therefore less attuned to the relevance of these dimensions for innovation capacity. If students are not yet confronted with IIC expectations in their studying environment — neither explicitly taught nor assessed against such criteria — they may perceive fewer risks or barriers simply due to a lack of exposure rather than a genuinely more enabling environment.

Risk Tolerance and Learning from Failure: Group C shows the most pronounced risk aversion in the study. Among survey leaders, only 19% state that their institution encourages risk-taking through exploratory innovative research — the lowest rate across all groups — and approximately 26% state that failure in such projects does not harm the researcher's career. At the same time 14% could not provide any definite answer on this. The fact that only 19% of survey leaders perceive their institution as actively encouraging risk-taking through exploratory research — the lowest rate across all groups — combined with merely 26% believing that failure does not carry career consequences, paints a concerning picture of the institutional risk culture at leadership level. Notably, the additional 14% could not provide a definite answer indicating uncertainty among leaders that may reflect a lack of clear institutional policy or messaging around risk tolerance and failure. Leaders who are themselves unsure whether failure is penalised are unlikely to credibly model or communicate psychological safety to their teams. Moreover, most leaders indicated that at their HEI there is no funding or time for exploratory innovative research (47.4%) and ca. 51% reported that their HEI does not encourage exploratory innovative research at all. Among survey researchers, only 17.5% believe a failed project will not harm their career, and 15% "don't know". At the same time, a broad majority of researchers (55%) confirm that well-designed yet failed risky and/or exploratory research projects may harm their career

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at least to a certain degree. Only 10% receive specific funding or time for exploratory research. Only 10% feel unsuccessful projects are treated as learning opportunities, 27.5% explicitly state they are not, and 17.5% do not know.

This pattern likely signals the absence of clear institutional norms, policies, and communication around failure and risk — integral part of innovation culture - leaving both leaders and researchers without a coherent framework to navigate innovation-related risk and learning culture. Taken together, these findings suggest that in Group C, risk aversion is a cultural disposition, sustained by inadequate resourcing, absent policy frameworks, and career incentive systems. This represents a fundamental barrier to IIC development and signals an urgent need for systemic institutional reform.

Interview evidence confirms and deepens this picture. The absence of dedicated research support means that junior researchers who want to drive change lack mechanisms to do so. Multi-layered governance systems deter initiative through complexity and time cost of approval processes. Conformity culture has become normalised — and the interview evidence makes clear that this is a rational adaptation to an environment where initiative might carry real professional risks.

Collaboration and Interdisciplinarity: While leaders predominantly indicate (45.6%) that R&D collaborations with external partners are actively supported at their organisations through offering informal (47.4%) or formal structures and opportunities (31.6%), survey researchers report the lowest external collaboration support of all groups. Most of them think that this support is provided only to a certain extent. Formal interdisciplinary structures are present for only 22.5%, with informal opportunities similarly limited.

The collaboration pattern in Group C reveals a persistent gap between leadership perception and researcher reality. While formal structures nominally exist, administrative barriers — such as shared project quotas penalising joint applications — actively discourage interdisciplinary engagement. Where collaboration does occur, it largely relies on

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informal networks rather than systemic access, making innovation capacity dependent on individual positioning rather than institutional design. Together, these conditions fragment and inequitably distribute collaborative opportunity, substantially limiting the group's overall innovation potential.

Diversity, Inclusion, and Belonging: Survey leaders confirm that more than 70% (at least to a certain extent) actively promote anti-discrimination, diversity, and inclusion — but 20–26% do not know or deny that diversity is a shared responsibility or that diverse staff are recruited. Among survey researchers, shared responsibility is reported by 67.5% total. However, more than 22% are unaware of it at all. Also the transparency in recruitment is low. Survey students report the highest diversity acknowledgment of all student groups: 71% clearly acknowledge diversity among student bodies, and each diversity statement receives overall agreement from more than 50% of students.

Interview evidence raises fundamental governance concerns. Political influences on governance are referenced as affecting career and recruitment decisions. This concern disproportionately affects junior researchers and women, who are most dependent on transparent and fair recruitment and career advancement procedures.

All in all, while formal diversity commitments exist, low recruitment transparency, significant awareness gaps, and reported political interference undermine the trust and fairness essential for an IIC-enabling environment.

Role-Specific Experiences

Group C presents a striking paradox: it reports the highest formal weighting of IIC competencies in performance reviews among all groups, yet suffers from the lowest actual resource support, the highest risk aversion and pervasive informal power structures.

In recruiting or performance reviews, leaders gave equal weight by 36.8% to both interdisciplinarity and creativity (the highest equal weight score for creativity across all groups) compared to scientific

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achievements, but a massive 31.6% "Don't know" rate for D&I. Among survey researchers, interdisciplinarity is given equal weight by 50% (the highest across all groups), and creativity by 45%. D&I has a 27.5% "Don't know" rate.

The high "Don't know" rates suggest that many respondents genuinely do not know how these criteria function in formal processes. Qualitative survey feedback provides a sobering corrective: assessments are described as "mainly technical aspects," teaching titles and previous experience are preferred over innovation and innovation culture. Most critically — informal power structures, family connections, and political affiliations are identified as significant factors in hiring and advancement. This perceived nepotism directly undermines the meritocratic basis required for a functional IIC. The interview finding that access to innovation opportunities depends on *"being connected to active mentors, project teams, or supportive senior staff"* confirms that informal gatekeeping reproduces existing hierarchies.

Survey students acknowledge IIC-fostering activities with high rates (50–72.6%), with disagreement remaining below 10%. Students also raise concerns about political aspects — including the prevalence of partnerships with the Russian Federation over European partners — as a factor shaping the institutional innovation environment.

In sum, Group C's data reveals some contradictions: the highest stated commitment to IIC criteria coexists with the conditions least conducive to their realisation. Structural resource deficits, informal hierarchies, governance integrity risks collectively ensure that formal IIC commitments remain aspirational rather than operational — making Group C a critical case study in the gap between innovation policy and innovation culture.

Support for IIC Skill Development

Group C shows the highest total coverage of perceived support across all competencies — but this coverage is largely qualified as "to a certain extent," with low definitive "Yes" responses.

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Among survey leaders, inter- and transdisciplinary methods show the most consolidated awareness (70.2% total support), and there is a notable consistency in "Yes" responses across four key categories (inter- and transdisciplinary research, creativity, constructive feedback, and conflict resolution), all at exactly 22.8% — suggesting a standardised baseline expectation. Yet the majority (between 28% and 47%) indicate that support is somewhat inadequate (only to a certain extent) in all categories, while other considerable part either denies such support (between 17% and 33%) or is simply unaware of its availability (between 9% and 42%).

Among survey researchers, inter- and transdisciplinary methods are the most widely supported (77.5% total), constructive feedback shows high perceived availability (75.0%), and creativity and critical thinking both show 70% total support. However:

- Across all categories, the broad majority reports the availability of support to a certain extent;
- Conflict resolution: The highest "Don't know" rate in the study (22.5% among researchers).

Qualitative feedback reveals that “support" is often seen in a strictly technical context — *"working in laboratories and training on equipment"* — creating a cultural blind spot for soft, inclusive skills.

Interview evidence confirms and explains the technical bias. Training needs identified in the interviews are the most extensive of all groups: interdisciplinary research methods, communication skills, mentoring and supervision, leadership for cultural change, conflict management, creativity techniques, RRI, project management, industry collaboration, IP management, open science, and change management. This breadth reflects the most fundamental IIC capacity-building challenge in the sample.

The most acute needs identified by survey researchers are: clear IIC information, interdisciplinary research methods and RRI, creativity techniques, and communication/conflict skills.

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Topic	Leaders (n=57)	Researchers (n=40)	Students (n=62)	Interview Evidence
Commitment to IIC	57% strategy adoption (fragmented); silos perceived as more pronounced than Group B; 84% say senior management communicates IIC vision; 75% say staff encouraged to live IIC, (but not matched by practical support/tools. Support needed: 50–70%.	65% of the researchers acknowledge IIC strategy; 70% find it too abstract; freedom/ critical thinking significantly underrepresented; 70% say IIC champions lack influence to drive change; some researchers unaware of IIC strategies	Highest acknowledge-ment of leadership functions among all student groups: 66.1–74.2% approval	Leadership: emphasizes external collaboration, EU alignment, personal openness — limited visibility into supervisory relationships below, likely understating barriers for vulnerable staff. Early-career: multi-layered governance deters initiative; conformity culture normalized; junior researchers lack support structures. Overall: "form vs. essence" gap.
Leadership Role	Perceived present/com-municative at surface level, not deeply embedded in daily practice	Supervisor encouragement: 40% full agreement; role modelling: 50% (mostly "to a certain extent"); only 17.5% feel adequately supported.	(Same figures as Commit-ment row — 66.1–74.2%; no separate leadership -role-specific student question)	Critical need identified: leadership that actively protects junior researchers when they challenge established approaches

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Topic	Leaders (n=57)	Researchers (n=40)	Students (n=62)	Interview Evidence
Structural Support Demand	70% need support across all strategic items (staff training/ mentoring, learning from good practice ranks highest, guidance for IIC strategy/ action plans)	95% call for leader training/mentoring; 97.5% want to learn from institutions with established IIC; 97.5% want clear guidance; call for IIC integration into official HR strategy and teaching.	Calls for more diverse, innovative teaching methods; more channels for student involvement in innovative projects.	Absence of dedicated research support leaves junior researchers without mechanisms to drive change; call to integrate IIC into HR strategy echoed in interviews
Psychological Safety	High share feel work undervalued and a high share denies conflicts addressed constructively	Only 37.5% feel safe expressing unconventional ideas; conflict resolution: 42.5% constructive; valuation: only 40% feel fully valued; 12.5% not valued at all); admitting mistakes: 37.5% comfortable (55% partial); constructive criticism welcomed: 40%	Highest psychological safety among student groups: 61.3–72.6% agreement. Caveat: may reflect limited awareness of IIC criteria rather than a genuinely enabling environment.	Leaders describe environment as open/supportive; juniors report a different reality — challenging supervisors "may suffer consequences in terms of poor grades, delayed procedures, and career impact." Most hierarchical culture: leaders describe meetings as open; juniors report top-down communication, avoidance of challenging views.

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Topic	Leaders (n=57)	Researchers (n=40)	Students (n=62)	Interview Evidence
Risk Tolerance & Learning from Failure	Only 19% report it's encouraged; ~26% say failure doesn't harm career (14% unsure); 47.4% report no funding/time for exploratory research; ~51% say institution doesn't encourage it.	17.5% believe failure won't harm career (15% unsure); 55% confirm failed projects may harm career; only 10% receive dedicated funding/time; only 10% see failed projects as learning opportunities.	Not measured — question not included in student questionn aire	Absence of dedicated research support; multi-layered governance deters initiative through bureaucratic complexity/time cost; conformity culture (rational adaptation)
Collaboration & Interdisciplinarity	45.6% indicate external R&D collaboration actively supported; informal structures (47.4%) more common than formal (31.6%)	Lowest support — mostly "to a certain extent" (32.5% yes, 52.5% partial); formal interdisciplinary structures for only 22.5% (55% partial); informal opportunities also limited	50%+ agree opportuniti es exist to collaborat e across disciplines; slightly over 10% deny availability of such opportuniti es/ incentives	Leadership vs. researcher reality diverges; administrative barriers actively discourage interdisciplinary engagement; collaboration relies on informal networks rather than systemic access — fragmenting opportunity inequitably.

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Topic	Leaders (n=57)	Researchers (n=40)	Students (n=62)	Interview Evidence
Diversity, Inclusion & Belonging	>70% actively promote anti-discrimination/diversity (at least "to a certain extent"); 20–26% don't know/deny shared responsibility or diverse staff recruitment	Shared responsibility: 67.5 % total (30% yes, 37.5% partial); >22% entirely unaware. 40% confirm active diverse recruitment, 17.5% unsure, 15% disagree.	High diversity acknowledgement.	Political influences on governance referenced as affecting career/ recruitment decisions — disproportionately affects junior researchers and women, who are most dependent on transparent, fair procedures
Evaluation Criteria (Recruitment/Performance)	Equal weighting: interdisciplinarity 36.8%; creativity 36.8%; D&I — 31.6% "don't know" (highest in study).	Equal weighting: Interdisciplinarity 50%; creativity 45%; D&I — 27.5% "don't know." Qualitative: assessments described as "mainly technical"; teaching titles preferred over innovation; informal power structures cited as significant hiring factors.	Not applicable	Access to innovation opportunities depends on "being connected" — informal gatekeeping reproduces existing hierarchies, confirming the survey's nepotism finding

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Topic	Leaders (n=57)	Researchers (n=40)	Students (n=62)	Interview Evidence
Skill Development Support	Inter/transdisciplinary methods: 70.2% total (22.8% yes + 47.4% partial). Inter/trans methods, creativity, feedback, conflict resolution: all at 22.8% "yes," suggesting a standardised baseline; but 28–47% only partial, 9–42% "don't know". Leadership/mentoring — 42.1% "don't know" (critical blind spot); constructive feedback — 33.3% "no": critical thinking/creativity — 29.8%/28.1% "no."	Inter/transdisciplinary methods: 77.5% total (widely supported). Constructive feedback: 75%. Creativity & critical thinking: both 70% (yes + partially). Leadership/mentoring: only 15% definitive "yes". Conflict resolution: 67.5% some support but highest "don't know" rate in the study (22.5%). Qualitative: "support" often interpreted technically (e.g., "working in laboratories).	Acknowledgement ranges 50–72.6%; ~20% affirm only "to a certain extent"; denial rate <10% across categories	Most extensive training needs of all groups: interdisciplinary methods, communication skills, mentoring/supervision and leadership for cultural change, conflict management, creativity techniques, RRI, project management, industry collaboration, IP management, open science, change management — reflects the most fundamental IIC capacity-building needs.

Table 15: Summary of Main Results on the IIC Profile of Group C (Associated Institutions)

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Integrated Regional Profile

Key characteristics of IIC in group C organisations (EU Associated Countries)
The data across all groups tells a story of profound institutional contradiction. Group C formally reports the highest IIC weighting in performance reviews across the study, the highest total competency support coverage, and broadly positive student perceptions. At the same time, it exhibits the lowest resource support, the highest risk aversion, the most extensive training needs, and governance integrity risks that directly undermine foundations that IIC development requires. Researchers experience this contradiction most acutely: operating within a dual system where formal IIC commitments exist on paper, but informal power structures, political interference, nepotism, and technical-reductionist cultures determine actual outcomes. The consistently high 'Don't know' rates across multiple indicators signal an absence of clear policies, communication, and frameworks that leaves both leaders and researchers without reliable orientation. The student-researcher divergence is substantively meaningful and must be interpreted carefully: students' relatively positive perceptions likely reflect both genuinely more structured learning environments and, critically, limited awareness of IIC criteria and evaluation realities — making their satisfaction scores an incomplete proxy for institutional IIC health. Interview evidence adds the study's most serious dimension: reported experiences of intellectual appropriation, career consequences for challenging established approaches, and political interference in recruitment represent research integrity and governance concerns that formal IIC strategies cannot address in isolation.
Key challenges across the studied associated institutions are:
Transparency deficit: unclear evaluation criteria, opaque career

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consequences, informal power structures, political influence on HEIs' governance.
- High risk aversion: failure is feared, not learned from; conformity culture has become a rational adaptation.
- IIC strategies are the most abstract and least operationalized.
- Support is mostly seen in the technical context, leaving IIC competencies unaddressed.
- Multi-layered governance systems deter initiative through bureaucratic complexity.
- Administrative rules actively undermine interdisciplinarity.
- Access to IIC opportunities depends on informal gatekeeping/networking.
- Political and nepotistic factors undermine meritocratic IIC foundations.
- Absence of dedicated research support leaves junior researchers without support for innovative initiatives.

Identified opportunities that can contribute to favourable framework conditions for the sustainable establishment of IIC:

- High student satisfaction and positive attitude towards IIC at the educational level — a genuine foundation to build upon.
- Strong commitment to interdisciplinary collaboration expressed.
- High aspiration and genuine desire for improvement; high demand for support and training.
- Some institutions in the group report that strong external collaboration and IIC are achievable within these constraints — internal models exist.
- Existing student organisations, internship programmes, and events provide a foundation for broader IIC engagement.
- The honesty of qualitative feedback signals genuine interest and willingness for change.

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Recommendations for Strengthening Inclusive Innovation Culture

Group C: EU Associated Countries (Western Balkans)

Unlike Group A, and B, Group C faces more fundamental challenges and needs to deeply transform their institutional cultures.

The context of the studied EU Associated Countries is distinctive and must be understood on its own terms. Serbia, Bosnia and Herzegovina, North Macedonia, and Albania share a common post-socialist institutional heritage but occupy different positions in their trajectories toward European research integration. The gap between formal commitment and operational reality is, as the evidence demonstrates, wider here than anywhere else in the study.

The literature on post-socialist research systems provides further understanding of this context. (Kwiek 2018) describes that post-socialist HEIs underwent rapid formal modernisation — adopting strategies, quality frameworks, and European terminology — without the accompanying cultural transformation. (DOBBINS 2011) and (Zgaga et al. 2013) demonstrate that Western Balkans higher education systems retain deeply hierarchical governance cultures that persist beneath surface-level reform. The most recent European Commission Progress Reports (2023-2025)[27] for Serbia,[28] Bosnia and Herzegovina[29], North Macedonia[30], and Albania[31] acknowledge that the research capacities and innovation efforts in the region are still limited, and in some of them

[27] European Commission (2023). *Western Balkans Progress Reports* for Serbia, Bosnia and Herzegovina, North Macedonia, and Albania — European Commission Publications

[28] https://www.parlament.gv.at/dokument/XXVIII/EU/42368/imfname_11534753.pdf

[29] https://enlargement.ec.europa.eu/system/files/2023-11/SWD_2023_691%20Bosnia%20and%20Herzegovina%20report.pdf

[30] https://www.parlament.gv.at/dokument/XXVIII/EU/42336/imfname_11534678.pdf

[31] https://enlargement.ec.europa.eu/document/download/fe9138b7-90fe-4277-a12c-3a03f6d1957f_en?filename=albania-report-2025.pdf

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(e.g. Bosnia-Herzegovina, Albania) the overall research and innovation gap with the European Union is even widening.

Country	2025 Index	Performance Level	Relative Visual
Serbia	51.5	Emerging	
N. Macedonia	40.0	Emerging	
Albania	37.9	Emerging	
Bosnia & Herz.	25.7	Emerging	

Source: The European Innovation Scoreboard (European Commission 2025)

Table 16: Innovation Performance (EU-average = 100)

The Balkan countries also face well-documented challenges of brain drain, academic oligarchy, and the persistence of informal power networks in academic governance (Branković et al. 2014).

Country-level differentiation within Group C is significant and must inform how recommendations are prioritised and sequenced. **Serbia** has the most developed research infrastructure among the four countries and the strongest integration into European research networks, reflected in its comparatively higher participation in Horizon Europe and the established national science funding agency (Fund for Science of the Republic of Serbia, FONZR). Serbia is classified as an "Emerging Innovator" on the European Innovation Scoreboard (European Commission, 2025)[32]. Despite formal research infrastructure, Serbia faces persistent challenges of brain drain, under-resourced public research funding, and governance integrity deficits in higher education, including informal power networks and corruption in university governance. R&D expenditure remains below 1% of GDP, and the translation of formal quality frameworks into substantive research practice is incomplete.[33]

[32] https://ec.europa.eu/assets/rtd/ris/2025/ec_rtd_ris-regional-profile-rs.pdf

[33] https://ec.europa.eu/assets/rtd/eis/2025/ec_rtd_eis-country-profile-rs.pdf

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North Macedonia has undergone substantial formal higher education reform since the 2000s, including Bologna Process adoption and the establishment of quality assurance frameworks. However, the implementation capacity remains critically limited and the research system is among the most severely under-resourced in the region, with R&D expenditure consistently below 0.4% of GDP (European Commission, 2025, European Innovation Scoreboard)[34]. The ETF Torino Process assessment confirms a persistent gap between formal curriculum frameworks and actual teaching and learning practice, with graduate competency profiles remaining narrowly defined and insufficiently aligned with innovation-relevant skills (ETF, 2025, Torino Process: North Macedonia)[35]. North Macedonia is classified as an "Emerging Innovator" significantly below the EU average (European Commission, 2025). Academic-industry linkages remain weak, and quality assurance implementation gaps are explicitly identified as structural barriers to research capacity development.

Bosnia and Herzegovina presents the most complex governance environment. Its higher education system is fragmented across two entities — the Federation of Bosnia and Herzegovina and Republika Srpska — and the Brčko District, with no state-level higher education law, multiple parallel accreditation bodies, and deeply politicised university governance[36]. This fragmentation structurally impedes the development of coherent research and innovation strategies, cross-institutional collaboration, and consistent quality assurance. Bosnia and Herzegovina is classified as an "Emerging Innovator" and ranks among the lowest in the region on research output and innovation performance indicators (European Commission, 2025, European Innovation Scoreboard[37]). Brain drain is severe, with the country

[34] https://www.kowi.de/Portaldata/2/Resources/fp/2025-EIS.pdf
[35] https://www.etf.europa.eu/sites/default/files/2026-02/Country%20Fiche%202025_North%20Macedonia_EN_web.pdf
[36] https://eurydice.eacea.ec.europa.eu/eurypedia/bosnia-and-herzegovina/overview
[37] https://ec.europa.eu/assets/rtd/eis/2025/ec_rtd_eis-country-profile-ba.pdf

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recording some of the highest emigration rates in Europe (The World Bank, 2024)[38], disproportionately affecting educated young people and early-career researchers[39].

Albania has made a significant formal legislative progress in higher education, anchored by the 2015 Higher Education Law, which introduced governance reform, a new accreditation framework, and quality assurance structures aligned with European standards. However, the gap between legislative progress and operational reality remains acute without any substantial improvements for the autonomy and quality of education (Bedini 2025). Education related outputs of Albania are among the lowest in Europe (Maghnouj et al. 2020). Albania's R&D expenditure stands at approximately 0.15% of GDP — the lowest in the Western Balkans and among the lowest in Europe — reflecting structural under-investment that directly constrains research and innovation capacity (European Commission, 2024)[40], which is among the lowest in Europe (see Global Innovation Index, 2025)[41]. Governance integrity challenges persist despite reform: political interference in university governance, nepotism, and insufficient independence of quality assurance bodies remain documented structural concerns (European Commission, 2024, Albania Progress Report)[42].

These structural deficits are compounded by a human capital crisis of exceptional severity present in the Balkan region. Critically, this emigration is not driven primarily by economic factors alone: research identifies the absence of meritocracy, institutional distrust, corruption, and the lack of transparent career advancement as primary push

[38] https://openknowledge.worldbank.org/server/api/core/bitstreams/1039aa95-e256-42ed-8bda-934b35c5e16d/content

[39] https://www.wfd.org/what-we-do/resources/cost-youth-emigration-bosnia-and-herzegovina-wfd-research;

[40] https://ec.europa.eu/assets/rtd/eis/2024/ec_rtd_eis-country-profile-al.pdf

[41] https://www.wipo.int/edocs/gii-ranking/2025/al.pdf

[42] https://enlargement.ec.europa.eu/document/download/a8eec3f9-b2ec-4cb1-8748-9058854dbc68_en?filename=Albania%20Report%202024.pdf

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factors (Gëdeshi and King 2026). For example, only 17% of Albanian PhD holders and PhD students abroad wish to return, and only 5% of Albanian students studying abroad intend to return after completing their studies (Gëdeshi and King 2026). While the figures demonstrate the situation in Albania, it is indicative for the entire West Balkan region highlighting the depletion problem of the advanced human capital pipeline upon which any functional R&D ecosystem and innovation culture depends. Addressing the region's innovation culture therefore requires not incremental reform but a fundamental transformation of the institutional conditions. The recommendations below address this systemic capability gap directly.

1. Governance Reform and Transparency

The survey and interviews provide evidence of nepotism, political interference in governance, and opaque career criteria within academia in the Balkan countries. Researchers who know that informal connections matter more than competence have no rational basis for investing in IIC development. The literature on governance integrity in Western Balkans higher education confirms that this is a systemic rather than institution-specific problem.

Addressing this requires:

- **Establishing transparent, publicly communicated, and consistently applied criteria for all recruitment and promotion decisions**, with explicit weighting of IIC-relevant competencies alongside scientific outputs. Criteria must be communicated transparently, applied uniformly, and subject to independent review.
- **Introducing independent external participation in recruitment and promotion committees** for all permanent academic positions and senior appointments. The inclusion of external — ideally international — committee members reduces the scope for informal network influence and signals institutional commitment to merit-based advancement. The **European**

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University Association Institutional Evaluation Programme provides a directly applicable framework for external peer review of governance practices (IEP, 2022).[43]

- **Establishing or strengthening institutional integrity offices** with genuine independence from institutional leadership, accessible reporting channels for all staff and students, and clear procedural protections for those who report concerns. **The European Code of Conduct for Research Integrity** (ALLEA, 2023)[44] provides the normative foundation; the DFG Guidelines for Safeguarding Good Research Practice provide a practical implementation model[45]. Critically, these offices must be structurally independent — reporting to governing boards rather than rectors — to be credible in environments where leadership itself may be implicated in governance concerns.

The urgency of this recommendation is supported by research demonstrating that perceived procedural fairness is a foundational determinant of organisational trust, and that trust is a prerequisite for the psychological safety and collaborative risk-taking that IIC requires (Tyler and Blader 2003; Tyler 2006). In environments where fairness is not perceived, no amount of IIC training or strategy development will produce behavioural change.

2. Build IIC Awareness and Shared Understanding as the Foundation for All Operational Interventions

Group C faces the most fundamental IIC awareness deficit in the study.

[43] https://www.eua.eu/downloads/content/guidelines%20for%20institutions%202022-23.pdf

[44] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/european-code-of-conduct-for-research-integrity_horizon_en.pdf

[45] https://www.dfg.de/en/basics-topics/basics-and-principles-of-funding/good-research-practice/code-of-conduct

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The Group B recommendation (Section 0) for developing institution-specific IIC practice guides and structured awareness workshops applies fully here and should be implemented as a first-priority intervention. The specific adaptations required for Group C are:

- **Prioritise the leaders and research community as the primary awareness-building target**: as leaders and researchers occupy fundamentally different positions in the institutional hierarchy, face different professional incentives, and experience IIC barriers in qualitatively different ways — making a one-size-fits-all awareness approach both ineffective and counterproductive. Critically, awareness must explicitly address the professional relevance of IIC competencies for research performance and career development — framing IIC not as another institutional compliance requirement but as a set of skills with documented impact on research quality, innovation capacity, grant competitiveness, and international collaboration capacity:
    - **For leaders**, awareness interventions should focus on translating IIC from abstract strategic commitment into concrete leadership behaviours. These interventions are best delivered through **structured peer learning formats**[46] — facilitated exchanges between leaders on real institutional IIC challenges — that simultaneously build awareness and accountability. Given the conformity culture documented in Group C, leader-focused awareness must also explicitly address the gap between how leaders perceive the institutional environment and how researchers experience it, using evidence from structured feedback and anonymous researcher input to make this divergence visible and actionable.
    - **For researchers**, awareness interventions must translate IIC values into concrete, discipline-specific daily behaviours

[46] https://www.wgu.edu/blog/peer-learning2208.html

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relevant to research contexts that define Group C's disciplinary profile. Short, facilitated departmental workshops co-designed with researchers from relevant disciplines, combined with a concise institution-specific IIC practice guide developed participatively rather than imposed top-down, provide effective and contextually grounded implementation format.[47]

- **Develop IIC literacy programmes for leaders, researchers and students** that explicitly address what IIC means in professional research practice and why it matters for innovation capacity, directly addressing the awareness gap identified in the analysis.

3. Reform Evaluation Systems to Recognise IIC Contributions

The detailed evaluation reform framework — IIC-relevant metrics, CoARA, the Dutch Recognition and Rewards programme, and the Leiden Manifesto — is elaborated in the **Group A recommendations** (**Section 0, recommendation 1**) and applies fully here. The essential Group C adaptations are:

- **Criteria transparency before metric reform**: making criteria explicit, publicly communicated, and consistently applied. Introducing new IIC metrics without this foundation adds complexity to an already opaque system without changing behaviour.
- **Governance and evaluation reform in parallel**: the dual system — formally high IIC weighting, informally low IIC practice — is a governance integrity problem. Evaluation reform without governance reform (**Section 0, recommendation 1**) will not produce behavioural change.

[47] https://www.ncbi.nlm.nih.gov/books/NBK574117/

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4. Establish Dedicated Funding and Protected Time for Exploratory Research

The internal seed funding and After-Action Review framework elaborated in the **Group A recommendations (Section 0, recommendation 2**) applies also here. The essential Group C adaptations are:

- **Leverage Horizon Europe Widening instruments** — Twinning, Teaming, ERA Chairs — as the primary vehicle for externally funded exploratory research capacity. These instruments are specifically designed for less-developed research systems and provide not only funding but institutional development support and international network access. Grant-writing support is a prerequisite for competitive applications.
- **Introduce explicit career protection policies for exploratory research** alongside any funding scheme. Researchers will not engage in exploratory projects without credible assurance that failure will not harm their careers. Formalising After-Action Review debriefing processes — with explicit career protection for participants — is a cultural and policy prerequisite to produce behavioural change.
- **Leverage existing Western Balkans regional cooperation frameworks**, including the Regional Research and Development Strategy for Innovation[48] supported by the World Bank and Regional Cooperation Council, provide additional funding and capacity-building opportunities specifically targeted at the Group C context.

[48] https://www.rcc.int/download/docs/WBRIS%20Strategy10-21-13%20web.pdf/a3c34a7d7bfa321e83e5b95824d792b4.pdf

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5. Introduce Structural Protections for Early-Career Researchers

The structural vulnerability of early-career researchers in Group C is acute. Brain drain evidence confirms that failure to protect early-career researchers is not only an ethical failure but a strategic one: it drives the departure of the talent most critical for innovation capacity.

The detailed framework for co-supervision mandates, ombudsperson structures, and independent progress reviews is elaborated in the **Group A recommendations** (**Section 0, recommendation 5**) and applies fully here. The essential Group C adaptations are:

- **Prioritise accessible, anonymous, and structurally independent reporting mechanisms as an immediate first-order intervention**. In environments where challenging established approaches might imply negative "career" consequences, a credible independent reporting channel is a foundational safety requirement.
- **Mandate external co-supervision for all doctoral researchers**: "External" committee members for independent progress reviews should ideally be external to the institution, given the small scale of national research communities where informal networks extend across institutions.
- **Address women and junior researchers' specific vulnerability**: Transparent, criteria-based recruitment (**Section 0, recommendation 1**) and independent committee oversight are the primary structural protections, complemented by publicly monitored gender equity commitments.

6. Build Leadership Capacity for Transformational IIC Leadership

The leadership challenge in Group C is more fundamental than in Groups A or B. It is not a gap in specific IIC skills — it is a gap in the conception of leadership itself. The evidence broadly confirms that transformational leadership is a strong predictor of innovation

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performance (Gumusluoglu and Ilsev 2009). (Pieterse et al. 2010) demonstrate that transactional, authority-based leadership is negatively associated with innovative behaviour, creating compliance-oriented rather than initiative-driven work environments — contributing to precisely the pattern of passive conformity documented in Group C.

The detailed framework for practice-oriented IIC leadership training, peer learning networks, and structured feedback is elaborated in the **Group A recommendations** (**Section 0, recommendation 4**) and the **Group B recommendations** (**Section 0, recommendation 5**). The essential Group C adaptations are:

- **Begin with transformational leadership orientation**: the primary need is reframing leadership as a facilitative and protective function rather than an authority-based one. This conceptual reorientation is a prerequisite for all other leadership development and must be addressed explicitly.
- **Make the leader-researcher perception gap a central training focus**: use structured, anonymous researcher feedback to make the divergence between leadership perception and researcher experience visible to leaders.
- **Leverage BEAMING and Horizon Europe networks for peer learning**, connecting Group C leaders with Group A and advanced Group B institutions. Peer learning provides both practical models and normative reference points.

7. Embed Soft Skill Development

The training needs identified through interviews are the most extensive in the study.

The detailed soft skill development framework — creativity methods, conflict resolution, constructive feedback, and the psychological safety precondition — is elaborated in the **Group A** (**Section 0, recommendation 3**) and applies fully here. The essential Group C adaptations are:

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- **Prioritise conflict resolution and constructive feedback as immediate interventions**, given that Group C shows the lowest psychological safety in the study and a significant share of researchers explicitly feel unsafe expressing unconventional ideas.
- **Integrate into existing research activities** rather than standalone workshops. In Group C, where time and resource constraints are acute, integration into project activities, supervisory relationships, and research group activities could be more feasible and more effective than dedicated training programmes.
- **Address RRI as a specific priority**: RRI frameworks provide an important link between European research culture norms and IIC competencies. RRI requirements in Horizon Europe also create a practical incentive for institutions seeking European funding.

8. Convert Individual IIC Champions into Institutional Infrastructure and Eliminate Administrative Barriers

IIC in Group C is driven by individual champions operating in structural isolation.

The Group B (section 0, recommendation 3) for formal IIC coordination roles and action plans applies fully here. The essential Group C adaptations are:

- Eliminate administrative rules that actively undermine interdisciplinarity immediately identifying and removing barriers and dysfunctions across Group C institutions.
- **Establish dedicated research support (offices)** at institutional level, providing junior researchers with practical support for grant applications, project management, IP issues, and administrative navigation.
- **Develop formal, participatively co-created IIC action plans** — concrete, time-bound, and publicly monitored — translating strategic vision into operational commitments. Given that the

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broad majority of researchers request clear guidance and action plans, the mandate for this intervention is unambiguous.

9. Integrate IIC into Curriculum

- **Integrate IIC competencies explicitly into curriculum**. This means not only interdisciplinary teaching methods but explicit instruction in creativity, constructive feedback, conflict resolution, and collaborative research skills as professional competencies. (Healey et al. 2014) demonstrate that research-based learning in collaborative, interdisciplinary settings is among the most effective methods for developing this competency profile.
- **Formalise students as IIC implementation partners**, providing resources, recognition, and institutional standing to organise interdisciplinary projects, peer learning events, and innovation challenges. Converting this existing asset into a structural resource is one of the most accessible entry points for bottom-up IIC culture building in Group C.

10. Address the Conformity Culture Through Structural Reform

Conformity is not a cultural deficiency but a rational adaptation. Researchers who know that initiative might carry professional risk, that failure harms careers, and that informal connections determine advancement have every rational reason to conform. There is convincing evidence provided in literature demonstrating that organisational culture is a product of structural conditions — reward systems, power distributions, and behavioural consequences — rather than values or attitudes alone (see e.g. (Fehr and Gächter 2000; Schein 2010)). Cultural change interventions that do not address the rational basis for passivity will not produce sustained behavioural change.

Changing the conformity culture, therefore, requires changing the structural conditions that make conformity rational. The specific complementary cultural interventions are:

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- **Publicly recognise and celebrate IIC-relevant contributions** — interdisciplinary projects, innovative teaching, successful external collaborations, and well-designed failed projects — to shift the visible reward signals that shape behaviour. (Ryan and Deci 2000) demonstrate that informational recognition of specific contributions and competencies is among the most powerful drivers of intrinsic motivation in knowledge workers.
- **Develop a peer learning network** connecting IIC champions across the region — reducing individual isolation, providing mutual support, and building a regional community of practice. (Wenger 2013) provides the foundational framework for understanding how deliberately cultivated learning networks sustain professional learning and shared practice across institutional boundaries.

The overarching message is that Group C's IIC development challenge is not only a matter of skills, awareness, or goodwill. It is a matter of structural conditions: governance integrity, meritocratic incentive systems, career protection, and administrative environments.

Table 17 summarises the strategic measures described above to help improve IIC in the studied EU Associated Countries.

	Recommendation	***Problem Addressed***	***Key Actions***
1	Governance Reform and Transparency	Evidence of nepotism, political interference, and opaque career criteria; researchers have no rational basis for investing in IIC when informal connections outweigh competence — a systemic, not	• Establish transparent, publicly communicated, uniformly applied recruitment/promotion criteria, explicitly weighting IIC-relevant competencies • Introduce independent (ideally international) external participation in recruitment/ promotion committees • Establish/strengthen institutional integrity offices, structurally independent of leadership (reporting to governing boards, not rectors), with accessible

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	Recommendation	***Problem Addressed***	***Key Actions***
		institution-specific, problem	reporting channels and protections for reporters
2	Build IIC Awareness and Shared Understanding as the Foundation for All Operational Interventions	Fundamental IIC awareness deficit	• Prioritise leaders and researchers as distinct target groups, given their different institutional positions, incentives, and experience of barriers • Frame IIC as professionally relevant (research quality, grant competitiveness, international collaboration), not compliance • Leaders: peer learning formats exposing the leader–researcher perception gap via structured/anonymous feedback • Researchers: discipline-specific, participatively co-designed departmental workshops and practice guides • Develop IIC literacy programmes for leaders, researchers, and students
3	Reform Evaluation Systems to Recognise IIC Contributions	Dual system of formally high IIC weighting but informally low IIC practice — a governance integrity problem, not just a metrics problem	• (Full framework: see Group A, Recommendation 1) • Group C-specific: establish criteria transparency before introducing new metrics • Pursue evaluation reform and governance reform (Recommendation 1) in parallel — evaluation reform alone will not produce behavioural change
4	Establish Dedicated Funding and Protected Time	Structural underfunding and dependence on external funding;	• (Full framework: see Group A, Recommendation 2) • Leverage Horizon Europe Widening instruments (Twinning,

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	Recommendation	***Problem Addressed***	***Key Actions***
	for Exploratory Research	researchers unlikely to engage in exploratory work without credible career protection	Teaming, ERA Chairs) with grant-writing support • Introduce explicit career-protection policies alongside any funding scheme; formalise After-Action Review with career protection for participants • Leverage Western Balkans regional cooperation frameworks (e.g., Regional R&D Strategy for Innovation, World Bank/Regional Cooperation Council)
5	Introduce Structural Protections for Early-Career Researchers	Acute structural vulnerability; brain drain evidence shows failure to protect early-career researchers is both an ethical and strategic failure	• (Full framework: see Group A, Recommendation 5) • Prioritise accessible, anonymous, structurally independent reporting mechanisms as an immediate first-order intervention • Mandate external co-supervision/committee members, • Address specific vulnerability of women and junior researchers via transparent recruitment (Recommendation 1) and publicly monitored gender equity commitments
6	Build Leadership Capacity for Transformational IIC Leadership	Leadership gap is conceptual, not just skill-based — authority-based/ transactional leadership dominates, fostering	• (Full framework: see Group A, Recommendation 4; Group B, Recommendation 5) • Begin with reframing leadership as facilitative/protective rather than authority-based (prerequisite for all other leadership development)

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	Recommendation	***Problem Addressed***	***Key Actions***
		compliance rather than initiative	• Use structured, anonymous researcher feedback to make the leader–researcher perception gap visible to leaders • Leverage BEAMING/Horizon Europe networks to connect Group C leaders with Group A and advanced Group B institutions for peer learning
7	Embed Soft Skill Development	Most extensive training needs in the study; lowest psychological safety of all groups, with many researchers explicitly feeling unsafe expressing unconventional ideas	• (Full framework: see Group A, Recommendation 3) • Prioritise conflict resolution and constructive feedback as immediate interventions • Integrate into existing research/supervisory activities rather than standalone workshops, given acute time/resource constraints • Address RRI as a specific priority, linking European research culture norms to IIC and creating a practical incentive tied to Horizon Europe funding
8	Convert Individual IIC Champions into Institutional Infrastructure and Eliminate Administrative Barriers	IIC driven by isolated individual champions operating without institutional support; administrative rules undermine interdisciplinarity	• (Full framework: see Group B, Recommendation 3) • Immediately identify and eliminate administrative rules undermining interdisciplinarity • Establish dedicated research support offices for junior researchers (grant applications, project management, IP issues, administrative navigation) • Develop formal, participatively co-created, time-bound, publicly monitored IIC Action Plans

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	Recommendation	Problem Addressed	Key Actions
9	Integrate IIC into Curriculum	IIC competencies not embedded in teaching and learning; students represent an underused resource for bottom-up culture change	• Explicitly integrate IIC competencies into curricula — creativity, constructive feedback, conflict resolution, collaborative research skills as professional competencies, via research-based interdisciplinary learning • Formalise students as IIC implementation partners, with resources/recognition/standing to organise interdisciplinary projects, peer-learning events, and innovation challenges
10	Address the Conformity Culture Through Structural Reform	Conformity is a rational adaptation to real professional risk (career harm, informal advancement criteria), not a cultural deficiency — will not change through values-based interventions alone	• Publicly recognise and celebrate IIC-relevant contributions (interdisciplinary projects, innovative teaching, successful collaborations, well-designed failed projects) to shift visible reward signals • Develop a peer learning network connecting IIC champions across the region, reducing isolation and building a regional community of practice

Table 17: Overview of Strategic Measures to Strengthen Inclusive Innovation Culture (Group C — EU Associated Countries)

Strengthening Inclusive Innovation Culture in the Age of AI

Artificial intelligence is drastically reshaping the conditions under which research and innovation occur — but its implications for Inclusive Innovation Culture (IIC) are more profound and more urgent than most HEI strategies currently reflect. Integrating AI into research and teaching is not primarily a technical challenge; it is a cultural, pedagogical, and

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governance challenge that intersects with every dimension of IIC (see Figure 4). This governance dimension is no longer optional: since 2 February 2025, Article 4 of the EU AI Act (Regulation (EU) 2024/1689)[49] has required providers and deployers of AI systems — universities included — to ensure a sufficient level of AI literacy among their staff and others operating these systems on their behalf.

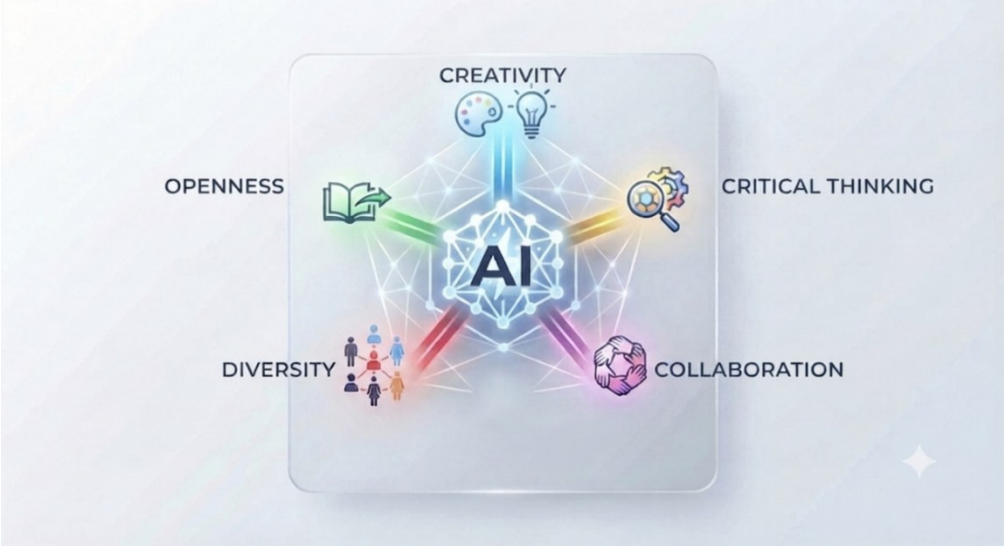


Figure 4 Integrating AI Into Research and Teaching

*(Source: Fraunhofer ISI - *Visualisation is AI-generated)*

AI is not replacing human creativity, critical thinking, interdisciplinarity, or collaborative competency — it is making these capacities more critical, not less. The World Economic Forum's *Future of Jobs Report* (2023; updated 2025[50]) ranks creative thinking, analytical thinking, and collaboration among the fastest-growing skill demands worldwide, directly alongside AI and big-data literacy. The JRC report accompanying the European Strategy for AI in Science (Purificato et al.

[49] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024R1689; https://artificialintelligenceact.eu/article/4/

[50] https://reports.weforum.org/docs/WEF_Future_of_Jobs_Report_2025.pdf

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2025)[51] identifies **hybrid, multi- and interdisciplinary teams — combining AI expertise with deep domain expertise** — as a strategic priority for European research competitiveness. IIC competencies are therefore not peripheral to AI-era research but central to it.

The evidence also reveals a critical paradox with direct consequences for inclusiveness. In a large-scale experiment, (Doshi and Hauser 2024) show that generative **AI raises *individual* creative performance — most of all for less-creative contributors — yet simultaneously makes outputs more similar to one another, *reducing the collective diversity* of ideas**. This is a social dilemma at the heart of IIC: the same tool that widens individual participation can narrow the diversity of contribution on which an Inclusive Innovation Culture depends. (Anderson et al. 2024) independently document the same **homogenisation effect on human ideation**. Two further risks compound this. (Salisu et al. 2026) model a moderated-mediation pathway in which **AI use erodes student creativity by fostering AI dependence**, with the suppression effect strongest where academic support is weakest — the condition observed in Groups B and C. Recent empirical work sharpens the cognitive concern: (Gerlich 2025) finds that **frequent reliance on AI tools is associated with weaker critical thinking**, mediated by cognitive offloading, while (Lee et al. 2025) report that knowledge workers who place higher confidence in generative AI engage in less critical thinking, with effort shifting from producing answers to verifying machine outputs. (Chen et al. 2025) also confirm the foundational concern that AI-assisted performance gains may substitute for, rather than build, the deep cognitive engagement that genuine skill development and critical thinking require.

These findings converge on one **conclusion relevant to all three groups: AI integration demands *more* investment in human IIC competencies, not less** — investment explicitly designed to build the metacognitive, creative, collaborative, and ethical capacities that

[51] https://research-and-innovation.ec.europa.eu/document/c1afd7d0-ff65-4f84-be48-b0e0949596c5_en;

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make AI augmentation productive. (Hoßbach and Isaksen 2025) confirm that AI-augmented creative problem-solving still requires people to engage in creative cognition, so organisations must continue to invest in creativity training. The EUA Task-and-Finish Group on AI (Jørgensen and Phelan 2026) reinforces this: **thoughtful AI use depends on metacognition and reflective judgement that must be developed through training and guided practice**, and universities must sustain open dialogue on AI's possibilities and limitations so their communities can discern where it genuinely adds value.

Cross-Cutting AI and IIC Recommendations

1. Reframe AI Literacy as an IIC Competency

AI literacy must cover not only how to use AI tools but how AI shapes thinking — algorithmic bias, authorship and attribution, and AI's effects on creative and collective processes.

What HEIs should do:

- **Introduce cross-disciplinary AI-literacy modules** in every discipline addressing algorithmic bias, authorship, creative-process and collective-diversity effects, and ethical use. Frame them as IIC competency development, linking AI literacy to research quality, creative performance, and responsible innovation.
- **Position AI literacy as an extension of RRI** giving a ready curricular pathway and a direct link to Horizon Europe requirements.
- **Anchor AI-literacy provision in the EU AI Act's Article 4 duty and align it with the European Commission's Living Guidelines** on the Responsible Use of Generative AI in Research (2024)[52] and

[52] https://research-and-innovation.ec.europa.eu/document/download/2b6cf7e5-36ac-41cb-aab5-0d32050143dc_en?filename=ec_rtd_ai-guidelines.pdf

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UNESCO's Guidance for Generative AI in Education and Research (2023)[53] — giving HEIs ready-made frameworks rather than requiring them to build governance from scratch.

- **Establish clear guidelines** distinguishing unethical AI use from legitimate AI exploration; communicate them publicly so the whole community understands both opportunities and boundaries[54].
- **Include information on AI's environmental footprint** (energy and water use) within responsible use of AI and RRI framing, connecting AI governance to the sustainability commitments central to the bioeconomy.

2. Address the AI–Creativity Paradox

The most immediately actionable finding in recent literature is that AI use, without appropriate academic support and pedagogical design, undermines the creative capacities IIC requires (Salisu et al. 2026). **Providing AI access without structured support (mentoring, guided reflection, iterative feedback) risks actively suppressing creative and critical thinking**. The collective-diversity risk is just as serious for interdisciplinary fields such as the bioeconomy: because generative AI recombines existing knowledge and converges on similar outputs (Doshi and Hauser 2024; Anderson et al. 2024). **Over-reliance can therefore reduce the likelihood of radically new, paradigm-breaking ideas**. Genuine interdisciplinary synthesis still requires human creative judgement that AI cannot substitute.

What HEIs should do:

- Invest in creativity training *alongside* AI literacy — the two are complementary, not substitutable.

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[53] https://www.unesco.org/en/articles/guidance-generative-ai-education-and-research

[54] https://www.linkedin.com/pulse/how-higher-education-can-rethink-creativity-age-ai-safaraliyeva-ma-5ym0f

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- **Design AI use to preserve human creative agency**: position AI as a creative partner and thinking stimulus, not an answer generator — using AI to generate initial idea pools that researchers critique and extend, to propose alternative problem framings for human assessment, and to evaluate options systematically while humans retain direction and final judgement (Hoßbach and Isaksen 2025).
- **Build structured academic support** — mentoring, guided reflection, iterative feedback — as the primary mechanism for protecting creative autonomy while enabling productive AI use. (Salisu et al. 2026) identify it as the strongest moderator of AI's negative effects, simultaneously reducing dependence and protecting performance.
- **Assess creativity as a *process***, not only a product: evaluate idea development, reflection, and iteration rather than polished AI-assisted outputs alone[55].
- **Require students to submit their own idea set *before* consulting AI,** then use AI to expand or challenge it and document what changed and why — safeguarding divergent thinking.
- Pilot AI-assisted interdisciplinary synthesis with human-in-the-loop checkpoints and extend assessment explicitly to AI-assisted outputs.

3. Develop Metacognitive Competency for AI-Augmented Research

Researchers and students who lack metacognitive foundations — the capacity to monitor and control their own thinking and their interactions with AI — cannot realise AI's creative and analytical potential and are most vulnerable to passivity and dependence. People with greater knowledge of creative problem-solving are markedly better able to actualise AI augmentation; without it, AI's speed and volume produce

[55] https://www.linkedin.com/pulse/how-higher-education-can-rethink-creativity-age-ai-safaraliyeva-ma-5ym0f

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cognitive overload rather than enhancement (Hoßbach and Isaksen 2025).

What HEIs should do:

- **Teach prompt engineering as a general research competency** across all disciplines via short, discipline-specific workshops embedded in existing research activities — covering effective prompts for literature synthesis, idea generation, problem framing, and evaluation in bioeconomy contexts.
- **Build metacognition into leadership development**: leaders who model reflective AI use — articulating when AI adds value and when it does not.
- **Create safe, structured spaces for reflective experimentation**, where people can try AI tools, make mistakes, and build metacognitive knowledge through guided practice (Hoßbach and Isaksen 2025); Jørgensen & Phelan, 2026).

4. Safeguard Critical Thinking and Build Bioeconomy-Specific Innovation Capacity

Critical thinking is both the competency most directly threatened by uncritical AI use and the one most essential to bioeconomy innovation. (Lee et al. 2025) show that the more knowledge workers trust AI, the less critical thinking they apply. And because the bioeconomy's sustainability mission depends on paradigm-breaking rather than merely recombinant ideas, the homogenisation effect (Doshi and Hauser 2024; Anderson et al. 2024) is a direct threat to the radical novelty the bioeconomy transition requires.

What HEIs should do — protect critical thinking:

- **Make verification a core, teachable competency**. Since AI shifts effort toward oversight (Lee et al. 2025), train people to do oversight well: source triangulation, fact-checking AI claims, and detecting fabricated citations or data as a standard step in every AI-assisted workflow.

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- **Engineer "productive friction" into AI-supported tasks**. Require learners and researchers to produce their own reasoning, hypothesis or interpretation before consulting AI, countering the cognitive offloading (Gerlich 2025) identifies.
- **Use AI as a challenger, not an oracle**. Deploy structured techniques — premortems (Klein 2008), Six-Hats-style multi-perspective critique (Bono 1985), and AI-generated counter-arguments — to interrogate AI outputs and stress-test human conclusions.

5. Use AI to Directly Support IIC Development

Used appropriately, AI offers concrete, immediately accessible mechanisms that can support IIC development across all three groups — especially in resource-constrained contexts lacking dedicated IIC infrastructure.

- **Interdisciplinary research:** the JRC report (European Commission, 2025) identifies AI as a tool for accelerating interdisciplinary synthesis, surfacing cross-disciplinary connections and knowledge gaps invisible within silos. AI plays increasing role for exploring and synthesising existing research — particularly in life sciences, chemicals, and materials offering a huge potential for bioeconomy related fields.
- **Creativity and idea generation:** AI augmentation can raise individual creative performance — widening the idea pool, enabling more systematic evaluation of options, and increasing switching between problem and solution spaces. AI can act as a creative mentor (reflective questions, progress monitoring, suggested adaptations) — but only when users have the foundational competency to direct and evaluate it. To protect collective diversity, vary prompts and models across a team and treat AI output as raw material, not consensus (Doshi and Hauser 2024).
- **Psychological safety and feedback culture:** anonymous, AI-mediated feedback channels can lower the personal risk of giving constructive feedback in high-hierarchy environments.

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- **Awareness and training:** AI-powered personalised learning platforms can deliver IIC content in discipline-specific, multilingual formats, closing awareness gaps across Groups B and C without dedicated infrastructure. Language equity must be monitored, however: output quality is typically lower in less-resourced languages, so multilingual delivery should be paired with human review for non-Anglophone users.

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Best Practices

Best Practices on IIC

To accelerate the transition from diagnosis to lived practice, the BEAMING project turned to proven Best Practices that support the development of IIC at HEIs. Learning from models that have already been tested, refined, and successfully implemented across diverse institutional settings avoids reinventing the wheel and provides an evidence-based benchmark.

This section presents selected Best Practices — their foundations, mechanics, enabling conditions, and documented impacts — as evidence-based benchmarks for Inclusive Innovation Culture. Against each benchmark, institutional realities are reflected: partners identified barriers in their current framework conditions, structural advantages they can build on, and concrete adaptation routes. Importantly, the focus is on developing strategies that allow these practices to be adapted without complex structural reform, leveraging low entry barriers at BEAMING partners' institutions. The goal is to equip every institution with the knowledge to design and launch a context-appropriate version of a proven model for strengthening inclusive innovation culture.

Challenge-Based and Project-Based Learning: The Aalto University Design Factory Model

Among the practices capable of cultivating an Inclusive Innovation Culture in higher education, the model pioneered at Aalto University in Espoo, Finland is particularly instructive. It answers a fundamental pedagogical question: **how do we move students from the passive reception of knowledge to active problem-solving**? The empirical case for doing so is convincing — literature shows (Freeman et al. 2014; Romero Caballero et al. 2025) that active-learning approaches significantly improve performance among students and improve their critical thinking (Sluijs et al. 2024).

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Challenge-based learning (CBL) emerged from Apple's *Apple Classrooms of Tomorrow — Today* initiative and was formalised by Nichols and Cator (2008)[56]; it draws on the human-centred design thinking (Nichols et al. 2016) and on the engineering-education reforms of the **CDIO** (Conceive-Design-Implement-Operate) framework (Crawley et al. 2007). Aalto operationalises these principles by organising learning around real, open-ended challenges posed by external partners — companies, public bodies, and NGOs.[57]

The essence of Best Practice

The model is anchored in the **Aalto Design Factory** (Björklund et al. 2024). It was founded in 2008 as an experimental, interdisciplinary co-creation platform designed to break down the silos separating engineering, business, and design (Björklund et al. 2019). Its flagship vehicle, the **Product Development Project (PdP)**, brings mixed student teams together on genuine, company-sponsored briefs across a full academic year, culminating in a large public showcase (the *"Gala"*).

Over time the Design Factory matured into the founding node of the Design Factory Global Network (DFGN), which today comprises 39 Design Factories across 26 countries.[58] This international diffusion is itself the clearest evidence of transferability. Björklund et al. (2019) identify the five enablers that allow the model to be re-created in diverse settings: **institutional flexibility, dedicated collaborative space, leadership support, community-building, and design-based experimentation**.

[56] https://www.challengebasedlearning.org/wp-content/uploads/2019/03/CBL_Paper_2008.pdf

[57] https://www.aalto.fi/en/news/challenge-based-learning-is-an-approach-for-enriching-the-learning-experience; https://www.aalto.fi/en/teachers-handbook/best-practices-for-project-based-learning

[58] https://dfgn.org/

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Sourcing challenges from the regional context

The model's first principle is simple: the most fruitful challenges are often "low-hanging" — specific, authentic, and regional. (Kohn Rådberg et al. 2020), confirm that challenge-based learning expands both student learning and societal impact when anchored in real societal needs. The practical guiding question for any adopting university follows directly: **who, in our region, has a real problem that an interdisciplinary student team could tackle**?

Sample Regional Contexts

- Biodegradable packaging (berry farm)
- Energy efficiency (rural hotel)
- Local bio-based product concepts
- Reducing plastic at public events
- Logistics (dairy cooperative)
- Waste-stream valorisation
- Short food supply chain design
- Water-quality monitoring concepts

In the bioeconomy context these can be different practical challenges and tasks — biodegradable packaging for a berry farm, logistics for a dairy cooperative, valorising a waste stream, developing a local bio-based product, designing a short food supply chain, reducing plastic at public events, or concepts for water-quality monitoring etc.

Box 1: Examples for project ideas

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Crucially, the deliverable need not be necessarily a physical prototype. It can equally be a feasibility study, a cost–benefit analysis, a service concept, a policy brief, or a communication campaign. This regional embeddedness reflects the "third mission" of universities and their role within **a Quadruple Helix** — making the model especially well suited to HEI partners in the BEAMING project.

Box 2: Examples of deliverables

How the model works in practice

The model runs on three integrated yet adaptable mechanics: how challenges are sourced, how disciplines are combined, and how the process is delivered.

- **Sourcing:** A systematic, curated process in which dedicated staff — a "challenge scout" — proactively identify real regional problems and establishes links with external stakeholders (Björklund et al. 2019; Björklund et al. 2024). The first question for any adopter is who plays this role: a Technology Transfer Office, a PhD student, or a well-connected professor.
- **Integration:** Interdisciplinarity is forced through task dependency — challenges that cannot be solved within a single discipline — and deliberate cross-disciplinary team composition. Students lead; trained student project managers pitch a vision and manage their teams. Teachers step into a facilitative coaching role, not providers of solutions.

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- **Delivery:** The process moves from a partner brief through iterative sprint cycles of problem framing, concept development, and refinement, culminating in a public presentation. Roles are clearly distributed: teachers coach, partners act as clients, students own the and lead the project (Björklund et al. 2019). The final showcase can be a department seminar or stakeholder workshop.

Turning the mechanics into reproducible guidance

Based on the content provided by Björklund et al. (Björklund et al. 2019; Björklund et al. 2024) and Aalto's Teacher's Handbook[59] a concrete, reproducible implementation guidance is synthesised and described below:

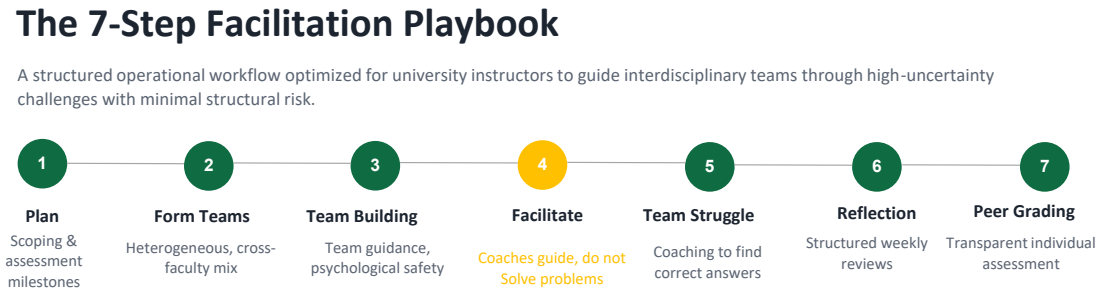


Figure 5: The 7-Step Facilitation Playbook

1. **Select and plan project**: Use authentic, appropriately scoped projects with clear milestones; make coaching, iteration, and reflection explicit; align assessment to both process and product.
2. **Forming project teams**: Prefer deliberate, heterogeneous composition over pure self-selection; mix disciplines, skills, and experience according to the requirements for solving the challenge.
3. **Initial team-building exercises:** Start with a team guidance (goals, roles, norms, communication channels, decision-making) and build psychological safety (Edmondson 1999a).

[59] https://www.aalto.fi/en/teachers-handbook/best-practices-for-project-based-learning

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4. **Using project instructors to support teams:** Deploy instructors/coaches as facilitators, not problem-solvers — ask questions rather than give answers; hold regular check-ins; monitor dynamics; brief/train instructors for consistency. PhD students and postdocs suit this role.
5. **When a team is struggling:** Watch for warning signs (conflict, disengagement, uneven contribution); intervene proportionately; first coach the team to self-resolve; escalate only when serious.
6. **Project reflection:** Build in regular, structured retrospectives (individual and team) tied to learning outcomes, at each milestone so teamwork itself becomes a developed and assessed competence.
7. **Peer assessment:** Capture individual contribution within team grades; be transparent about criteria. Assess both the process and the final output.

The Enabling Conditions: Building the Institutional Backbone

For this Best Practice to become sustainable rather than dependent on individual efforts, four enabling conditions must be in place. Together, they form the institutional backbone that turns a promising pilot into a sustainable structure.

1. **Structure.** Interdisciplinary, challenge-based work must be formally embedded in the curriculum as credit-bearing courses, with cross-faculty enrolment made administratively possible. Encouragement alone is not sufficient; the curriculum architecture must actively permit and reward cross-disciplinary participation (Björklund et al. 2019).
2. **Governance.** Challenge-based learning endures only when it is recognised in the HEI's official strategy and explicitly linked to regional engagement and responsible research and innovation goals. Anchoring the practice in strategic KPIs transforms it from an isolated initiative into an institutional commitment. Leadership

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support is one of the key enablers and a precondition for long-term sustainability (Björklund et al. 2019).

3. **Resources.** Coaching and partner liaison demand protected staff time; iterative development requires flexible physical space; prototyping depends on access to basic resources. These can be modest — reallocated teaching load, a seminar room repurposed as a studio, and local materials, including bio-based waste, substituting for costly equipment.
4. **Processes and Incentives**. Staff need formal preparation for the coaching role: how to support student creativity, how to frame failure as learning, and how to foster psychological safety. Assessment must be redesigned to reward the process of iteration and reflection, not only the final product. Equally, challenge-based learning must be officially recognised as a legitimate teaching model, with dedicated training opportunities for teaching staff to implement it effectively.

Impacts and evidence

At the individual level, this Best Practice develops user-centred problem framing, creativity, genuine interdisciplinary teamwork, and an entrepreneurial mindset through the real-world exposure. At the institutional level, it triggers a cultural shift: external collaboration becomes essential, repositioning the university as an active player in its regional innovation ecosystem.

The evidence base is growing. Systematic reviews report consistent gains in motivation, self-direction, and transversal competences, alongside stronger stakeholder engagement (Leijon et al. 2022; Gallagher & Savage 2023). Kohn Rådberg et al. (2020) document expanded learning and societal impact from challenge-based experiences. The Design Factory Global Network's growth to 39 hubs across 26 countries provides further practical confirmation of its impacts (Björklund et al. 2024).

The model's reliability and suitability for Widening contexts rest on a low structural entry barrier. It requires no advanced laboratory — only basic

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tools and materials. Interdisciplinarity is guaranteed by deliberate team composition. And it shifts the central question students ask from "What is the right answer?" to "How can we make this work?" That shift — from passive knowledge reception to active problem-solving — is the heart of an innovation culture, and it aligns directly with what the active-learning evidence predicts (Freeman et al. 2014).

Reality Check

The purpose of the reality check undertaken with project partners in a group work was to understand how it can be translated into the lived conditions of the partner institutions. For this, partners completed a structured self-assessment against the four enabling dimensions — structure, strategy & governance, resources, and processes & incentives contributing qualitative input on barriers, opportunities, and feasible implementation routes.

Structure

At the structural level, following **main challenges** were identified that might make the implementation of CBL Best Practice complicated:

- Creating new courses is slow, and the curriculum offers only limited time slots to insert them.
- Organising courses that mix students from different faculties raises organisational and communication hurdles.
- Many programmes are already overloaded, so replacing or redesigning existing courses triggers formal approval processes.

At the same time there might be some **opportunities / structural advantages** that can facilitate the adoption:

- Elective modules and projects carry higher flexibility and allow interdisciplinary collaboration to be piloted without major curriculum reform.

Following measures were suggested: to overcome challenges and use existing opportunities:

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- Establish institutional **"challenge hubs" or labs** that operate *across* faculties, providing a platform for interdisciplinary teamwork and external-stakeholder engagement.
- Run sustained **awareness raising** so that faculty, programme directors, and students understand what Challenge Based Learning (CBL) is and why it counts.

Strategy & Governance

From the legitimacy perspective that are anchored in strategies and governance of HEIs there is a challenge of:

- **Lack of explicit recognition** of challenge-based learning in institutional strategies and KPIs, which currently limits its perceived legitimacy among both faculty and leadership.

Specific opportunities that can be used are:

- **Existing strategic priorities of HEIs** on innovative capacities, entrepreneurship, and societal impact offer a ready-made narrative into which CBL fits naturally.
- **International university rankings** provide an external incentive that leadership already values and that CBL can credibly serve.

Following measures were suggested: to overcome challenges and use opportunities:

- **Embed CBL explicitly into university strategy** and tie it to measurable indicators — industry collaboration, innovation outputs, etc. — so legitimacy is documented, not assumed.
- **Set up industrial collaborations** from where students can source and address real industrial problems, generating exactly the evidence that justifies the strategic commitment.

Resources

In terms of resources the partner identified **limited staff time** is the critical constrain. However, main opportunities / structural advantages to overcome the challenge may provide:

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- **PhD students and early-career researchers** who can act as facilitators or coaches, easing the load on senior staff while gaining valuable, relevant teaching experience.
- **Partnerships with industry and the public sector** that **co-fund or co-support** challenge-based projects converting the resource gap into a shared, externally funded effort rather than a purely internal cost.

Processes & Incentives

The Best Practice supporting and sustained processes and incentives are crucial at HEIs, as they determine whether the practice will survive beyond its pilots. Main challenge with this respect identified by partners:

- **Assessment systems are not adapted** to interdisciplinary, process-oriented learning, making it difficult to evaluate student performance fairly.

Main opportunities / structural advantages are thereby

- Regular academic events — **departmental seminars and colloquia** — can serve as ready-made platforms to showcase challenge-based projects and build internal support at low cost.

Following measures are suggested to implement it in the context of BEAMING HEIs:

- Develop new assessment frameworks that reward teamwork, problem-solving, and real-world impact, aligning evaluation with CBL's objectives.
- Pair this with **coach training** for staff and, critically, with **recognition** of CBL effort in workload and promotion — because the practice diffuses sustainably only when it is both legitimised and rewarded.

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Openness for New Topics & Strategic Agility

As elaborated in the conceptual part of this deliverable, the overall role of higher education institutions (HEIs), and specifically universities have changed to a significant extent towards solving societal challenges. Universities are actively required to contribute to knowledge transfer in society. This necessitates not only improved collaboration with several societal actors and also appropriate capacities to deal with this new role. The rationale of this best practice was therefore to provide individuals and collectives at universities with concrete examples of how they can readjust their capacities so that they are effectively equipped with the right skills to shape knowledge production and innovation in the twenty-first century.

Strategic agility in this context has an overarching function as it enables academic leaders to set priorities in the context of changing conditions of systemic and external environment and to reallocate, if necessary resources. It comprises the capacity to adapt fast to changing conditions in a shared leadership governance. Strategic agility further includes the ability to identify and capture relevant opportunities faster. If developed it can enable academic leaders to rearrange organisational systems and its overall innovation culture strategy.

As a concrete example how this best practice is functioning, the chair group model at the Dutch Wageningen University has been chosen as it reflects the most how strategic agility can lead to whole reorganisation and readjusting of university priorities and structural conditions.

The essence of the best practice

At Wageningen University in the Netherlands, specific chair groups have been developed to provide a flexible and decentralised structure, in which individuals and collectives can collaborate in a meaningful way. Relevant priorities of the university are institutionalised along the Sustainable Development Goals (SDGs) which reflect the most the

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changing role of the university in providing effective solutions for societal challenges. The chair group model also benefits from the integration of research, teaching and collaboration as an interface between academia and external partners. As outlined in the conceptual part of this deliverable, a lived network-culture in which universities actively are seeking external partnerships is paramount for the development and implementation of an Inclusive Innovation Culture (IIC). Certain innovation micro-grants in the university within further animate innovative and experimenting research.

The best practice approaches strategic agility and openness from four different dimensions:

- Structure
- Strategy & Governance
- Resources
- Processes & Incentives

It is assumed that universities need to develop capacities to shape all these four dimensions as they represent basic functions of universities. Based on these four categories, challenges and solutions have been discussed with workshop participants to obtain a better understanding how universities deal with the demand to develop overall strategic agility.

How the model works in practice

WUR comprises roughly 90 chair groups across five Science Groups: Agrotechnology and Food Sciences, Animal Sciences, Environmental Sciences, Plant Sciences and Social Sciences. Each chair group is the smallest autonomous organisational unit in which research and teaching are jointly combined. This decentralised structure avoids the rigidity of large, static and inflexible departments and enables faster realignment of expertise around new topics. The following Table 18 displays the four dimensions that are applied in the best practice.

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Dimensions	*Indicators*
Structures	• Reconsidering structural conditions and adjusting to new functions and roles • Smaller, more focused research units with greater autonomy
Strategy & Governance	• Mapping research and education portfolio against external frameworks (e.g. EU bioeconomy strategy, SDGs, national research agendas) • Governance mechanism systematically assessing gaps and opportunities for portfolio renewal
Resources	• Small and competitive funds for exploratory and experimenting research in emerging research areas
Processes & Incentives	• Co-Design and collaboration between societal actors • Actors as transformative change agents and process owners

Table 18: Targeted Dimensions with Indicators

- **Structure**: Moving away from large, monolithic departments toward smaller, more focused research units with greater autonomy allows institutions to respond faster to emerging topics and changing external conditions. Even within existing department structures, creating internal 'thematic clusters' or 'research cells' with dedicated resources can replicate some of the agility benefits. Overall, universities must reconsider their structural conditions and adjust them to the new functions and roles they need to inhabit.
- **Strategy & Governance:** Mapping the institution's research and education portfolio against external priority frameworks (such as the EU Bioeconomy Strategy, the SDGs, or national research agendas) creates a governance mechanism that systematically identifies gaps and opportunities for portfolio renewal.

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- **Resources:** Establishing small internal competitive funds (analogous to WUR's Road-to-Innovation Grants) to support exploratory and experimenting research in emerging areas allows researchers to cover new topics before large external funding is made available.
- **Processes & Incentives:** In this dimension, the processual character at higher education institutions was addressed. It included co-design and collaboration between different societal actors, such as between academia, industry and societal partners. The basic argument in this dimension is that these actors must operate as transformative change agents and process owners. Only through this roles and functions, Inclusive Innovation Culture can be developed and implemented sustainably.

Impacts and evidence

This best practice contributes to the development and implementation of an Inclusive Innovation Culture by highlighting structural and institutional priorities of universities. The chair group model creates a flexible, interdisciplinary structure with strong adaptive capacity. Wageningen Campus operates as an open innovation platform for co-creation in sustainable agri-food system transformation. This confirms that WUR's structural model is recognised as an evidence-based approach to strategic agility.

WUR has ranked as the best university in the Netherlands in full-time education in the national Keuzegids ranking for 20 consecutive years (as of 2024). This sustained performance in a fast-changing life sciences landscape demonstrates that the chair group model effectively balances strategic responsiveness with educational quality.

However, it needs to be noted that Inclusive Innovation Culture and its principles, including best practices are highly context dependent. What in one higher education institution might work does not necessarily

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mean that it is also suitable in other HEIs. This best practice can therefore only serve as an inspiration and illustration of possible pathways universities can follow to establish inclusive innovation culture. It also needs to be considered that usually structural conditions are challenging to change and necessitates high degree of commitments by academic leaders.

Reality check

The purpose of the reality check undertaken with project partners in a group work is to understand how it can be translated into the lived conditions of the partner institutions. Partners completed a structured self-assessment against the four enabling dimensions — structure, strategy & governance, resources, and processes & incentives. Following questions have been addressed for the self-assessment:

1. Structure
    a. We benefit from a cross-departmental structure?
    b. We have institutionalized incubators, technology transfer offices or co-working spaces?
    c. Our institutional structures allows us to form networks with external partners?
2. Strategy & Governance
    a. Research priorities re set up through bottom-up and top-down approaches?
    b. Research priorities are organized along societal challenges (e.g. food security, climate change, biodiversity loss)?
    c. Our university integrates education, research and societal collaboration as main pillars?
3. Resources
    a. Are there internal funding opportunities I can apply for?
    b. We have enough funding opportunities to conduct risky and exploratory research?
    c. We have sufficient funding for innovative start-ups?
4. Processes & Incentives

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a. Knowledge and sustainable solutions are co-designed between academia, industry, and societal partners.
b. Do all employees act as transformative change agents?
c. Do all employees act as process owners?

After the self-assessment, the participants contributed qualitative input on important challenges and solutions along all four dimensions. In the following Table 19, key findings from this group discussions are summarized and listed based on the specific questions that were asked for.

Dimension	***Challenges***	***Solutions***
Structures	• There is a rigid culture and unclear decision rights that make flexible governance hard to implement • We intend to reduce the rigidity of existing structures, however administrative processes and traditional hierarchies still slow down adaptation • Lack of Clear Roles and Accountability, mindset • Management, poor leadership, communication, lack of awareness and understanding • Funding conditions and funding rules	• Wageningen university example, interdisciplinary working groups/task forces • Giving faculties and departments more autonomy and a broader, inclusive participation from students and staff in different university issues • More autonomy for faculties, departments and project teams • Universities can test and scale new ideas more easily, pilot programs, create research centres, hubs etc • Flexible resource allocation
Strategy & Governance	• Societal challenges are integrated in projects rather than being institutionalized • Difficult to integrate students in priority-setting due to top-down mentality	• More communication between stakeholders • Sustainability plan and indicators to some extend integrated • Main idea on priorities must come top-down, and

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Dimension	*Challenges*	*Solutions*
	• Societal actors are included in projects, but the impact gained is still limited as they speak different languages • Lack of awareness by hierarchical levels	then faculties must specify these priorities • We have a strategic plan at our university and we also use indicators
Resources	• General lack of resources available for HEIs	• At our university we have sufficient funding for risky and exploratory research available. • But these are rather smaller projects with duration of 3-4 years. • National funds are to some extend available at national level but only for fundamental research
Processes & Incentives	• Lack of awareness and understanding • No curricula available with communication training. • Communication is most often conducted by consulting firms, but it should be conducted by the universities themself.	• Individuals are needed that can operate as intermediaries, as brokers between several societal actors. • We need persons with communication skills that can communicate research results to the industry • It would be helpful to have a unit that is preparing the project together with researchers. Translating results in meaningful language. • More training of researchers is needed. Although we have some training programs, this is not sufficient.

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Dimension	Challenges	Solutions
		• Curricula should be adjusted to the needs of communication training. • Best practice: University of Bologna in Italy that has dedicated units for communication.

Table 19: Overview key findings from group discussions

How Best Practice can be implemented in the context of Beaming HEIs

The best practice example has shown that a readjustment of university's structure and priorities can sustainably shape inclusive innovation culture. However, it needs to be noted that changing structural conditions necessitates high commitment by academic leaders. Therefore, it is essential for higher education institutions in widening and EU Associated Countries to actively promote Inclusive Innovation Culture and its different characteristics and to inform their hierarchy about the benefits the university would gain. It also needs to be critically elaborated how the specific innovation culture at the university would enriched by different aspects of inclusive innovation culture. With that understanding how the university would sustainably profit from inclusiveness would sustainably raise the commitment by hierarchical leaders to allocate resources or to restructure its institution. Further substantial recommendations that could be considered are the following.

- Start with an iterative and reflexive process how the current innovation culture at your university is characterised. Based on this elaboration, develop a common understanding how inclusiveness could be implemented at your university and which

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aspects of Inclusive Innovation Culture best fits your university profile. A concrete output of such an iterative process could be an action plan or a roadmap that could be submitted to academic leaders.

- Actively seek collaboration with a broad range of different stakeholders at your university and in the external environment. Deepening an already existing network can sustainably form future joint activities. These activities could be informal in character at the beginning but should be in the long term institutionalized to provide them with a clear mandate and structure.
- Actively seek collaboration with other higher education institutions that are already advanced in the implementation of inclusive innovation culture. Critical gaps that need to be considered are still monitoring tools and evaluation.
- A further finding from the group discussion at the workshop was the observation that that importance of societal challenges is implemented in project-oriented work rather than institutionalized in the higher education institutions. Individuals should critically reflect how project results could be transferred to the overall management strategy of higher education institutions.

Best Practice – Implementing IIC in Higher Education Institutions

Unlike previous Best Practices that concentrated on a specific pedagogical approach – such as Challenge Based Learning or the integration of new topics into higher education – this section addresses a meta-level question: how to systematically implement IIC within higher education institutions. The following Best Practice was derived from a pilot model suggested by the BEAMING AUP partners as an Inclusive Innovation Culture (IIC) Model for Bulgarian Higher Education, comprising a human-centred and responsible innovation approach. It

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was complemented by best practice results and recommendations from the EU-funded CO-CHANGE project. This project (2020-2023) aimed at supporting the implementation of institutional changes at research and innovation stakeholders with respect to IIC. Best practices in this project (Rilla et al. 2023) were derived from practical experience with implementation in the CO-CHANGE partner institutions.

It was outlined in detail in chapter 4 that the implementation of an Inclusive Innovation Culture is driven by the changing role of HEIs: Beyond education (first mission) and research (second mission), universities are increasingly required to be active players for solving societal challenges (third mission). However, these challenges and problems have become so complex that no single scientific discipline can provide viable solutions. Rather, an Inclusive Innovation Culture provides the fertile ground to adapt in an agile way to new challenges. It comprises the five elements of (cognitive) diversity with equal voice, learning orientation, adaptive processes, boundary spanners and external partnerships, and psychological safety and inclusive leadership (chapter 4).

The essence of the Best Practice

This Best Practice proposes activities how to establish an IIC in HEIs in widening and EU Associated Countries into teaching, research, and collaboration with industry and society by two complementary strategies: top down and bottom-up. None of them is superior or preferable to each other. Rather, they complement each other, they should be pursued in parallel and should be linked to each other, to exploit the synergies between the two approaches. The following best practice is intended to help practitioners apply IIC elements in their university, institute or research group by using tools that have been found effective by other practitioners.

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Impacts and evidence

Practitioners acknowledge that it is relatively easy to conduct selected activities related to IIC but difficult to embed IIC practices and principles in an institutional structure and culture. Like any change, introducing IIC into an institution or an organisation demands a new way of doing things and requires a transformation in organisational culture. Creating change in institutions is not easy, in fact, statistics show that only 30% of transformational organisational change initiatives are successful (Sarran et al.).

HEIs especially in EU widening and EU Associated Countries face several systemic constraints:

- Limited interdisciplinary program design
- Weak integration between universities and SMEs
- Underdeveloped culture of experimentation and failure tolerance
- Gender and generational gaps in leadership positions
- Brain drain of young researchers

If the IIC could be strengthened in these HEIs, the following impacts will be expected:

- On the institutional and organisational level:
    - Leaders in the HEI with a keen interest in IIC and corresponding skills, acting as role models and drivers of further change
    - Higher attractiveness of the HEI as employer and for secondary education, reduced early-career researcher emigration
    - Improved international visibility and ranking
    - Increased start-up formation rates, spin-outs of university research
- On the teaching level:
    - Strengthened curricula with interdisciplinary lectures and courses, project- and challenge-based learning (see best practice in chapter 0), requiring new ways of teaching

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- On research level:
  - More collaborative projects on real-world problems
  - More creative, risky, high impact research
  - New forms of doing research: co-creation with stakeholders and future users of the research results, living labs

Top-down approach to IIC implementation

The **top-down strategic approach** is driven by the HEI's top management. They are the key players and process owners. Their main tasks are

- On the strategic level
  - to initiate, coordinate and moderate the development of an IIC strategy, a roadmap of activities and milestones for the implementation of this strategy, and its monitoring. They must acquire and provide funding and resources for this change process and, if necessary, should advocate on the political level for supportive frame conditions.
- On the teaching level
  - To introduce changes in the academic curriculum, with the aim to prepare students best for inter- and transdisciplinary work, creativity and critical thinking.
  - To introduce changes in the grading system so that achieved progress in the learning process is acknowledged, not only the achieved outcome.
  - To motivate, train and incentivise academic staff so that they change their teaching and grading behaviour accordingly.
- On the research level
  - To motivate and incentivise boundary spanners between scientific disciplines, faculties, between the HEI and companies, between the HEI and communities and societal actors.

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- To support the work of boundary spanners by appropriate contractual frameworks (e.g. between the HEI and companies, between HEIs from different countries) and other formal structures.
- To motivate and incentivise creative, risky research.
- To establish informal opportunities such as conferences, open lab days and dialogues to foster connection, exchange and collaboration between the different actors.

Activities within the top-down strategy are intended to induce change across the entire HEI, or at least in selected faculties or research fields.

Steps in the process of developing and implementing the top-down strategy

Error! Reference source not found. Figure 6 shows the best practice steps in the process of developing and implementing the top-down strategy (Rilla et al. 2023). These steps are described in more detail below.

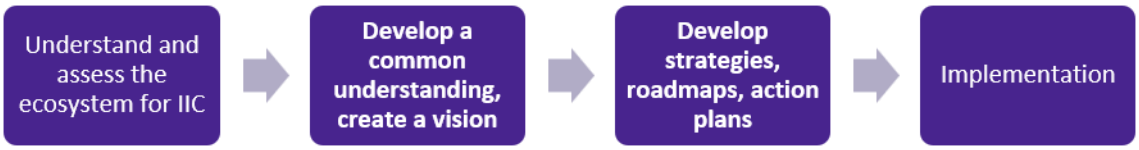


Figure 6: Best Practice Steps in the process of developing and implementing the top-down strategy.

Step 1: Understand and assess the ecosystem for IIC:

The characteristics of the ecosystem both within the HEI and outside might accelerate or hinder the change towards IIC. Therefore, it is

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important to understand what must be considered for change to happen. Best practice activities in this step are:

- Evaluate the ecosystem the organisational structures of the ecosystem, finance, size, maturity, and the level of external pressures. Apply a PESTE (Political, Economic, Social, Technological, Environmental factors) analysis, e.g. in a multistakeholder workshop.
- Carry out a series of participatory workshops, starting with smaller interactive workshops with participants who share the same knowledge or background and continue with multidisciplinary workshops once people have built an understanding among their own peers.
- Conduct a survey to understand the employees' ideas about IIC.
- Involve middle and top management early in the IIC institutionalisation process because their acceptance and trust are key success factors.
- Increase the visibility of the change process towards IIC: Clearly articulate and communicate the potential gains of change towards IIC in contrast to the status quo. This will bring new advocates and help argumentation for incentives.
- Reach out to the wider ecosystem stakeholders outside the HEI. Organise structured interviews, informal chats and roundtables. Motivate ecosystem stakeholders to join the IIC change process and tailor your arguments towards them.

Step 2: Develop common understanding, create a vision

IIC institutionalisation can be supported by creating a common vision that justifies change. Ideally the vision should present in a convincing way which problems the IIC will help to resolve, and should present IIC as superior to previous solutions, and at best provide other compelling reasons for adopting the vision for IIC implementation. Be aware that IIC may be perceived as abstract and that stakeholders may differ in their understanding of IIC and the value gain.

Best practice activities in this step are

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- Find a common language that operationalises different elements of IIC to make it meaningful for stakeholders. This requires repeated discussions.
- Identify relevant elements of IIC in the HEI's strategy and align IIC language and elements with the HEI' strategy.
- Organise trainings, events and discussions about the different elements of IIC to engage people to share their beliefs and values about a specific IIC element.
- Organise internal webinars to showcase results of IIC.
- Based on the activities in steps 1 and 2, create a vision for IIC in the HEI in a co-creation process with relevant stakeholders.

Step 3: Develop strategies, roadmaps, action plans

Once a common understanding and vision for IIC at the HEI has been achieved, it should be documented in a strategy, roadmap and action plan how to implement the strategy and achieve the required changes. Be aware that this requires repeated meetings and workshops for exchange, discussions and interaction to form collective awareness, objectives and priorities.

Best practice activities in this step are

- Develop the strategies, roadmaps and action plans in participatory co-creation and stakeholder engagement processes to foster ownership of the results.
- Allow different strategies, roadmaps and action plans for different faculties, allow them to progress at different pace. Do not fall into a "one-size-fits-all" trap.
- Take care that the IIC strategy and related documents are strategically aligned with the overall HEI strategy.
- Actively disseminate the strategy and related documents, both interactively and in written form.
- Organisational fit. Ensure that leaders, staff and administrators view the IIC as an important part of the HEI's identity and operations.

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Step 4: Implementation

It is important to bring the strategies, roadmaps and action plans to life, to implement them. But it is equally important to address sustainability because improved outcomes achieved during the implementation phase of a project do not automatically result in lasting improvements. It is best practice to already include long-term sustainability of the intended changes already early in the process and in the implementation phase. In this way, sustaining long-term changes can be achieved (Thomas and Zahn 2017).

Best practice activities in this step are:

- Funding: Obtain continuous funding from different sources (e.g. publicly funded grants, contract research for companies) to support implementation and further development and expansion.
- Perceived and actual value: Establish a monitoring system which tracks whether the perceived benefits of IIC, the intended outputs and outcomes have been achieved. Communicate the results regularly both to leaders and staff, as justification and motivation. Communicate success stories, showcase good IIC practices.
- Staff training. Establish staff training and technical assistance so that the staff has the skills, confidence, and interest in implementing elements of IIC in their own work environment, and give them regular feedback (see above, monitoring and communication).
- Make sure that the action plans comprise IIC elements in teaching, especially challenge-based and project-based learning (see chapter), semester-long "wild idea" design sprints
- For introducing changes in the curriculum towards IIC, adopt and adapt best practices from other HEIs.
- Make sure that inter- and transdisciplinarity and risk-taking in research is fostered, e.g. by micro-grants for pursuing experimental ideas, by protected exploratory time for early career researchers, by high-risk/high impact challenge competitions.

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- Incentivise and reward good IIC practices, by formal acknowledgement from high-level management and financially: Allocate resources to good IIC practices.
- Revise job descriptions to include new job roles and recruit staff with openness towards and skills in IIC.
- Partners. Ensure that partners (e.g. companies) have an active role in both decision-making and the provision of resources.
- Spread. Ensure that best practice established in parts of the HEI are spread to the entire HEI, or that best practice is exchanged with other HEIs.

Bottom-up approach to IIC implementation

The bottom-up strategic approach is driven by individual researchers, group leaders or directors of a single institute who take the initiative to implement elements of an IIC in their direct work, teaching and research environment. Ideally, these initiatives are closely intertwined with the top-down approach. The active drivers of the change introduce

- changes in the way of teaching in their own lectures and courses, towards more creativity, critical thinking, inter- and transdisciplinarity, and learning from mistakes and failures,
- changes in research how they set up projects or in which projects they engage, respectively, especially engaging in inter- and transdisciplinary projects, in innovative and high-risk topics, in close collaboration with external experts and stakeholders, especially industry and societal actors,
- changes in the way they interact with collaborators and students, providing advice, support and psychological safety.

By acting as a role model for students, colleagues and within the HEI, they can also motivate and recruit allies and supporters. Their impact is enhanced if their activities gain institutional acknowledgement and support and if they are synergistically intertwined with the institutional strategy and activities of the top-down strategy.

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In the following, best practice is provided how to change the ways of teaching towards an IIC.

Interdisciplinarity in teaching

Interdisciplinary capabilities are understood as the ability to achieve the *integration* of knowledge from different disciplines to solve problems. These capabilities can be characterised by (see e.g. Luecht et al. 1990; Wood et al. 2009; Wilhelmsson et al. 2012; Lattuca et al. 2013)

- communication and collaboration skills,
- reflective self-awareness,
- integrative practice,
- understanding and respecting other disciplines values, and ethics, and
- the pursuit of shared goals.

A tool[60] for measuring the students' interdisciplinary capabilities has been tested and published by Chen et al. (2017). To enhance students' interdisciplinary capabilities, it is best practice to integrate the following elements into course teaching and curricula (Xu and Wu 2025):

- Foundational courses in one's own discipline: Students learn theories, core concepts, and methods of their own discipline and of related disciplines, to be firmly rooted in their discipline.
- Foundational courses of other disciplines: Students learn theories, core concepts, and methods of related/other disciplines, and understand differences to their own discipline.
- Interdisciplinary integration practice courses: students actively identify, analyse, and solve real-world problems without a predefined solution. The predominant type of work is collaborative group work of students of different disciplines.
- Off-campus internships: This is similar to problem-based learning (see chapter 0), but students are placed (for longer periods of time) in an authentic work environment where they work with

[60] Common Interdisciplinary Integration Based Core Competencies tool

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professionals from diverse fields and collect significant practical experience.

- Collaboration in student teams: Teamwork is an integral part of all elements of interdisciplinary courses and curricula. Over the course of the entire educational programme, student team composition should evolve from monodisciplinary via multidisciplinary to interdisciplinary.

It should be avoided that students are offered only multidisciplinary curricula in which themes are merely addressed from different disciplinary perspectives, but each discipline remains distinct and separate. Rather, the goal is to achieve the integration of different disciplinary knowledge and perspectives to solve problems. To achieve this, it is good practice to have a continuum of disciplinary, multidisciplinary, interdisciplinary and transdisciplinary courses over the entire educational programme. It would be desirable if this was delivered by team teaching: teams of teachers from various disciplines collaboratively guide students through their learning process. However, this is still rare in practice.

In the curriculum elements listed above, students acquire subject knowledge. In addition, the elements gradually foster self-directed learning, critical thinking, problem-solving skills, communication, teamwork, and the integration and expansion of knowledge across disciplines.

Ideally, an integral part of these curriculum elements is learning from failure and providing a psychologically safe space. Psychological safety means that team members feel safe to speak up, admit mistakes and propose unconventional ideas without fear of embarrassment or punishment. The intended result is that they experiment more, collaborate better and deliver more creative solutions (Markland 2025; Edmondson 2019). It is best practice to conduct (anonymous) feedback surveys, post-project reflection sessions, or even seminars in which to analyse why case-studies failed. Learning from failures enables individuals to gain knowledge about the failures made, the system in which failure occurred and how to deal with failures in general.

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Individuals get the necessary coping skills to navigate negative emotions, thoughts or beliefs that result from failures. Overall, this contributes to turn the negative perception of mistakes and failures into positive learning experiences (Malschutzky and Gurganus 2022).

Reality check: status quo, barriers and opportunities across partner HEIs to adopt Best Practice

The purpose of the reality check undertaken with project partners in a group work was to understand how the best practices can be translated into the lived conditions of the partner institutions. Partners completed a structured self-assessment, discussed the results and provided experience and good practice from their HEI.

How did workshop participants (n=4) assess the current status of IIC implementation via the top-down strategy in their HEI?

- All participants stated that top management staff act as key drivers and process owners in their HEI, and an IIC strategy and related documents (such as a code of conduct, or guidelines) have been developed, at least to a certain extent (e.g. on the level of an institute, not the entire HEI). However, implementation lags.
- Although the process of IIC strategy has started, not all universities, faculties, institutes progress at the same pace. Still a lot remains to be done.
- A major challenge is to develop a common understanding and a common language ("do we talk about the same if we talk about IIC?"). Participants reported that such a common understanding is mainly developed in (interdisciplinary) projects, but not on a higher organisational level, such as an institute, a faculty, or the HEI. Against this background, participants saw the need for to raise awareness and to develop a common understanding. They suggested doing this by learning from examples, e.g. through presenting case studies from different universities or countries, followed by frequent reflection.

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- In addition to an IIC strategy, highest importance was also given to the need to specifically adapt curricula, and to making appropriate resources available.
- BOKU has established in these bachelor's degree programmes Landscape planning, Food technology and Biotechnology, Forestry, Wood and Fibre Technology, Environment and Bioresource Management, Environmental Sciences and Civil Engineering, and Agricultural Sciences so called "cross-cutting modules". However, it took 13 years to establish interdisciplinary modules in all bachelor's degree programmes. Students enrolled in these bachelor's degree courses can choose (at least) one of these modules:
    - Ethics in science, technology development and society
    - Gender, diversity and societal transformation
    - Fundamentals and concepts of bioeconomy
    - Sustainable development - developing competencies for a socio-ecologic transformation
    - Principles of sustainable entrepreneurship.

  In each module, students from the seven bachelor's degree programmes listed above participate, so that the student group is really multidisciplinary and can practice interdisciplinary skills. Each module is equivalent to 6 ECTS. Students benefit most from these modules at end of their bachelor's degree programme, when they have already developed an understanding of their own scientific discipline.
- There was scepticism whether a HEI-wide approach towards a different grading system would be feasible at all. It was reported that grading practices differ a lot between individuals: university staff often follow an individual approach. Some individuals have implemented grading also by process, not only result.
- Although staff training is offered in most HEIs, it does not cover all key elements of an IIC, and more training would be needed. Moreover, participation is not yet mandatory and/or there is a lack of time to participate.

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Participants also reflected and discussed to which extent IIC and interdisciplinarity is an integral part of teaching at their HEI. The following aspects were discussed:

- All participants reported that at least several researchers and group leaders act as drivers to implement IIC in their lectures, courses and their immediate work environments.
- In curricula, there are only a few short courses on soft skills. Participants report that emphasis is given to writing scientific publications whereas teaching IIC practices and experience is neither acknowledged nor fostered. However, participants felt that more training on IIC and related soft skills would be needed.
- Lectures and courses are not yet specifically adapted to interdisciplinarity and IIC. Rather, at some HEIs, a series of lectures on interdisciplinary topics is offered: each lecture session presents a disciplinary view of the topic. Students who attend all lecture sessions get a multidisciplinary perspective of the topic. So, it is rather multidisciplinary than interdisciplinary, but a good entry point to go beyond disciplinary silos.
- While interdisciplinary group work and project-based learning was offered – at least to a certain extent – in some HEIs, this does not yet seem to be a standard element in curricula. Rather, specific events such as students' challenges and hackathons (e.g. weekend events), sponsored by industry, were reported as opportunities where students work in interdisciplinary teams on a solution.
- Inter- and transdisciplinarity was reported to be mainly restricted to projects but was more the norm than the exception.
- However, instruments to reduce over-conservation in research topic selection and to stimulate breakthrough thinking were reported to be very rare: One participant reported that a cooperation of the agricultural university with the economic university has been established to support "wild ideas" for a potential start-up to develop a business plan.

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- Specific protected exploratory time for young researchers was not implemented in the participants' HEIs. At BOKU, three permanent positions are financed from the university budget, dedicated to certain strategically important topics. This is exceptional, as fixed-term contracts (and not permanent positions) are the rule for scientists. Nevertheless, only 3 positions for the whole HEI are very few.

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Appendix

Survey Results

Leadership, Professors, and Principal Investigators (PIs)

Group characteristics and profiles

Overall, 102 leaders took part in the survey, with the majority from EU Associated Countries (57), followed by EU Widening Countries (26) and Austria and Germany (19) (Table 1).

The main field of work (data not shown) of the respondents is Agriculture, accounting for 24%, followed by Biotechnology (14%), Food science and food technology (10%) and 2% dealing with Bioenergy and Bio-based materials. Individual respondents represent other fields, such as e.g. business studies, tourism, landscape architecture, social science, and innovation research in policy instruments.

The vast majority of respondents are senior employees with more than 10 years of employment in their university or research organisation.

Group A: Germany & Austria (n=19)

Demographics: This group differs from all leaders in the survey, as the main field of work is economics, coordination and innovation research (30% of responses), followed by environmental sciences and circular economy (22%), various fields of biotechnology (20%), and forestry (15%). Agriculture, food science and food technology are less represented than in the overall sample (11%).

The majority of respondents are senior employees with more than 10 years of employment (n=16) in their university or research organisation.

Group B: EU Widening Countries (n=26)

Demographics: This group differs from all leaders in the survey, as the main field of work are various fields of biotechnology (38%), followed by

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environmental sciences and circular economy (20%), economics, coordination and social/teaching focus (20%, Food science and food technology (16%), and agriculture (9%).

The majority of respondents are senior employees with more than 10 years of employment (n=20) or more than 5 years of employment (n=5) in their university or research organisation.

Group C: EU Associated Countries (n=40)

Demographics: The main fields of work are agriculture (35% of responses), Followed by various fields of biotechnology (30%), environmental sciences and circular economy (11%), forestry (9%), and food science and food technology (7%). Economics and miscellaneous disciplines (e.g. IT) play a marginal role.

As in the other country groups, most respondents are senior employees with more than 10 years of employment (n=41) or more than 5 years of employment (n=9) in their university or research organisation.

Commitment to an inclusive innovation culture

Group A: Germany & Austria

Based on the survey data from 19 leaders in Germany and Austria, the general commitment to an Inclusive Innovation Culture (IIC) can be summarized as follows:

- **Commitment of HEI/RO for IIC**: The commitment seems to be rather high: The large majority of respondents (75-90%) state that the senior management actively communicate their commitment to IIC, act as role models and encourage other leaders to do so as well. Appr. 2/3 of leaders participating in the survey deny that the focus of their university or RO is not on soft aspects like IIC or that other goals are prioritised. Moreover, 85% state that individuals support IIC. However, there seems to be either a knowledge gap or different interpretations regarding an official strategy or vision that emphasizes IIC – whether it exists at all, or what it contains in detail, or what should count as such a

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strategy or vision. One respondent indicated the existence of a diversity strategy. Moreover, the training of skills, practical guidelines and tools lag behind – 37% of respondents do not receive such support.

- **Support needed:** On the practical level, most respondents (21%) need training in communication skills (e.g. constructive feedback and conflict solving), and clear information what an Inclusive Innovation Culture is (26%). By contrast, training in interdisciplinary research ranks at the low end of support needed (< 15% of respondents). Several respondents comment that not so much formal training, but relief from administrative burden, additional personnel resources to live an IIC, more time and space for personal interaction would effectively support them in practicing an IIC in everyday life.
  On the strategic level, appr. 80% of respondents see support in staff training or mentoring, learning from good practice in other institutions, and guidance for setting up an IIC vision, strategy or action plan as suitable support to improve their IIC further. Political backing is much less important.

Group B: EU Widening Countries

Based on the provided survey data from 57 leaders in the EU Associated Countries, a similar pattern of responses as in EU Widening Countries can be observed, with some deviations.

Commitment of HEI/RO for IIC: On the strategic level, the commitment to an Inclusive Innovation Culture is demonstrated by the adoption of strategies (57%) which emphasize aspects of IIC, such as gender equality, internationalisation, cooperation, openness, creativity, interdisciplinarity, but more in a fragmented than in a coherent manner. Activities towards a cultural change and adoption and transfer into everyday practice are hampered by similar factors as in EU Widening Countries (i.e. few individuals driving the change, few resources devoted to IIC), with two deviations: Faculties and departments are to an even larger extent perceived as operating in silos, whereas the focus set on scientific-technological aspects seems to be less prominent

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than in EU Widening Countries. However, a remarkable high percentage of respondents state that the senior management communicates the vision of IIC (84%) and encourages staff to live an IIC (75%). However, this encouragement does not seem to be accompanied by an equally intensive practical support or tools to do so.

- **Support needed:** A much higher share of respondents (50-70%), compared to Austria and Germany (5-25%) indicates a clear need for support on the practical level, mainly in clear information what an Inclusive Innovation Culture is (70%), in creativity techniques, RRI, individual mentoring, and communication skills. The need for support in interdisciplinary research ranks at the low end of support needed (50% of respondents). In comments, less workload, more time, and presenting good and bad examples are mentioned as effective support. On the strategic level, 70% indicate a clear need for support in all items (staff training, learning from good practice in other institutions ranks highest, guidance for IIC strategies/action plans), similar to the needs in EU Widening Countries.

Key conclusions on commitment to IIC

Based on the cross-regional analysis of the three leader groups – 1) from Germany & Austria, 2) EU Widening Countries, and 3) EU Associated Countries - the following synthesis identifies aspects which are shared by all HEIs or ROs from all regions, but also points out regional variations, and specific institutional needs.

Common Strengths

- **Adoption of IIC strategies:** All regions have a high rate of official IIC strategy adoption (58%).
- **Shared Values:** Leaders in all regions perceive IIC values including openness to new ideas, creativity, interdisciplinarity, gender equality and scientific ethics as part of their official institutional identity.

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- **General Openness**: Leaders across all country groups assess an IIC as important and desirable for their institution.

Common Weaknesses

- **Fragmented understanding of IIC.** In all countries, a comprehensive, coherent and commonly shared understanding among most HEI/RO members what the IIC concept entails does not exist. Rather, the focus tends to be on selected aspects, even more so in EU Widening and EU Associated Countries.
- **The Translation Gap:** Senior management in all countries advocates actively for an IIC and encourages staff to implement and practice such a culture in their work environment. However, this encouragement does not seem to be accompanied by an equally intensive practical support or provision of tools to do so. Unfavourable frame conditions hamper the translation into everyday practice (e.g. silos between organisational units, overload with administrative tasks, lack of time, space and financial means).
- **Need for improvement and support.** In all countries, irrespective of the current level of achieved IIC, a need for further improvement is seen, and appropriate support is called for. Respondents from Austria and Germany have highest needs for training in communication skills (constructive feedback, conflict solving). By contrast, leaders from EU Widening and EU Associated Countries also demand training in basic concepts (e.g. RRI) and methods (e.g. co-creation, creativity techniques). By contrast, skills specifically for inter- and transdisciplinary research seem to be advanced in all countries.

Regional Variations in IIC Aspects

The primary regional variation lies in how IIC is institutionalized and implemented:

- **Level of implementation:** While Germany and Austria have reached a rather high level of implementation of an IIC in everyday life and a relatively high number of individuals who

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actively support and live this culture, widening and EU Associated Countries are still in early phases of implementation, with few active promotors. Although a vision or strategy has been developed (comments indicate that a top-down mode might prevail, without much opportunity of non-leader staff to engage), frame conditions and lack of practical support hamper the implementation.

- **Unfavourable frame conditions in EU Widening and EU Associated Countries**. Frame conditions hampering the adoption of an IIC in everyday practice is the lack of a comprehensive and shared understanding what IIC entails, departments operating too much in silos, and a strategic and operational focus on science and technology and other goals, rather than on "soft" aspects such as IIC.
- **Need for support**. Given the different levels of achieved implementation, it is understandable that the respondents from EU Widening and EU Associated Countries see a much larger need for support in IIC, than respondents from Austria and Germany. Learning from other institutions and good practice ranks highest, together with better understanding the IIC concept and staff training. Although political backing could be supportive, support directly targeted at the own HEI or RO is favoured by the respondents.

Cultural-specific experiences

Cultural-specific experiences comprise

- psychological safety and autonomy,
- tolerance for risk and learning from failure,
- collaboration and inter- and transdisciplinarity, as well as
- diversity, inclusion and belonging.

Psychological safety and autonomy

In the interaction with the senior management in their HEI or RO, leaders **in Germany and Austria** experience a high degree of psychological

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safety and autonomy, as 80 to 90% agree with the statements fully or to a certain extent. Highest scores are given to being valued.

A similar pattern of responses can be observed in **EU Associated Countries**, with the only deviation that respondents feel their work and contributions valued to a lesser extent than respondents from Austria and Germany.

By contrast, respondents from **EU Widening Countries** experience the lowest valuing of their work and contributions in the overall survey sample, and have the highest share or respondents who feel that conflicts are NOT addressed constructively and resolved fairly, and fewer respondents than in the other countries feel comfortable when admitting mistakes and knowledge gaps. Moreover, remarkable 42% answer the question « I feel safe to express controversial or unconventional ideas » with « Don't know » - this can be interpreted that controversial or unconventional ideas are not a topic in interactions with senior management.

Tolerance for risk and learning from failure

All three regions show similar response patterns regarding risk tolerance and learning from failure, with the following specificities:

- Tolerance for risk seems to be highest in **Austria/Germany**, given, that 68% of respondents state that their HEI/RO encourages risk taking through exploratory innovative research, and failure in such projects does not harm the researcher's career.
- By contrast, encouragement for risk taking is significantly lower in **EU Widening** (39% of respondents) and **EU Associated Countries** (19% of respondents), and only about 25% of respondents state that failure in such projects does not harm the researcher's career. This points to a certain risk aversion in research in these countries.
- In **all three regions**, the potential to learn from unsuccessful projects is not sufficiently exploited, and also specific funding or time for exploratory research seems scarce, especially in **EU**

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Associated Countries: here 47% of respondents state that such opportunities do not exist in their HEI or RO.

Collaboration and Inter- and Transdisciplinarity

In **Germany and Austria**, all respondents state that research collaborations with external partners are actively supported and valued. This is also supported by providing opportunities for interdisciplinary exchange, mainly informally, and to a lesser extent by formal structures. This shows that collaboration, inter- and transdisciplinarity are firmly established in these HEI and RO.

In the **EU Widening and EU Associated Countries**, a similar response pattern can be observed, however, on a lower level than in Austria/Germany. EU Widening Countries seem to be more advanced than EU Associated Countries regarding openness towards interdisciplinary collaboration and collaboration with external partners and informal and formal support for this.

Diversity, inclusion and belonging

In **Germany and Austria**, 63-73% of respondents state that diversity and inclusion is seen as a shared responsibility within the HEI or RO, resulting in recruiting staff from diverse backgrounds and active promotion of anti-discrimination, diversity, and inclusion – at least to a certain extent is stated by all respondents. This shows that diversity and inclusion are firmly established in these HEI and RO.

Against this background, it is remarkable that 30% of leaders in HEI/RO in **EU Widening Countries** either do not know or deny that diversity and inclusion are a shared responsibility and that staff from diverse backgrounds is being recruited. In **EU Associated Countries**, 22-26% of respondents do not know or deny this. However, more than 70% of respondents from these two country groups state that anti-discrimination, diversity, and inclusion is actively promoted by their institution. This can be interpreted as in implementation gap.

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Key conclusions on cultural-specific experiences across regions

Common Strengths (across all country groups and categories)

- **External Networking:** In all regions, research collaboration with external partners is the most "solid" positive, with "Yes" scores ranging from 46% to 74%. Even where "Yes" is lower, the "To a certain extent" brings the total positive assessment above 85%.
- **Aspiration for Diversity:** Promoting diversity in institutional communication is relatively high (50% to 74% "Yes").

Common Weaknesses (across all country groups and categories)

- **The Resource Gap:** Although exploratory innovative research is encouraged in all countries, a deficit in providing specific funding or time for this can be stated from the survey results.
- **Conflict Resolution:** This is the most consistent failure in psychological safety in all country groups. Only 23% to 33% fully agree that conflicts are resolved fairly.
- **Formal support structures:** Formal structures to support interdisciplinarity are consistently weak. Most researchers rely on informal opportunities, which are also often not systematically provided.
- **Learning from failure:** The potential for future improvement by learning from failure is not systematically exploited in all regions; it only seems to be done occasionally or not at all.

Regional Variations:

Germany/Austria, despite some common weaknesses listed above, consistently perform well regarding cultural-specific aspects of IIC. They explicitly value their staff's work and contributions, succeed in offering a comparatively high degree of psychological safety, a failure-tolerant environment despite taking risks in research, and are advanced in recruiting staff from diverse backgrounds.

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Respondents from **EU Widening Countries** give their institution poor ratings in psychological safety and especially point to a lack of discussing controversial or unconventional ideas: this is in line with a certain risk aversion in research. Collaboration, inter- and transdisciplinarity in research seems to be more firmly established in the EU Widening Countries than in EU Associated Countries. Although anti-discrimination, diversity, and inclusion are formally promoted by the institutions, an implementation gap can be stated (e.g. gaps regarding the recruitment of staff with diverse backgrounds, regarding diversity as a shared responsibility across the institution).

EU Associated Countries could improve psychological safety especially if their staff's work and contributions would be valued more. Risk aversion in research is highest among the country groups investigated, and the organizations score lowest in encouraging exploratory innovative research, in providing specific funding or time for it, and in being open and supportive towards interdisciplinary collaboration and collaboration with external partners. Although anti-discrimination, diversity, and inclusion are formally promoted by the institutions, an implementation gap can be stated (e.g. gaps regarding the recruitment of staff with diverse backgrounds, regarding diversity as a shared responsibility across the institution).

Role-specific experiences

The following section provides insights on how much weight is given to interdisciplinarity, creativity, diversity and inclusion compared to scientific achievements during recruitment or performance reviews across regional leader groups.

Group A: Germany & Austria

Based on the survey data from 19 leaders at HEIs and ROs in Germany and Austria, role-specific experiences can be summarized as follows:

- **Interdisciplinarity:** 42.1% report equal weight, yet 36.8% say it receives less and 10.5% much less weight – meaning nearly half of leaders perceive it as undervalued.

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- **Creativity:** Only 26.3% view it as an equal metric. Nearly 58% rate it as less or much less important than scientific achievement.
- **Deliberate Pursuit of D&I:** The lowest-rated dimension. 47.4% report less and 15.8% much less weight – a combined 63.2%. Only 21.1% see it as equal, with 15.8% selecting "Don't know."

Qualitative feedback provides some further insights: leaders explicitly identify scientific excellence, teaching, and science communication as primary competencies. But also commercial understanding and management skills for third-party funded research are among dominant evaluation criteria, effectively shifting weight away from IIC-related qualities toward project acquisition and external funding performance.

Group B: EU Widening Countries

Based on the survey data from 26 leaders at HEIs and ROs in the EU Widening Countries, role-specific experiences can be summarized as follows:

- **Interdisciplinarity** is the most critically rated dimension among leaders in this group: only 19.2% report equal weighting, while 65.4% rate it as less or much less important – the lowest score across all three groups for this competency.
- **Creativity** rates are somewhat better, with 34.6% reporting equal weight, yet nearly 54% consider it secondary to scientific output.
- **Deliberate pursuit of D&I** shows the starkest gap: 61.6% rate it as less or much less weighted, with only 26.9% seeing it as equal.

Qualitative feedback confirms an output-driven culture: leaders cite teaching and conducting scientific research, technical knowledge, scientific results, and publication performance as the dominant evaluation criteria. The mention of tribal affiliation as a relevant factor points to informal social structures influencing assessments beyond formal merit criteria.

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Group C: EU Associated Countries

Based on the survey data from 57 leaders at HEIs and ROs in the EU Associated Countries, role-specific experiences can be summarized as follows:

- **Interdisciplinarity** and **Creativity** receive the most balanced formal recognition in this group, with 36.8% reporting equal weight respectively — the highest equal-weight scores for creativity across all groups.
- **Deliberate pursuit of D&I** also has a relatively high combined "Much Less/Less" rate (43.8%) in this group.

However, exceptionally high "Don't know" rates across all three competencies (22.8%–31.6%), indicating that a substantial share of leaders lack awareness and visibility into how these criteria actually function in formal processes. This transparency deficit is most severe for D&I, where nearly one third (31.6%) of leaders cannot assess its institutional weight — the highest such rate in the entire study.

Qualitative feedback is sparse but telling: leaders note that *"other competencies" are difficult to define* and that *grade point average in studies* carries significant weight — pointing to a preference for traditional academic credentials over IIC-related qualities.

Cross-Group Comparison: Common Strengths, Weaknesses, and Patterns

Common Strengths

- All three groups show a baseline of formal interdisciplinary and creativity skill recognition — suggesting at least rhetorical acknowledgment across institutional contexts.

Common Weaknesses

- **D&I** is the lowest-ranked competency across all groups.

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- **Hard metric dominance** (publications, funding acquisition, educational titles) universally overvalues IIC-related criteria in performance reviews.

Key Regional Patterns

- **The Transparency Pattern**: Group A leaders have the clearest picture of evaluation criteria (lowest "Don't know" rates); Group C leaders face the highest ambiguity, particularly around D&I.
- **The Interdisciplinarity Gap**: Group B leaders report the lowest score for interdisciplinarity (19.2%).
- **The Recruitment Logic Divergence**: Group A prioritises funding acquisition and management skills; Group B emphasizes scientific output, teaching, and technical credentials; Group C relies on academic grades and, informally, personal connections — each presenting distinct structural barriers to IIC integration.

Overall finding: Scientific achievement dominates institutional reward systems in all groups. IIC — especially D&I — is culturally undervalued relative to scientific output. EU Widening Countries show the most acute gap; Associated countries show the most ambiguity; G+A countries show the most balanced (though still incomplete) recognition.

Support of IIC Skill Development

Group A: Germany and Austria

Perceived Strengths and Weaknesses

The institutional support landscape in Group A is characterized by operational competence over creative innovation." Leaders in this group feel highly supported in areas that ensure project delivery and academic standing—such as project management, didactics, and administrative acquisition—but perceive lack of interest in the development of the "soft" or creative tools required for a truly inclusive innovation culture.

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Strengths: The "Hard" Skills and Operational Frameworks

- **Operational and Project Efficiency**: Beyond general leadership, there is robust institutional backing for the "other skills" essential to academic survival: project management, didactics, and the specific acquisition of inter- and transdisciplinary projects.
- **Established Leadership Support**: Leaders report strong institutional foundations for formal mentoring and coaching, with 79% of respondents noting at least some level of support (47.4% "Yes" and 31.6% "To a certain extent").
- **Inter- and transdisciplinary skills**: There is a clear commitment to inter- and transdisciplinary research methods, which 57.9% of leaders confirm is fully supported, suggesting these institutions are well-aligned with modern cross-disciplinary research goals.

Weaknesses: The "Soft Skill" Deficit

- **Creativity and Critical Thinking**: Despite the high level of support for administrative and project-based skills, creativity and critical thinking skills are supported only "to a certain extent", with only 15.8% of leaders reporting definitive, institutional support for these areas.
- **Structural Opacity of Innovation Culture Support:** The high "Don't know" rates suggests that the support to develop most of these skills is not always clearly formalized as organizational resources. When leaders discuss "support," they gravitate toward project management, didactics rather than creative problem-solving or innovation culture.
- **Implementation Gap**: The data implies that while institutions are good at training researchers "how to do projects" (project management/didactics), they may not always provide adequate support on how to innovate inclusively (conflict resolution, creativity, constructive feedback), treating these soft skills as secondary to established academic outputs.

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Group B: EU Widening Countries

Perceived Strengths and Weaknesses

Leaders in this group perceive institutional adequacy primarily through the lens of active academic participation, such as publishing, event organization, and methodological development. This provides a practical context for the quantitative data, which showed a standardized, moderate approach to support across core research categories.

Strengths: Baseline Uniformity in Support

- **Uniform Commitment:** On leadership, interdisciplinary methods and critical thinking leaders report an identical 19.2% definitive "Yes". This suggests some standardized, top-down institutional baseline that treats these various skill sets with equal, albeit moderate, priority.
- **Collaborative and Academic Skills:** Leaders view their institutions as reasonably supportive of core academic skills (Inter-/ Transdisciplinary methods and Critical Thinking), with approximately 73% total support (combining "Yes" and "To a certain extent").

Weaknesses: The "Support Gap" for Interpersonal Skills

- **Constructive Conflict Resolution:** This is the most critical identified weakness, with 38.5% of leaders explicitly stating "No" support exists.
- **Constructive Feedback:** Leaders identify a significant lack of support here as well, with 26.9% reporting "No" support, highlighting that the necessary institutional mechanisms are not currently in place.
- **Creativity and Visibility:** The 19.2% "Don't know" and 19.2% "No" rate for creativity indicates that leaders feel this area is currently underserved and perhaps not yet clearly defined within the institutional strategy.

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Group C: EU Associated Countries

Perceived Strengths and Weaknesses

Unlike the other groups, leaders in this category report a pervasive uncertainty regarding the existence of institutional support structures. This is particularly evident in the high "Don't know" rates across all categories, suggesting that even among senior leadership, the support landscape for inclusive innovation is fragmented, not existent or poorly communicated. Moreover, there is a perceived "Technical-Scientific Bias." Leaders here primarily define "support" as the provision of resources for tangible academic outputs and professional training. While this ensures strong foundations in technical and pedagogical development, it creates a "Cultural Blind Spot" regarding the softer, inclusive skills that define an IIC.

Strengths: Baseline Recognition of Research Methods

- **Inter- and Transdisciplinary Methods:** This area shows the most consolidated institutional awareness, with 70.2% of respondents reporting at least some level of support (22.8% "Yes" and 47.4% "To a certain extent").
- **Consistent Core Priority:** There is a notable consistency in "Yes" responses across four key categories (Inter- and transdisciplinary research, Creativity, Constructive Feedback, and Constructive Conflict Resolution), all of which sit at exactly 22.8%. This suggests that while resources may be limited, there is a standardized baseline expectation for these skills across the institutions.

Weaknesses: The Leadership Visibility Gap

- **Leadership (Mentoring/Coaching):** This category reveals a critical institutional blind spot, with a striking 42.1% of leaders responding "Don't know" regarding the adequacy of support. This suggests that mentoring programs are either non-existent or so poorly advertised that even decision-makers are unsure of their status.

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- **Constructive Feedback:** This is the most significant area of perceived deficiency, with 33.3% of leaders stating "No" to the availability of support.
- **Critical Thinking and Creativity:** 29.8% and 28.1% of respondents respectively report "No" support for these essential innovation skills. This high rate of "No" responses, combined with the "Don't know" rates, points to a gap in support of critical thinking and creativity for these institutions.

Open Feedback

Error! Reference source not found. visualizes the weighted average, providing a single value for the individual perception of IIC by leaders within different country groups based on the survey results. The satisfactory threshold is an imaginary benchmark used to distinguish between an innovation culture that is above or below this threshold. The specific value 6.0 serves as a "perceptual midpoint" outweighing a simple mathematical average score 5.0, defined as neither good nor bad.

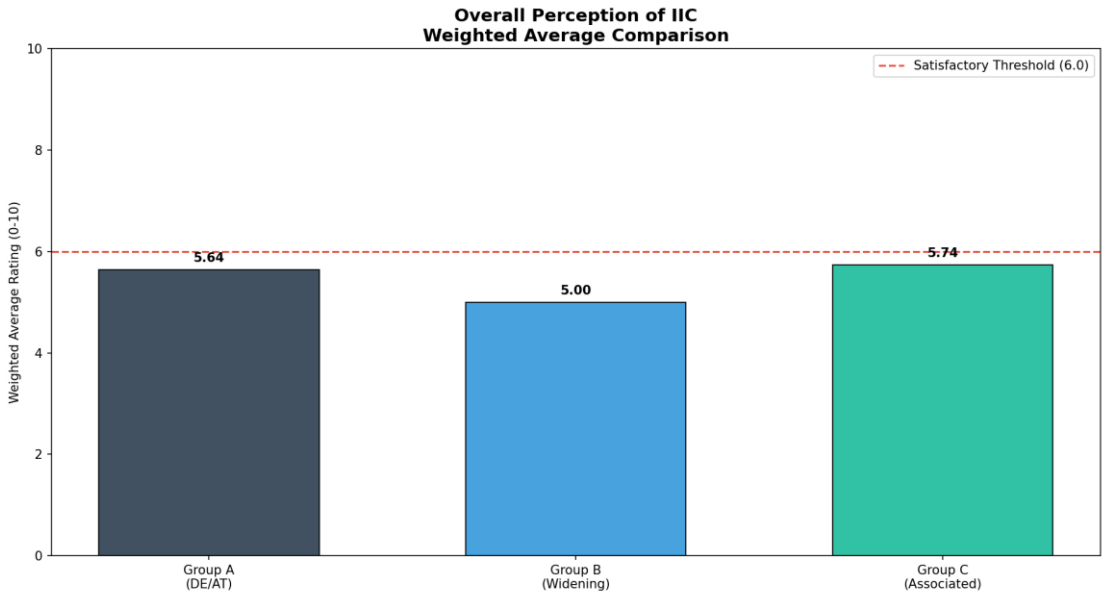


Figure A 7: Overall Perception of IIC Weighted Average Comparison

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- **Group A (DE/AT):** This group exhibits high consistency, with a weighted average of 5.64, landing just below the satisfactory threshold. Opinions are primarily clustered around the middle-to-high range, reflecting a mature system where inclusivity is an established component, yet one that remains constrained by some procedural rigidity.
- **Group B (Widening):** This group holds the lowest weighted average at 5.00, reflecting a transitional phase where IIC is at least implicitly recognized goal but faces significant implementation hurdles. The perception is notably uneven; while some leaders are optimistic, the low average indicates that IIC is not yet a systemic reality, but rather a "work in progress".
- **Group C (Associated):** Despite having the highest weighted average at 5.74, this group demonstrates the most volatility. This suggests that while there are pockets of high-performing, inclusive environments, they are not uniformly distributed, indicating a massive internal divide between those institutions perceived as successfully implementing IIC and those struggling to move beyond initial administrative steps.

Figure A 8 provides a detailed view of how the ratings for Inclusive Innovation Culture (IIC) are spread across the three regional groups. Whiskers represent the range of the data excluding outliers. The boxes represent the middle 50% of respondents[61]. The red line is the median,

[61] How to read the boxplot: The Box (Interquartile Range): Represents the middle 50% of all responses. The Bottom of the Box (Q1) marks the 25th percentile (25% of respondents rated at or below this value), while the Top of the Box (Q3) marks the 75th percentile (75% of respondents rated at or below this value). The Whiskers: Extend from the box to the highest and lowest values that fall within the standard statistical range, illustrating the full spread of typical responses. The Circles (Outliers): Represent individual data points that fall significantly outside the standard range of the rest of the group.

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splitting each group exactly in half. The graph allows for the following interpretation:

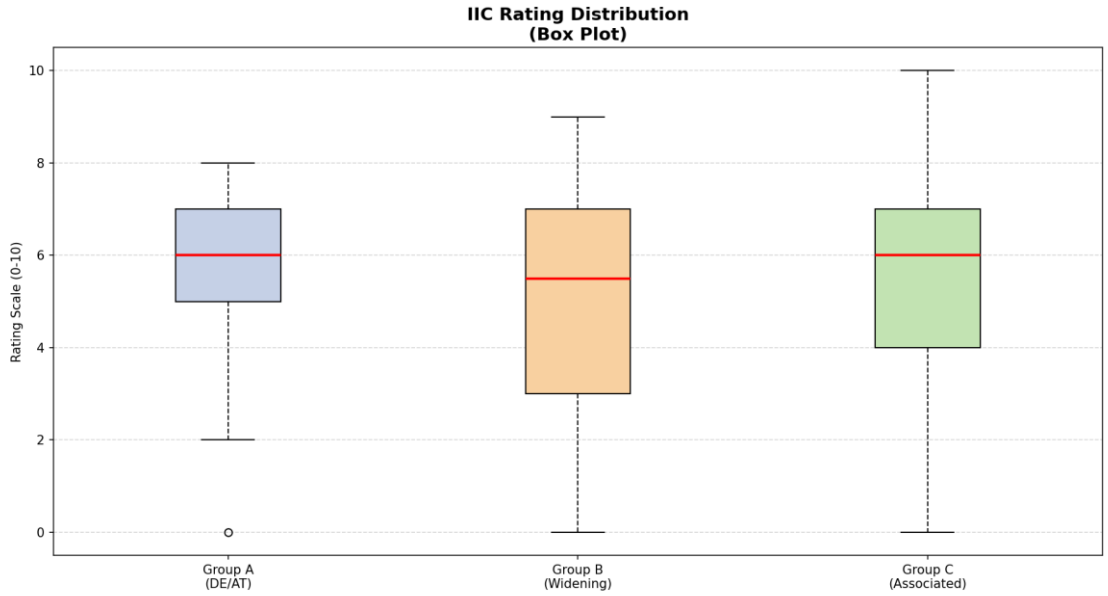


Figure A 8: IIC Rating Distribution (Box Plot)

- **Group A (DE/AT):** Shows the highest level of stability. The ratings are concentrated, indicating that the majority of leaders share a similar experience, though there is one outlier at the lowest rating.
- **Group B (Widening):** The distribution is spread across the middle. The presence of ratings across the entire spectrum—from 0 to 9—indicates that the IIC perception is highly polarised within this group.
- **Group C (Associated):** The "distribution is characterised by a range spanning from 0 to 10, demonstrates that the culture is highly inconsistent. This indicates that while some success stories might exist (with scores as high as 10), they are not systematic within this group, as evidenced by the significant variance.

Open Feedback

The analytical synthesis of the leaders' open feedback reveals a landscape where "institutional rhetoric" regarding inclusion often meets the reality of administrative or systemic hurdles. While quantitative data

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shows where institutions stand, the qualitative commentary provides critical context on *why* these perceptions exist.

Group A: Germany & Austria

This region exhibits high consistency, yet leaders are critical of the survey's assessment framework, suggesting the study focuses too heavily on deficiencies rather than success. Leaders argue that administrative tasks are a primary barrier, noting "a lack of time due to too many administrative tasks and obstacles". There is a distinct desire for best-practice benchmarking rather than critical assessment, with one leader observing: "The entire survey was very biased and aimed at showing that too little is being done with IIC". For Group A, the challenge is that leadership must move to actively modelling the culture, as current processes are perceived as rigid.

Group B: EU Widening Countries

Leaders in this region view IIC as a functional tool for growth and emphasize the need for "a safe environment for testing new approaches and risky (radically new) projects," where failure does not penalize the researcher. The core priority is shifting from a culture that relies on individual "heroes" to one that is formalized, with leaders calling for "a clearer concept, description and set concrete steps for implementation". This group highlights that for IIC to succeed, they require institutionalized support, including practical workshops, rather than relying on individual initiative to drive change.

Group C: EU Associated Countries

Leaders here identify a significant "form vs. essence" gap, acknowledging that they are struggling to keep pace with modern standards. The feedback is striking in its honesty: one leader admitted that "Everything that is the subject of this questionnaire is ahead of the prevailing practice of my institution". The priority for this group is "raising awareness among all employees" and moving from passive administrative compliance to an active, shared understanding. They

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express an urgent need for "turning inclusive ideas into consistent, measurable action".

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Final Synthesis: The "Translation Gap"

Across all three regions, one can recognize a pervasive "Translation Gap," where high-level institutional strategies fail to integrate into the daily operational reality of the research environment.

- **Efficiency vs. Empowerment:** While leaders in **Group A** are focused on administrative optimization to sustain their high standards, leaders in **Group B** are focused on building the necessary psychological safety to encourage risk-taking.
- **Aspiration vs. Reality:** Leaders in **Group C** recognize that their institutions are currently lagging behind the modern standards of Inclusive Innovation Culture and require comprehensive, systemic overhaul rather than just policy adoption.

The analysis concludes that institutions must stop treating IIC as a "nice-to-have" policy document and start treating it as a core operational requirement. There is a universal call from leadership for "vision and support" that moves beyond passive encouragement to active, resource-backed, and structurally integrated practices.

Researchers

Group Characteristics & Profiles

Group A: Germany & Austria (n=25)

Demographics: This group is dominated by Economics and Social Sciences (80% of respondents). 32% of respondents have 2–5 years, 52% - more than 5 years and the rest less than 2 years of their research activities experience. The survey is dominated by respondents from Germany, i.e. Fraunhofer ISI (84%).

Group B: EU Widening Countries (n=38)

Demographics: the disciplinary profile is led by Circular Economy (34%), Environmental science/sustainability (29%), Agriculture (26%), followed by Biotechnology and other Life Sciences. Major contributions are from Bulgaria (34%), the Czech Republic (24%) and Croatia (21%). The tenure

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profile is different, with nearly 40% of researchers holding their positions of over 10 years, 26% - less than 2 years, and 24% - between 2 and 5 years.

Group C: EU Associated Countries (n=40)

Demographics: Contributions are led by Albania (15 respondents) and Serbia (12 respondents), followed by North Macedonia (7) and Bosnia and Herzegovina (6). The largest discipline segments represented are Agriculture and Forestry, followed by Biotechnology. The majority of respondents have been at their institution for more than 5 years.

Commitment to an inclusive innovation culture

Group A: Germany & Austria

Based on the survey data from researchers in Germany and Austria, the general commitment to an Inclusive Innovation Culture (IIC) can be summarized as follows:

- **Commitment of HEI/RO for IIC**: While 56% of researchers acknowledge an official IIC strategy at their organizations, there is a significant "translation gap," as also 56% find these visions too abstract to influence daily practice. Furthermore, the majority of respondents indicated that individuals striving for an IIC usually lack the influence to drive institution-wide change. However, there is an emphasize of interdisciplinarity, advanced scientific methodology, openness, curiosity and creativity in the daily work of researchers.
- **Support needed:** According to feedback provided, structural support is required to overcome departmental silos, which most respondents identify as a primary barrier to collective cultural change. Many feel the current focus remains disproportionately on purely scientific-technological aspects rather than "soft" cultural integration.

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Group B: EU Widening Countries

Based on the survey data from researchers at HEIs in the EU Widening Countries, trends regarding Commitment to an Inclusive Innovation Culture (IIC) there include:

- **Commitment of HEI/RO for IIC:** While 71% of researchers acknowledge an official IIC strategy or vision (31.6% "Yes", 39.5% "To a certain extent") being in place, most of them (58%) find them too abstract. Comments suggest some strong emphasis on collaborative research and development and cooperation as core components of IIC at their HEIs. However, some researchers reported that they were hearing about IIC for the first time.
- **Support needed:** departmental silos was identified by 50% of respondents as a primary barrier to collective cultural change. Majority of respondents (73.7%) feel the current institutional focus remains disproportionately on purely scientific-technological aspects rather than Innovation Culture. 58% of researchers feel that individuals striving for an IIC lack the influence to drive institution-wide change. There is a need to expand creative freedom, as current R&D practices allow for new ideas to be realized only to "a certain extent".

Group C: EU Associated Countries

Based on the provided survey data from researchers in the EU Associated Coun-tries, the general Commitment to an Inclusive Innovation Culture (IIC) includes:

- **Commitment for IIC:** While 65% of researchers acknowledge that their institution has adopted an official strategy or vision for IIC (22.5% "Yes" and 42.5% "To a certain extent"), a significant 70% find these visions too abstract. The existing institutional strategies emphasize collaborative R&D, new ideas, and creativity. However, researchers note that while creativity is highlighted, freedom and critical thinking are significantly less represented in the institutional framework. A substantial 70% of respondents feel that

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while there are individuals striving for an IIC, they lack the necessary influence to drive change.

- **Support needed:** Support is required to dismantle departmental silos, which 65% of researchers identify as barrier. There is a clear need to rebalance institutional priorities, as 72.5% of respondents feel their university focuses solely on scientific aspects, leading to the perception that aspects like IIC are not considered as important. Communication support is vital, as a portion of the workforce remains completely unaware of IIC strategies.

Key conclusions on commitment to IIC

Based on the cross-regional analysis of the three researcher groups – 1) from Ger-many & Austria, 2) EU Widening Countries, and 3) EU Associated Countries - the following synthesis identifies aspects shared by all academic institutions from all regions, but also regional variations, and specific institutional needs.

Common Strengths

- **Adoption of IIC strategies:** All regions have a high rate of official IIC strategy adoption, ranging from 56% in Germany/Austria to 71% in EU Widening Countries.
- **Shared Values:** All groups perceive IIC values including openness to new ideas, creativity, and scientific ethics as part of their official institutional identity.
- **General Openness**: Researchers across all groups express a strong desire and openness for new topics and methods.

Common Weaknesses

- **The Translation Gap:** A majority of researchers in all groups (56% to 70%) find institutional visions too abstract to influence their daily practice.
- **Departmental Silos:** Between 50% and 65% of respondents in all groups identify silos as a primary barrier to collective cultural change.

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- **Marginalization of IIC in Daily Work**: In all regions scientific-technological aspects are clearly prioritised over "soft" cultural ones, with the highest perception of this in EU Associated Countries (72.5%).
- **Influence Gap:** Individuals lack the necessary influence to drive systemic change.

Regional Variations in IIC Aspects

The primary regional variation lies in how IIC is institutionalized and communicated:

- **Conceptual Depth:** While Germany and Austria emphasize interdisciplinarity, advanced scientific methodology, openness, curiosity and creativity in the daily work of researchers, researchers from EU Widening Countries point out to the need to expand creative freedom, and the EU Associated Countries group specifically notes a lack of emphasis on freedom and critical thinking within their innovation frameworks.
- **Communication Awareness:** Germany/Austria show higher internal alignment, whereas EU Widening and Associated Countries face significant awareness gaps, with some researchers completely unaware of IIC initiatives.

Leadership role

Group A: Germany and Austria

- **Status quo:** The data suggests that while leadership is supportive in theory, there is a significant disconnect when it comes to active implementation and clear communication. Only 12% of respondents believe leadership effectively communicates the organization's IIC strategy. Over a quarter (28%) state that leadership does not communicate this vision effectively at all. While supervisors are generally seen as encouraging, there is a lack of "role modelling." About 28% of researchers feel their supervisors do not demonstrate IIC principles in their daily actions. Some respondents indicate that a "willingness to change"

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is currently missing, suggesting that leadership may be settled in their status quo rather than driving evolution.

- **Support needed:** A majority of researchers feel "encouraged" to live an IIC (76% at least to a certain extent), but only 8% feel they actually receive the adequate support and training needed to develop those skills. There is an 80% consensus that leaders and responsible staff need specific training or mentoring. 72% want to learn from other institutions that have already successfully established an IIC. 72% are asking for clear guidance or "action plans" to move IIC from a vague concept to a concrete institutional strategy. A further critical demand is the need for structural space, as current financing models set incentives that conflict with IIC. Moreover, leadership must facilitate critical discussions on strengths and weaknesses to realistically position the research institution for the future.

Group B: EU Widening Countries

- **Status quo**: 42.1% of researchers agree that their supervisors demonstrate IIC principles in daily actions. However, the free-text answers reveal a critical nuance indicating that IIC strategies are not really actively practiced. Only 26.3% feel they receive adequate training to develop their own IIC skills.
- **Support needed**: There is a consensus for training and mentoring needs for leaders. This suggests that even though leaders are "trying," staff believe they require professional development to be effective. Over 92% of respondents are looking for concrete guidance or action plans. In addition, free-text responses highlight two vital missing components: 1) Funding for IIC; 2) Joint European projects to link IIC efforts with broader research frameworks.

Group C: EU Associated Countries

- **Status quo:** Across all categories - from supervisor encouragement (40%) to role modelling (50%) - the majority of responses fall into the "to a certain extent" category. This indicates

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that while IIC isn't absent, it is not yet deeply embedded in the daily organizational DNA. Only 17.5% feel they receive adequate support and training to develop IIC skills.

- **Support needed:** 95% of respondents emphasize the need for training or mentoring for leaders and responsible staff. This is the highest percentage across all three groups, showing an urgent desire for professionalized IIC leadership. 97.5% want to learn from institutions with established IICs. 97.5% are asking for clear guidance or action plans to develop an IIC strategy. Moreover, there is a call to integrate IIC into the official HR Strategy as well as modern teaching principles.

Key conclusions on leadership roles across regions

Common Strengths

- **Encouraging leadership**: Leaders across all regions are predominantly perceived as "encouraging". There is a baseline of goodwill; researchers generally feel that their immediate supervisors are open to IIC values in principle across all three groups.
- **Recognition of the relevance of specific skills**: there is a broad recognition across all groups that leaders and responsible staff need specific training or mentoring to successfully implement IIC. Regardless of geography, there is a massive demand for clear "Action Plans" (72% to 97.5%).

Common Weaknesses:

- **Communication:** Only a small minority across three groups (12% to 36%) believe leadership effectively communicates the organization's IIC strategy.
- **Lack of Active Role Modelling:** many researchers feel that their leaders do not actually demonstrate IIC principles in their own daily actions.
- **Training Deficit:** There is a massive gap between the *need* for training and the reality. Only a small fraction (8% to 17.5%) of

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researchers feel they receive adequate support/guidance to develop their own IIC skills.

Regional variation

In **Germany and Austria** the researchers reported the lowest communication of IIC principles by their leadership (only 12%). They expect open and critical discussions on institutional weaknesses, moving IIC from a side-project.

EU Widening Countries representatives' answers suggest that the role modelling often disconnects in practice.

Responses from researchers from **EU Associated Countries** indicate some awareness & uncertainty gap through a high level of "Don't Know" responses (up to 16%), suggesting that leadership has not yet made IIC a transparent or tangible priority for the average researcher.

Specific assistance needed

Group A: Germany & Austria

- **Clear, Actionable Information:** 88% (52% of them defined it as a high need) of researchers identified a need for support on "clear information what an Inclusive Innovation Culture is".
- **Soft Skills & Professional Interaction:** 84% of respondents demand training in communication skills (e.g., constructive feedback and conflict solving).
- **Methodological Skills:** 84% see a need for application-oriented research methods and 76% specifically ask for creativity techniques.

In addition, free-text comments emphasize that specialized support is secondary if there is a lack of awareness of the current situation and a subsequent willingness to change implicitly, prioritising the awareness raising measures on IIC.

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Group B: EU Widening Countries

- **Methodological and Personal Development:** The most acute need is for training in methods on how to conduct interdisciplinary research (60.5%). This suggests researchers are eager to break out of silos but lack the technical "know-how."
- **Individual Mentoring:** Over half of the respondents (55.3%) report a high need for individual mentoring or coaching on IIC. This indicates a desire for personalized career guidance rather than just generic information.
- **Conceptual Clarity**: There is a significant need for clear information on what an Inclusive Innovation Culture actually is, with 86.8% (High + Moderate) reporting this need.
- **Soft Skills and Creativity**: 50.0% of researchers report a high need for training in communication skills, specifically focusing on constructive feedback and conflict solving as well as for training in creativity techniques, application-oriented research methods, and Responsible Research and Innovation (RRI).

Group C: EU Associated Countries

- **Methodological Development**: the most acute need is shared between training in methods on how to conduct interdisciplinary research (60.0%) and Responsible Research and Innovation (RRI) (60.0%). 55.0% identify a high need for application-oriented research methods.
- **Soft Skills and Creativity**: This group shows the highest demand for creativity techniques (65.0%). 52.5% of researchers report a high need for training in communication skills, specifically focusing on constructive feedback and conflict solving.
- **Individual Mentoring**: Nearly half of the respondents (47.5%) report a high need for individual mentoring or coaching on IIC.
- **Conceptual Clarity**: The overwhelming majority (92.5%) requires clear information on what an Inclusive Innovation Culture actually is.

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Free-text feedback explicitly mentions continuous monitoring & flexibility: There is a call for tools and systems that allow for the continuous monitoring and improvement of IIC, which are flexible enough to adapt to current issues as they arise. Researchers warn that training alone does not guarantee practical application and can lead to frustration. They advocate for a transition from passive learning to active practice within the research environment.

Cultural-specific experiences

Group A: Germany and Austria

Psychological Safety & Autonomy

- **Expression of Ideas:** Most researchers feel safe expressing unconventional ideas (68%) and constructive criticism (64%).
- **Conflict Resolution:** only 40% agree that conflicts are resolved fairly and constructively, indicating a potential "avoidance" culture regarding difficult interpersonal issues.
- **Valuation of Work**: 60.0% feel their contributions are valued, though 28.0% only feel this "to a certain extent."
- **Admitting Mistakes**: 48.0% feel fully comfortable admitting mistakes or knowledge gaps, while 40.0% only feel safe doing so "to a certain extent".

Tolerance for Risk & Learning from Failure

- **Career Protection**: 40.0% believe failed risky projects won't harm their career, but 28.0% "don't know," suggest that for many the career progression criteria regarding risk are opaque.
- **Encouragement of Exploration**: 80.0% total agree (32% Yes, yet 48% To a certain extent) that their organization encourages innovative research.
- **Funding & Time**: Despite the encouragement, 48.0% explicitly state the organization does not provide specific funding or time for exploratory projects, and 32% only to a certain extent.

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- **Learning from Failure**: Only 20.0% feel unsuccessful projects are treated as learning opportunities, while 32.0% say they are not or only to a certain extent.

Collaboration & Inter-/Transdisciplinarity

- **External Collaboration**: 64% report that collaborations with external partners (industry, NGOs) are actively supported and valued.
- **Formal & informal Internal Structures**: 32.0% reported established formal structures (centres, study programmes) for interdisciplinary collaboration, while 40% see them established to a certain extent. Connection depends largely on informal opportunities according to the feedback of respondents (80%).

Diversity, Inclusion & Belonging

- **Communication & shared responsibility**: 68.0% agree that their organizations actively promote anti-discrimination and diversity in their communication. 76% experience diversity and inclusion as a shared responsibility for all staff.
- **Active Recruitment**: 52.0% feel the organization actively recruits staff from diverse backgrounds.

Group B: EU Widening Countries

Psychological Safety & Autonomy

- **Expression of Ideas:** Most researchers feel safe expressing controversial or unconventional ideas (57.9%) and agree that constructive criticism is welcomed and appreciated (52.6%) or at least to a certain extent.
- **Conflict Resolution:** 42.1% agree that conflicts are addressed constructively and resolved fairly; with 39.5% agreeing only "to a certain extent," indicating some ambiguity regarding the fairness of interpersonal problem-solving.
- **Valuation of Work:** 52.6% feel their work and contributions are valued, while 42.1% only feel this "to a certain extent."

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- **Admitting Mistakes:** 47.4% feel comfortable admitting mistakes or knowledge gaps, while 34.2% only feel safe doing so "to a certain extent," and 18.4% explicitly do not feel comfortable—suggesting some pressure to maintain an "error-free" image.

Tolerance for Risk & Learning from Failure

- **Career Protection:** Only 36.8% believe a failed risky or exploratory project won't harm their career, and 31.6% "don't know," suggesting that for many, the career consequences of failure remain unclear.
- **Encouragement of Exploration:** in total, 84.2% agree (52.6% Yes, 31.6% To a certain extent) that their organization encourages exploratory innovative research.
- **Funding & Time:** Despite the high encouragement, only **31.6%** feel the organization provides specific funding or time, while **34.2%** see this only "to a certain extent" and **23.7%** explicitly state it is not provided.
- **Learning from Failure:** Only **28.9%** feel unsuccessful projects are treated as learning opportunities, while **34.2%** agree only "to a certain extent" and **21.1%** state they are not.

Collaboration & Inter-/Transdisciplinarity

- **External Collaboration:** 60.5% report that research collaborations with external partners (industry, NGOs, etc.) are actively supported and valued.
- **Formal & Informal Internal Structures:** Only 28.9% reported established formal structures (centres, study programmes) for interdisciplinary collaboration, while 31.6% explicitly say these do not exist. Connections depend largely on informal opportunities (events, shared spaces), which are recognized by 71.1% (Yes + To a certain extent).

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Diversity, Inclusion & Belonging

- **Communication & Shared Responsibility:** 50.0% agree that their organization actively promotes anti-discrimination and diversity in its communication. 76.3% experience diversity and inclusion as a shared responsibility for all staff (50.0% Yes, 26.3% To a certain extent).
- **Active Recruitment:** Only 34.2% feel the institution actively recruits staff from diverse backgrounds (international, gender, disabilities), while a significant 21.1% "don't know," pointing to a lack of transparency in hiring practices. Almost 16% denied the recruitment of diverse staff.

Group C: EU Associated Countries

Psychological Safety & Autonomy

- **Expression of Ideas:** Researchers in this group feel the least secure in sharing new thoughts: only 37.5% feel safe to express controversial or unconventional ideas, with an equal 37.5% feeling so only "to a certain extent." 22.5% do not feel safe doing it at all.
- **Conflict Resolution:** 42.5% agree that conflicts are addressed constructively and resolved fairly and 32.5% - to a certain extent. However, 20.0% explicitly disagree, indicating a higher level of unresolved interpersonal tension.
- **Valuation of Work:** 40.0% feel their contributions are fully valued - the lowest positive score for this metric across all three regional groups – and 42.5% to a certain extent. Yet 12.5% of respondents do not feel valued at all.
- **Admitting Mistakes:** Only 37.5% feel comfortable admitting mistakes or knowledge gaps, while a majority (55.0%) only feel safe doing so "to a certain extent".
- **Constructive Criticism:** 40.0% agree criticism is welcomed, while 42.5% agree only partially, and 15% disagree suggesting a culture where direct feedback may be avoided for some reasons.

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Tolerance for Risk & Learning from Failure

- **Career Protection:** Career risks are perceived as high and unpredictable; only 17.5% believe a failed risky project won't harm their career, and 15.0% "don't know" how failure affects their path.
- **Encouragement of Exploration:** While 72.5% total agree (30.0% Yes, 42.5% To a certain extent) that the organization encourages exploratory innovative research, this appears to be largely symbolic, as feedback on all related aspects indicate.
- **Funding & Time:** This group reports the most severe resource deficit: only 10% feel they receive specific funding or time for exploratory research, while 40% explicitly state these resources are not provided.
- **Learning from Failure:** Only 10.0% feel unsuccessful projects are treated as learning opportunities and 45% perceive this to a certain extent, while 27.5% state clearly that they are not.

Collaboration & Inter-/Transdisciplinarity

- **External Collaboration:** Collaboration with external partners is supported by 32.5% (Yes) and 52.5% (To a certain extent), though this is lower than in Groups A and B.
- **Formal & Informal Internal Structures:** 22.5% of respondents experience established formal structures (interdisciplinary centres, study programmes, conferences) for their interdisciplinary work and 55% only to some extent.
- **Informal Opportunities:** Connections rely heavily on informal opportunities. Only 20% of respondents fully agree that their organization provide them with such opportunities, while 60.0% see them only "to a certain extent." 17.5% do not have them at al.

Diversity, Inclusion & Belonging

- **Communication & Shared Responsibility:** 42.5% agree the organization promotes diversity in its communication. 67.5% experience diversity and inclusion as a shared responsibility for all staff (30.0% Yes, 37.5% To a certain extent), while 22.5% of respondents is not aware of it (22.5%).

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- **Active Recruitment:** 40.0% feel the institution actively recruits staff from diverse backgrounds. However, 17.5% "don't know" and 15.0% disagree, suggesting a perceived lack of transparency and/or relevance of these aspects in hiring practices.

Key conclusions on cultural-specific experiences across regions

Common Strengths (across all country groups and categories)

- **External Networking:** In all regions, external collaboration is the most "solid" positive, with "Yes" scores ranging from 32.5% to 64%. Even where "Yes" is lower, the "To a certain extent" brings the total positive sentiment above 85%.
- **Aspiration for Diversity:** Promoting diversity in institutional communication is relatively high (42.5% to 68% "Yes").
- **Innovation Rhetoric:** There is no lack of verbal encouragement. Total agreement that organizations "encourage exploratory innovative research" is high in all groups.

Common Weaknesses (across all country groups and categories)

- **The Resource Gap (The "Lip Service" Problem):** Every group reports a major deficit in actual funding and time. "No" and "To a certain extent" dominate this category in each country group.
- **Conflict Resolution:** This is the most consistent failure in psychological safety across all groups. Only 35% to 42.5% fully agree that conflicts are handled fairly.
- **Internal Fragmentation:** Formal interdisciplinary structures are consistently weak. Most researchers rely on informal opportunities, which are not systematically provided.

Regional Variations: Analysis by Category

1: Psychological Safety & Autonomy

- **Group A (Germany/Austria):** Highest safety for unconventional ideas (68%). However, the 40% "To a certain extent" for admitting mistakes points that showing weakness is risky.

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- **Group B (Widening):** Most balanced. While 57.9% feel safe with ideas, the 18.4% "No" on admitting mistakes is the highest in this group, suggesting a pressure to maintain an "error-free" image.
- **Group C (Associated):** The most restricted: Only 37.5% feel safe with unconventional ideas, and 22.5% explicitly feel unsafe. It has the highest "No" share for fair conflict resolution (20%).

Pattern: Overall psychological safety decreases as we move from Group A to Group C.

2: Tolerance for Risk & Learning from Failure

- **Group A:** High "Yes" for career protection (40%), but also the highest "Don't know" (28%), suggesting a lack of transparency.
- **Group B**: Highest total encouragement (84.2%), but the highest "No" for learning from failure (21.1%).
- **Group C**: The most risk adverse group: A massive 37.5% "Don't know" if failure will kill their career, and 27.5% explicitly say failure is not treated as a learning opportunity.

Pattern: Group C researchers are under the most pressure to deliver "safe" results.

3: Collaboration & Inter- and Transdisciplinarity

- **Group A:** Strongest external ties (64%), but 20% explicitly say no informal internal opportunities exist.
- **Group B**: High reliance on informal opportunities. While only 28.9% have formal centres, over 71% use informal paths. However, 31.6% explicitly lack formal structures.
- **Group C:** Lowest external support (32.5%) and some ambiguous internal structure (55% "to a certain extent").

Pattern: Internal collaboration is weak in group B and group C relying on individual initiative rather than institutional support.

4: Diversity, Inclusion & Belonging

- **Group A:** High on communication (68%) and recruitment (52%), but lowest on shared responsibility (40%).

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- **Group B:** Highest shared responsibility (50% "Yes" + 26.3% "to certain extent"), but low in active recruitment (34.2%).
- **Group C:** High shared responsibility (67.5% total), but the highest "Don't know" for recruitment (25%), showing a lack of transparency in HR.

Pattern: Western HEI and RO have structural mechanisms to support diversity and IIC (HR/Recruitment); whereas EU Widening/Associated countries largely lack formal structures.

Role-specific experiences

The following section provides insights on how much weight is given to interdisciplinarity, creativity and diversity and inclusion compared to scientific achievements during recruitment or performance reviews in different regions.

Group A: Germany and Austria

- **Interdisciplinarity:** While 40.0% of researchers feel it is given equal weight, nearly half (48.0%) experience it as being valued less (36.0%) or much less (12.0%).
- **Creativity:** 60.0% of respondents reported that creativity is secondary (44.0% less weight, 16.0% much less weight), when compared to scientific achievements, with only 28.0% viewing it as an equal metric.
- **Deliberate Pursuit of Diversity & Inclusion**: 72.0% of researchers report it receives less (48.0%) or much less (24.0%) weight than scientific output. Only 12.0% see it as an equal competency.

Moreover, the open-ended feedback highlights that institutional sustainability outweighs cultural change:

- **Funding over Science**: Researchers explicitly identify "bringing in external funding" as a primary competency that outweighs actual "scientific achievements". Therefore, weight is heavily shifted toward project leadership, management skills, and the ability to acquire new projects.

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- **Invisibility of IIC**: Critical thinking, interdisciplinarity, and the "will to change something" are seen as essential by individuals but are reportedly missing from formal performance assessment structures.

Group B: EU Widening Countries

- **Interdisciplinarity**: Only 34.2% of researchers see it as an equal metric to scientific output, while a combined 52.7% feel it is valued less or much less.
- **Creativity**: Half of the respondents (55.2%) report that creativity is valued less or much less than standard achievements.
- **Deliberate Pursuit of Diversity & Inclusion**: only 31.6% see it as equal, while 47.3% report it carries less or much less weight.

The open-ended feedback confirms that career progression is tied strictly to traditional, quantifiable research results, creating a barrier for IIC-related activities:

- **Science and Education Output-Driven Assessment**: Achieved results and educational level are cited as the primary drivers of performance reviews.
- **Lack of Transparency**: The qualitative comment "I cannot assess any of this… nor do I have any overview of the employees being hired" mirrors the high 21.1% "Don't know" rate for diversity & inclusion weight in the quantitative data, highlighting a major transparency gap.

Group C: EU Associated Countries

- **Interdisciplinarity:** 50.0% of researchers report it is given equal weight (the highest score among all groups). However, 37.5% say it is valued less or much Less.
- **Creativity:** 45.0% see creativity as an equal metric, but 37.5% still view it as a secondary priority (Less/Much Less).
- **Diversity & Inclusion Pursuit:** While 40.0% report equal weight, this category has a massive transparency deficit, with 27.5% selecting "Don't know/Not applicable."

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In addition, the open-ended feedback provides a sobering context to the quantitative "Equal weight" scores. The region appears to be struggling with some legacy systems and external influences:

- **Emphasis on "Hard" Outputs:** Respondents noted that assessments are still "mainly technical aspects".
- **Teaching over Research:** In some institutions, "titles and previous experiences in teaching are preferred compared to research," creating a barrier for innovation-led careers.
- **Informal Power Structures:** A critical concern raised was the influence of "family, political, or other connections" in hiring. This perceived nepotism significantly reduces opportunities for young researchers with high scientific and innovation potential but no "connections."

Common Strengths

- **Formal Interdisciplinary Recognition**: All three groups show a significant baseline of "Equal" weighting for interdisciplinarity, ranging from 34.2% to 50%.

Common Weaknesses

- **Devaluation of Creativity**: Across all regions, creativity is systematically ranked as "Less" or "Much Less" important than traditional scientific output, reaching 60% in Group A and 55.2% in Group B.
- **D&I Assessment Gap**: The "Deliberate pursuit of D&I" is the lowest-rated competency in performance reviews across all country groups.
- **Hard Metric Dominance**: Recruitment is universally driven by "hard" research outputs, specifically external funding acquisition and publication counts.

Patterns and Significant Regional Variations

- **The Transparency Pattern**: While Group A has the clearest understanding of what is being measured (lowest "Don't know"

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rates), Group C has the highest ambiguity, with 27.5% unaware of how D&I affects their career.

- **The Recognition Paradox**: Group C (Associated) paradoxically reports the highest formal weighting for IIC competencies (e.g., 50% for interdisciplinarity) but suffers from the lowest actual resource support and the highest fear of career harm (as indicated in previous parts of the analysis).
- **The Recruitment Shift**: Group A moves toward management/ funding acquisition, while Group B remains tethered to educational titles, and Group C has some problems with informal power structures/nepotism.

Support of IIC skill development

Group A: Germany and Austria

Perceived Strengths and Weaknesses

The institutional landscape in Group A is characterized by a "Support Paradox": general leadership is well-covered, but the specific "tools" for innovation are either absent or inaccessible.

Strengths: Formal Leadership & Methodological Frameworks

- **Leadership (Mentoring/Coaching):** This is the strongest pillar of support, with 80% indicating availability of adequate support at their organizations (40% Yes, 40% To a certain extent).
- **Inter- and Transdisciplinary Methods:** While 72% feel supported, only 20% give a definitive "Yes." The majority (52%) are supported only "to a certain extent," indicating that while interdisciplinary work is rhetorically encouraged, the actual methodological training is perhaps too generic or inconsistent.

Weaknesses: The Creativity and "Soft" Skill Deficit

- **Creativity Methods:** Only 4% of researchers report fully adequate support. The majority of respondents – 48%- indicated that the support to develop related skills is provided to a certain extent

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and nearly a third (28%) say it is non-existent. Further 12% find it "Difficult to access."

- **Conflict Resolution:** While 56% say support exists "To a certain extent," the definitive "Yes" is low (12%), and 20% report no support at all.
- **Critical Thinking:** This shows the highest level of fragmentation, with 12% clearly confirming the availability of support, 36% - to a certain extent, 28% reporting a total lack of support, and 12% indicate difficulties to access.
- **Constructive Feedback:** Likewise, 28% report a total lack of support, 12% find it hard to access, and ca. half of respondents confirm the availability of support to develop constructive feedback skills.

Group B: EU Widening Countries

Based on the provided data, Group B shows a profile, where fundamental skills are clearly recognized, but support for innovation-specific methodologies remain relatively vague.

Perceived Strengths and Weaknesses

The institutional landscape in Group B can be characterized as following: while fundamental academic skills (Critical Thinking, Interdisciplinarity) are highly supported, specialized innovation methods (Creativity, Conflict Resolution) suffer from significant structural opacity.

Strengths: High Recognition of Fundamental Research Skills

- **Inter- and Transdisciplinary Methods:** This is the strongest pillar, with 73.7% total adequacy and a high definitive "Yes" (39.5%). Compared to Group A's 20% "Yes," researchers in Group B feel much more supported in crossing disciplinary boundaries.
- **Critical Thinking Skills:** 68.4% report adequate support, with 36.8% giving a definitive "Yes." This is a stark contrast to Group A (12% Yes).

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- **Constructive Feedback:** Support is well-established, with 68.4% confirming at least support to a certain extent in this area. Qualitative comments reinforce this, specifically mentioning "mentoring" and "feedback" as available resources.

Weaknesses: The Creativity and Conflict Resolution Skill Gap

- **Creativity Methods:** While 50% report at least some support, this category also has a transparency deficit. 21.1% of researchers answer "Don't know," and 21.1% report a total lack of support.
- **Constructive Conflict Resolution:** While 57.9% feel that at least some support exists, it also has a high "No" rate (26.3%).

However, the qualitative feedback highlights a "Minimalist Support" reality for some indicating that support can be highly inconsistent across different HEIs.

Group C: EU Associated Countries

Perceived Strengths and Weaknesses

Total support coverage is relatively high across all competencies, although largely qualified as “To a certain extent”, while definitive institutional commitment (clear "Yes" responses) remains low compared to the other groups.

Strengths: Broad Curricular Awareness

- **Inter- and Transdisciplinary Methods:** This is the most widely supported skill development area, with 77.5% perceiving to receive adequate support from their organizations to develop such skills (20.0% Yes, 57.5% To a certain extent).
- **Constructive Feedback:** High perceived availability at 75.0% total support, though largely qualified as "to a certain extent" (57.5%).
- **Creativity and Critical Thinking:** Both show solid total support of 70.0%. Notably, the definitive "Yes" for creativity (22.5%) is significantly higher than in Group A (4.0%).

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Weaknesses: Structural Ambiguity and Technical Bias

- **Leadership (Mentoring/Coaching):** Definitive support is weak at 15.0% "Yes". With 15.0% stating "No" and 12.5% "Don't know," institutional leadership training appears fragmented or poorly communicated to researchers.
- **Constructive Conflict Resolution:** This represents a major systemic gap. While 67.5% feel that at least some support exists, it carries the study's highest "Don't know" rate at 22.5%, indicating that it remains entirely beyond the radar of researchers as a recognized professional resource.
- **Technical Interpretation of Support:** Qualitative feedback suggest that "support" is often strictly interpreted through a technical lens, such as "working in laboratories and training on the equipment".

Overall perception of IIC of researchers at their institution

Figure A 9 visualizes the weighted average providing a single value for the individual perception of IIC by researchers within different country groups based on the survey results. The satisfactory threshold is an imaginary benchmark. The specific value 6.0 serves as a "perceptual midpoint" outweighing a simple mathematical average score 5.0, defined as neither good nor bad.

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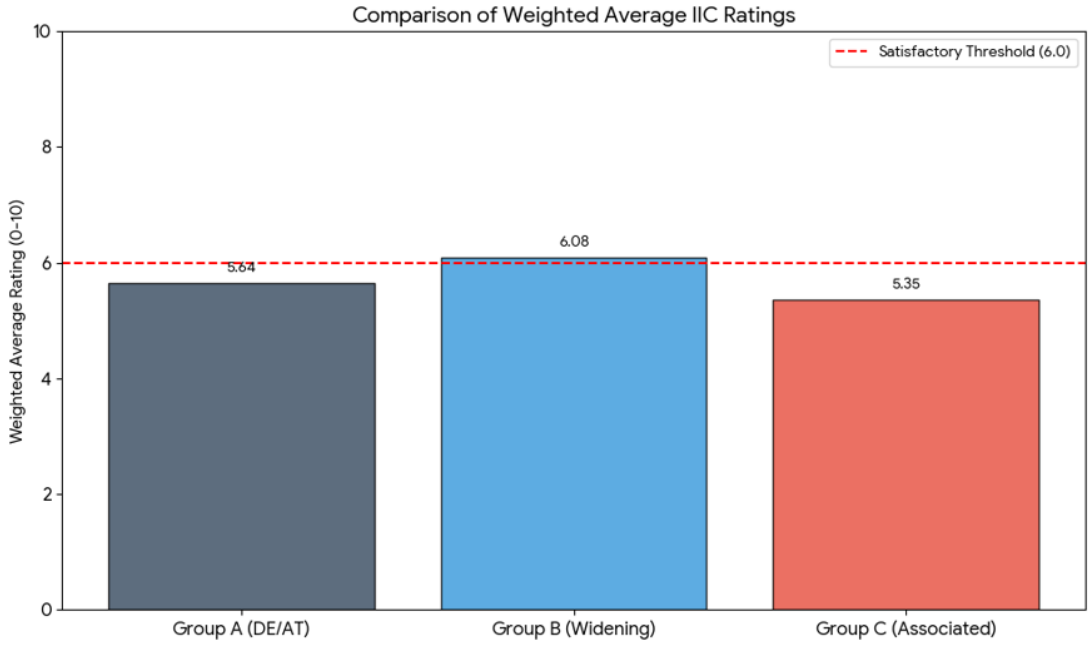


Figure A 9: Comparison of Weighted Average IIC Ratings

Group A (DE/AT): This group exhibits the highest consensus (lowest standard deviation). Opinions are primarily clustered around the 5–8 range. While the weighted average is below the threshold, there are no extreme outliers - no researchers gave a score of 0, but similarly, none gave a score of 9 or 10.

Group B (Widening): This group holds the highest weighted average and is the most optimistic overall. The perception of IIC is however highly uneven, as high standard deviation shows (see Figure A 9). 13% of researchers rated it even as a perfect 10/10, while 21% rate it as very low (0-3). 53% of respondents perceive their internal IIC as very good and well above the average – rating it 7/10 and higher.

Group C (Associated): This group has the lowest mean and a high variation. While a large portion of researchers – 45% are satisfied (rating it 7, 8 or 9), a critical minority (17.5%) gave a rating of 0 (not existent). This suggests a massive internal divide within EU Associated Countries.

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This graph provides a detailed view of how the ratings for Inclusive Innovation Culture (IIC) are spread across the three regional groups. Whiskers represent the range of the data excluding outliers.[62] The boxes represents the middle 50% of respondents.[63] The Red Line is Median splitting the group exactly in half. The graph allows following interpretation:

- **Group A (DE/AT):** Shows the highest level of consensus. The whiskers are shorter, and the box is smaller, indicating that most researchers share a similar experience, though it lacks the "excellent" ratings.
- **Group B (Widening):** Has the highest median. Its upper whisker reaches the maximum score of 10, indicating that the highest IIC perception score is considerable within this group. However, the long box shows significant diversity in experiences.
- **Group C (Associated):** While the median is 6, the presence of seven distinct "0" ratings pulls the average down significantly. This shows that the culture in Group C is highly inconsistent.

[62] Specifically, they extend from the box to the highest and lowest values that fall within the height of the box.

[63] The Bottom of the Box (Q1): This is the 25th percentile. It means 25% of researchers gave a rating at or below this value. The Top of the Box (Q3): This is the 75th percentile. It means 75% of researchers gave a rating at or below this value (or, conversely, the top 25% gave a rating above it).

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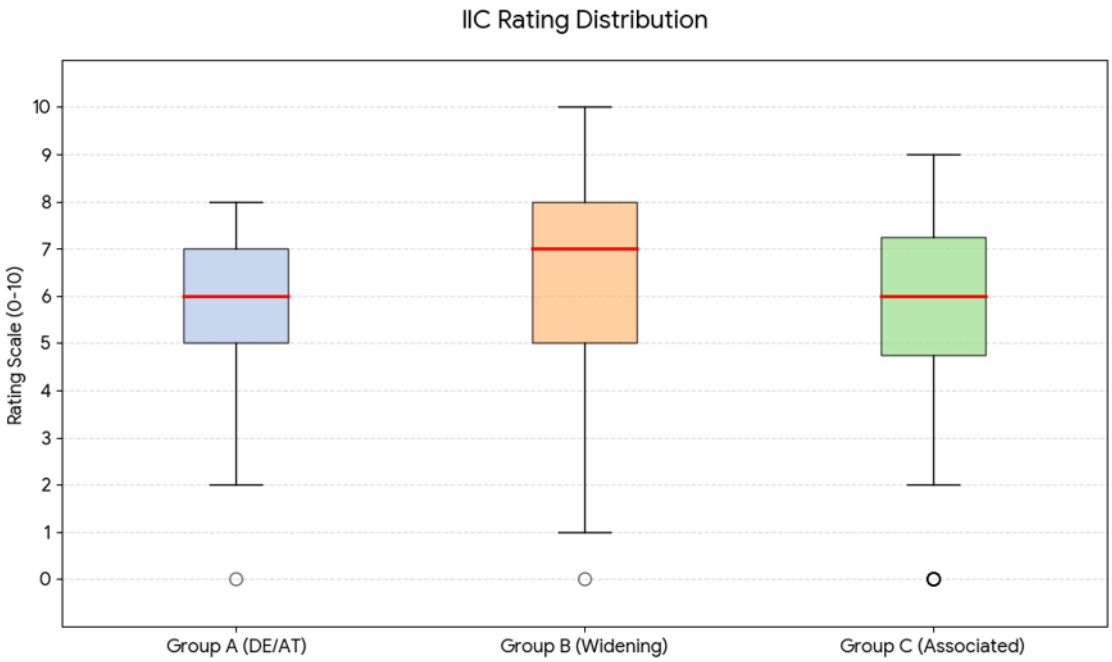


Figure A 10: IIC Rating Distribution

Open Feedback

The analytical synthesis of the researchers' feedback reveals a complex landscape where institutional ambition often outpaces operational reality. The qualitative commentary provides some further key insights.

Group A: Germany & Austria

This region exhibits high consistency, yet researchers feel trapped in a rigid framework where interdisciplinarity is technically integrated but frequently undermined by a profit oriented logic of activities**.** As one respondent noted, this structure "*cements silo structures, which often hinder interdisciplinarity and cross-departmental work.*" There is a profound sense that leadership performs the rhetoric of inclusion without practicing it. This is best captured by the observation: *"Virtue signalling is constantly practiced here... We emphasize openness and appreciation - but it is not practiced at all."* For Group A, the challenge is that cultural change is consistently sidelined because *"deadlines and project successes outweigh all other issues."*

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Group B: EU Widening Countries

The statistical "peaks of excellence" are driven by a genuine openness where results often matter more than origin, exemplified by the comment that "*the focus is not on where someone comes from, but on the results of their work*." However, researchers describe this as a culture that exists but is not formalized, meaning "*skills are gathered, not taught and a lot of the knowledge is implied.*" Because the IIC depends entirely on individual initiative, innovation often carries a "hidden penalty" where pioneers are "*left alone with it... they just end up with more work*." The core priority for this group is moving from a culture where colleagues merely *"feel like they have an important role"* to one where that role is supported by institutional systems rather than individual luck.

Group C: EU Associated Countries

While there is a high degree of psychological safety regarding ideation, these ideas rarely survive the transition into practice. The qualitative comments highlight that innovation culture is at an "*inappropriate level as a result of the high bureaucracy.*" Researchers express a deep desire for results, pleading for the institution to focus on "*turning inclusive ideas into consistent, measurable action*" rather than just discussion. The high number of "zero" ratings in the survey corresponds to a culture where suggestions are often feared; as one researcher pointed out, ideas *"must be taken as an improvement approach and not as criticisms for the work not done*."

Final Synthesis

Across all three regions, one can recognize a "Translation Gap," where high-level strategies fail to penetrate the daily administrative silos. Across all three groups, researchers report that while "Soft Skills" and "Creativity" are promoted in theory, they are invisible in practice. The institutional focus remains disproportionately on purely scientific-technological achievements. The analysis concludes that institutions must stop treating ICC as an aspiration and start treating it as a requirement. There is a universal call for "vision and support" that moves beyond passive encouragement.

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Students

Group characteristics and profiles

Overall, 142 students took part in the survey, with the majority from EU Associated Countries (76), followed by EU Widening Countries (66) and Austria and Germany (14) (Table 3).

The main fields of study (data not shown) of the respondents is Economics, followed by Biotechnology, Food Science and Food Technology, Bioenergy and Bio-Based Materials. Individual respondents represent other fields, such as Business Studies, Tourism, Landscape Architecture, Social Science, and Innovation Research.

Group A: Germany & Austria (n=14)

Demographics: This group is the least represented group of students. The main fields of study represented are economics, environmental science and sustainability, followed by food science and food technology, agriculture and biotechnology. Most respondents were students who had been enrolled at their university for 8 years.

Group B: EU Widening Countries (n=66)

Demographics: This group differs from the overall survey sample in its main field of study, which are economics, environmental science and sustainability, food science and food technology. Other common fields include agriculture and biotechnology. Most respondents were students who had been enrolled for between 2 and 5 years (n=30) or for less than 2 years (n=26).

Group C: EU Associated Countries (n=62)

Demographics: The predominant fields of study in group C are forestry and agriculture, followed by economics and other disciplines, such as applied sociology, pedagogy, safety studies. Fields like food science and food technology, circular economy or biotechnology proved to be marginal in this group.

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As in the other country groups, most respondents were students who had been enrolled at their university for 2 to 5 years (n=42).

University/research organisation environment

Leadership

Group A: Germany & Austria

Based on the survey data from students in Germany and Austria, the general commitment to an Inclusive Innovation Culture (IIC) can be summarized as follows:

Regarding leadership behaviour by supervisors, most of all respondents acknowledge key functions, such as providing support, training and practical guidance to develop skills (35.7%), encouraging to practice IIC principles (50%), acting as role models (57.1%). Communicating IIC strategies and visions was acknowledged by only 28.6%. Overall, however, these results do not point to a strong endorsement of leadership behaviour, as the majority of responses varied between "to a certain extent" and "no".

Group B: EU Widening Countries

Based on the survey data from students at HEIs in the EU Widening Countries, the following trends regarding leadership for Inclusive Innovation Culture (IIC) can be observed:

Compared to students in Germany and Austria, those in EU Widening Countries show a slightly different pattern in how they perceive leadership behaviour. Students acknowledged key functions, such as providing support, training and practical guidance, offering encouragement, and communicating effectively, in a range between 40-50%. However, around 9% of all respondents could not give a clear indication (don't know) on these aspects. Especially communication received the lowest level of acknowledgment (40.9%) and around 10% of all respondents denied effective communication by their supervisors.

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Group C: EU Associated Countries

Based on survey data from students in the EU Associated Countries, the following trends regarding Leadership for Inclusive Innovation Culture (IIC) include:

Students in this group showed the highest level of acknowledgment for key leadership functions within HEI's hierarchies, with approval rates ranging between 66.1% and 74.2. At the same time, the number of respondents that indicated no clear acknowledgment (don't know) has been marginal, ranging between 1.6%-6.5%.

Cultural-specific experiences

Psychological safety

Group A: Germany & Austria

In Germany and Austria, students painted a mixed picture regarding psychological safety and autonomy. While they generally acknowledged key aspects of psychological safety, feeling safe in expressing controversial ideas received the lowest acknowledgement (28.6%) and was most often affirmed only "to a certain extent" (64.3%). In contrast, students emphasized - at 64.3% each - that their contributions are appreciated and that they feel comfortable in admitting gaps in their knowledge. Only regarding the constructive resolving of conflicts, 7.1% indicated no clear answer (don't know).

Group B: EU Widening Countries

In EU Widening Countries, students showed higher levels of agreement regarding psychological safety and autonomy. More than half of all students indicated that their contributions are appreciated and that conflicts are resolved constructively. The share of students that disagreed with the statements remained below 20%, and only a small fraction (up to 7.6%) gave no clear answer ("don't know").

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Group C: EU Associated Countries

In sharp contrast to Germany and Austria and EU Widening Countries, students in EU Associated Countries reported the highest level of agreement on key aspects of psychological safety and autonomy. Across all statements, a clear majority (61.3%-72.6%) of students expressed agreement. Besides, around one-third of respondents agreed only to a certain extent. Across all statements, the share of disagreement remained under 5%. For instance, regarding the question whether students feel comfortable when admitting lack of knowledge, only 4,8% disagreed. Apart from that, no other findings stand out.

Collaboration & Inter- and Transdisciplinarity

Group A: Germany & Austria

In Germany and Austria, student responses revealed partly ambiguous findings on the role of collaboration and inter- and transdisciplinarity at their higher education institutions. While only 21.4% agreed that courses provide opportunities to engage with external partners, around three quarters (71.4%) agreed to a certain extent. A clear majority (78.6%) confirmed that students have opportunities and incentives to attend courses from other scientific disciplines, with 21.4% agreed to a certain extent and none disagreed. Regarding the statements whether students have opportunities to connect with students from other disciplines and to collaborate with students or academics from other disciplines, half of all respondents gave clear agreement for both statements. For each of these statements, only 7.1% students expressed disagreement.

Group B: EU Widening Countries

EU Widening Countries show a slightly different pattern. While around half of all respondents agreed with all statements, the share of disagreement and “don’t know” responses is higher than in Germany and Austria. For instance, 15.2% of all students indicated that no opportunities exist to connect with student or academics from other disciplines. The same proportion reported that there were no

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opportunities to collaborate across disciplines. Those who agreed only to a certain extent accounted for around one third of respondents.

Group C: EU Associated Countries

A similar picture can be seen for EU Associated Countries, with only slight differences in the distribution of responses. Slightly more than 10% of respondents denied the availability of opportunities to collaborate with students or academics from other disciplines as well as existence of opportunities and incentives to attend courses in other disciplines., At the same time, over half of all respondents agreed with each of the statements.

Diversity, Inclusion & Belonging

Group A: Germany & Austria

Regarding diversity, inclusion & belonging as important principle of an inclusive innovation culture, Germany and Austria show a mixed picture. Over one third (35.7%) of respondents do not perceive diversity among the teaching and supervisory body. The same proportion accounts for diversity among student bodies in courses and study programs (35.7%). In contrast, a majority agreed fully or to a certain extent that the faculty would encourage diverse scientific perspectives and commitment to diversity, non-discrimination and inclusion. Only when asked whether faculties encourage and support the use of diverse scientific perspectives and methodological approaches, 28.6% gave no clear answer ("don't know").

Group B: EU Widening Countries

In EU Widening Countries, students show a slightly higher levels of clear agreement with the statements on Diversity, Inclusion and Belonging. For instance, 65.2% agreed that the faculty encourages and supports the use of diverse scientific perspectives and methodological approaches in bioeconomy research. The lowest agreement can be seen for the question whether teaching and supervisory bodies are

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diverse (39,4%). Beyond this, no other findings stand out in contrast to the picture of Germany and Austria.

Group C: EU Associated Countries

In contrast to the mixed picture observed in Germany, Austria and the EU Widening Countries, students in EU Associated Countries showed the highest level of agreement on diversity, inclusion and belonging. For instance, 71% of all respondents clearly acknowledged the diversity of student bodies in courses and study programs. Also, each of the other statements received overall agreement from more than 50% of the participating students in the survey. For instance, 66,1% see clear evidence of commitment to diversity, non-discrimination and inclusion while 56, 6% acknowledge that the teaching and supervisor body in courses and programs are diverse. Also, the question whether the faculty would encourage the use of diverse scientific perspectives and methodological approaches received 59,7% agreement.

Role-specific experiences

Role-specific experiences were primarily captured through the question of whether activities fostering an Inclusive Innovation Culture would be part of courses, classes or other student events.

Group A: Germany & Austria

In Germany and Austria, a broad majority of respondents acknowledged that *mentoring, coaching and supervision* of students are actively pursued in their courses and classes, along with *inter- and transdisciplinary research including corresponding methodology.* However, several aspects that were partly denied: 28.6% of students indicated that support for the development of skills is difficult to access., while 35.7% reported lack of creativity methods and 28.6% noted that constructive conflict resolution is not available.

Group B: EU Widening Countries

In EU Widening Countries activities that foster Inclusive Innovation Culture and are part of student courses, classes and study events

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received broad acknowledgment overall. In several categories, over 50% of all participants confirmed their presence. In all other categories, such as support for skills, conducting inter- and transdisciplinary research or constructive conflict resolution received between 40% and 50% of approvement. Disagreement rates across all categories remained below 15%, and around 10% of survey participants provided no clear indication ("don't know").

Group C: EU Associated Countries

In EU Associated Countries, students expressed an overall more positive view on activities fostering IIC. Acknowledgements ranges between 50 and 72.6%, while around 20% affirmed each category only to a certain extent. The share of respondents that denied the presence of such activities remained low, at under 10%.

Open Feedback

Group A: Austria & Germany

Respondents were requested to share open feedback regarding the biggest strengths of their universities in the context of Inclusive Innovation Culture and how it could be improved. They emphasized that the highly innovative environment within higher education institutions would encourage key aspects of inclusive innovation culture, such as openness, creativity or collaboration across different disciplines. As many events are offered in English and without limiting the number of students participating, an interdisciplinary and collaborative research environment can be fostered. Additionally, the strong focus on diversity enables universities to actively promote international partnerships. This creates a dynamic space for creative problem-solving that sustainably fosters inclusive innovation culture. These comments support the statistical analysis findings showing that universities have developed incentives for students to participate in courses from other disciplines, thereby strengthening both collaboration and interdisciplinarity. Regarding the question how Inclusive Innovation Culture (IIC) could be improved, students noted that they wish to include more diversity

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among teaching staff at universities. Lectures and curricula could integrate more diverse teaching methods aligned to different learning styles. Further suggestions include incorporation of more collaborative projects bringing together students from different disciplines and integrating real-world challenges and global issues. These notes show that no clear picture in Germany and Austria appear, rather that questions of Inclusive Innovation Culture (IIC) cannot be quantified but depend on subjective views of the respondents. While already a trend of Inclusive Innovation Culture at higher education institutions is already visible in Germany and Austria, a clearer reflection of specific aspects of the concept needs to be pursued.

Group B: EU Widening Countries

Based on the additional comments, respondents provided through the survey, there is clear support for the idea of inclusiveness regarding innovative scientific approaches and methods. For instance, respondents emphasized that the university would offer space for ideas, new methods or brainstorming. In addition, inclusiveness can also be seen in the number of students from foreign countries. These international students would bring in new perspectives for providing ideas and assistance. Furthermore, comments indicate that teachers and mentors are open-minded, helpful and well-intentioned.

Regarding the question how Inclusive Innovation Culture (IIC) could be improved, the comments highlighted that students wish more support from teachers on how to develop new ideas and that mixed teams in courses could generally enhance the innovation culture at universities. Best practices, aligned study materials or online lectures by young professors were further suggested as ways to enrich the inclusive work environment in higher education institutions.

Group C: EU Associated Countries

Respondents in EU Associated Countries highlighted the presence of collaborative environment at their universities that brings together not only university staff, such as professors with students, but also external industrial partners. Furthermore, several opportunities exist, through

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which students' needs could be actively promoted, such as student organizations, internship programs or student events. In particular, the many events dedicated to students create a learning environment in which all students and researchers feel valued and encouraged to provide innovation ideas. Respondents further emphasized a strong commitment to teamwork and interdisciplinary collaboration, such as for example exchanges between students and both academic and administrative staff. These collaborative exchanges are further substantiated through programs/courses in intercultural and business communication. Regarding the question of how Inclusive Innovation Culture could be improved, respondents claimed that more diverse team staff should be employed encouraging participation and using innovative teaching methods. Besides the need to expand the number of active participants, respondents also put in question political aspects, such as the traditional partnership with the Russian Federation that would be much more common at higher education institutions than partnerships with European countries. Overall, respondents called for more workshops, mentoring programs and channels for involvement of students in innovative projects, where they can gain practical experience.

Final Synthesis

Across all three regions, students acknowledge important principles of inclusive innovation culture (IIC), such as creativity, collaboration or diversity. However, IIC practices might not be institutionalized in higher education institutions (HEIs) which means that academic leaders need to understand the potential IIC practices offer and that it can overall improve the performance of a university to a significant extent. While high level strategies might already be promoted at HEIs, they still are not fully diffused and penetrated in the administrative apparatus. A further key finding highlights that although several partnerships between universities and external partners have been established, students need to be more actively involved and engaged in such collaborations. This means that higher education institutions must start with translating visions and support in clear institutionalized practices.

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Interviews

Demographics and Sample Overview

This analysis draws on 19 interview records from 10 institutions across 7 countries, representing three country groups: Established (Germany, Austria), EU Widening (Bulgaria, Hungary, Croatia), and Associated (Bosnia & Herzegovina, North Macedonia, Serbia). With one to two respondents per institution, findings are indicative rather than representative.

Role Category	*Count*	*Share*
Leaders (Professors, Senior Researchers, Vice-Deans, PI, Works Council)	9	47%
Researchers (PhD Students, Junior Researchers, Research Assistants, Postdocs)	10	53%

Table A 20: Role Category

The near-equal split between leaders and researchers provides a valuable dual perspective, enabling systematic comparison between institutional decision-makers and those experiencing IIC in daily practice. This is particularly important given that the survey identified a gap between institutional strategy (as articulated by leaders) and lived culture (as experienced by researchers).

A structural observation: **the role from which one experiences an institution fundamentally shapes what one sees.** Leaders tend to describe institutions as more open, functional, and strategically aligned than researchers experience them to be. This leader-researcher perception gap is not primarily a matter of dishonesty but of positional visibility: leaders have limited access to the private dynamics of supervisory relationships and daily working conditions and may be subject to social desirability effects. Researchers — particularly early-career researchers — experience IIC from a position of structural vulnerability that makes its failures more visible and more

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consequential. Both perspectives are necessary; neither alone is sufficient.

These limitations do not invalidate the findings but should be considered when drawing conclusions and designing follow-up interventions. They also reinforce the value of triangulating interview findings with workshop data and other evidence gathered within the BEAMING project.

Thematic Analysis

Commitment to IIC — Strategy vs. Lived Practice

The Central Finding

Across all institutions and country groups, a gap exists between formal strategic commitment to IIC and its embedding in daily practice. This gap is universal but varies systematically in nature, depth, and root causes. Critically, **the gap is perceived and experienced differently depending on one's position in the institutional hierarchy** — a finding that runs through every thematic dimension of this analysis.

IIC is not uniformly understood across the sample. Established institutions engage with it as a known framework; in several Associated institutions it was not a known concept prior to BEAMING; Widening institutions occupy an intermediate position. Systematic implementation requires prior collective definition — a precondition that cannot be assumed.

Established Institutions

Established institutions have the most developed formal IIC frameworks: interdisciplinary project teams, formal D&I mechanisms, internal research funds for exploratory work, and performance incentives. However, significant implementation gaps persist.

From a leadership perspective, formal structures are described as functioning and the institutional commitment to IIC is genuine. Leaders in this group acknowledge specific gaps — such as mandatory

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debriefing processes that exist on paper but are inconsistently applied — but frame these as operational rather than structural failures.

From an early-career researcher perspective, the picture is more constrained. IIC is not yet experienced as a coherent organisation-wide framework. The dominant structural constraint — **third-party funding dominance** — is felt most acutely by those whose work is entirely project-bound: project timelines and deliverables leave little room for exploratory thinking, and the pressure to deliver within project parameters is experienced as a daily reality rather than a strategic choice. Junior researchers note that creativity is encouraged in principle but that no time, mentoring, or institutional recognition accompanies that encouragement.

A notable internal heterogeneity exists between the two Established institutions: one demonstrates stronger structural IIC embedding at the research level; the other shows stronger embedding at the educational level but describes innovative research at institute level as rare. Both converge on the finding that encouragement without structural support is the characteristic pattern — people are pushed to try new things but "left alone with their new way of work."

EU Widening Institutions

The Widening group is the most internally heterogeneous, spanning institutions with relatively strong strategic alignment through to those where IIC was not a known concept before BEAMING.

From a leadership perspective, strategic commitment to IIC is generally present and articulated with reference to EU frameworks, Horizon Europe participation, and national research priorities. Leaders tend to describe a broadly positive strategic environment and identify the primary barriers as resource constraints and evaluation system misalignment — structural problems external to their own practice.

From an early-career researcher perspective, the daily reality is considerably more constrained. The quality of the IIC experience depends heavily on which research group and supervisor one belongs

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to — a form of structural lottery that leaders' accounts do not fully capture. Junior researchers describe limited awareness of formal IIC practices, limited access to decision-making, and a sense that innovation culture is something that happens around motivated individuals rather than as an institutional condition they can rely on.

A generational dynamic is visible: younger researchers are more open to interdisciplinary collaboration, while senior staff remain primarily discipline-oriented. This creates a structural barrier for early-career researchers seeking to build interdisciplinary identities — they must navigate an environment shaped by the preferences of the senior generation while lacking the institutional standing to change it.

One important diagnostic observation from within this group: the primary barrier to IIC may not always be structural constraint but **cultural passivity** — individuals recognise the need for change but wait for management to provide solutions. This is a leader's framing, and it is not wrong, but it requires qualification: hesitation to take initiative is often rational in hierarchical environments where doing so carries real professional risks. Both the structural and the cultural dimensions need to be addressed simultaneously.

Associated Institutions

Associated institutions face the most acute combination of structural barriers, resource constraints, and cultural challenges. The characteristic gap is between individual motivation and structural enablement.

From a leadership perspective, external collaboration achievements, strategic alignment with EU priorities, and genuine openness at the personal level are emphasised. Several leaders describe themselves as personally committed to IIC and to protecting junior researchers — and in some cases this personal commitment is real and consequential. However, leaders in this group also tend to have limited visibility into what actually happens in supervisory relationships below them, and their accounts systematically understate the barriers experienced by those in more vulnerable positions.

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From an early-career researcher perspective, the picture is considerably more difficult. Multi-layered governance systems deter initiative not through formal prohibition but through the sheer complexity and time cost of approval processes — individuals "are horrified by these procedures and often give up." Conformity culture has become normalised: "many individuals are happy to live in the zone of conformity." The absence of dedicated research support offices means that junior researchers who want to drive change lack the scaffolding to do so. In at least one institution, political influence on governance is referenced as affecting career and recruitment decisions — a systemic integrity risk that formal IIC commitments cannot address.

The most advanced institution in this group demonstrates that strong external collaboration is achievable within these constraints. However, even here, access to innovation opportunities depends on "being connected to active mentors, project teams, or supportive senior staff" — a form of informal gatekeeping that systematically disadvantages researchers without established networks, reproducing existing hierarchies under the guise of meritocracy.

Leadership and Capacity Development

The Leadership Competency Gap

A consistent pattern across all groups is that leaders are academically strong but lack formal training in the competencies required to foster IIC. The nature of this gap differs by group and — importantly — is perceived differently by leaders and researchers.

In Established institutions, leaders identify the gap in terms of specific operationalisation skills: communication, mentoring, coaching on IIC, and practical application of Responsible Research and Innovation (RRI). Researchers add a more structural diagnosis: the problem is not only skill but incentive — leaders lack the time and institutional support to apply new competencies even when they acquire them. A methodologically important observation from this group: conventional training formats are described as ineffective when decoupled from

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everyday situations where behaviour should change. Learning-by-doing with structured reflection is proposed as more effective — a finding that should inform intervention design across all groups.

In Widening institutions, the gap is more fundamental. In some cases, the primary requirement is basic leadership commitment to inclusivity — not a specific skill but an orientation currently absent at institutional level. The ability to translate strategic innovation goals into practical everyday practice is identified as the most critical missing competency. A candid observation from one leader in this group — that she cannot identify her own missing competencies "probably because I am part of the management" — points to the value of external advisory support and peer learning. Researchers in this group experience the leadership gap most directly through the absence of structured mentoring, conflict management, and supervisory support.

In Associated institutions, the gap is most acute. The most critical need identified is **transformational leadership** — specifically, leaders who actively protect junior researchers when they challenge established approaches. This framing of protection as a leadership competency is significant: it acknowledges that psychological safety for junior researchers is not a cultural given but an active leadership responsibility. Senior leaders in this group observe that leadership development must address not only individual skills but the broader conformity culture in which leadership operates — a more complex and longer-term challenge than skill-building alone. From a junior researcher perspective, the absence of this protective leadership function is experienced directly: the consequences of challenging established approaches can include academic penalties and career damage.

Training Need	***Prevalence***	***Groups***
Interdisciplinary research methods and management	Very High	All
Communication skills and constructive feedback	Very High	All
Mentoring and supervision skills	High	All

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Training Need	*Prevalence*	*Groups*
Leadership for cultural change / inclusive leadership	High	All
Conflict management and mediation	Moderate–High	All
Creativity techniques and innovation thinking	Moderate	All
RRI — Responsible Research and Innovation	High	Widening, Associated
Project management and proposal writing	High	Widening, Associated
Industry collaboration and technology transfer	High	Widening, Associated
IP management and negotiation	High	Widening, Associated
Open Science and data management	Moderate–High	Widening, Associated
Change management	Moderate	Widening, Associated

Table A 21: Consolidated Training Needs

A critical design principle: **Training must be accompanied by incentives and reduced administrative burdens to produce lasting behavioural change.** Training without structural support generates short-term awareness but not sustained practice change — a finding consistently emphasised by experienced senior researchers across groups.

Psychological Safety and Autonomy

Conflict Resolution

Conflict resolution patterns reveal the gap between stated values and actual behaviour under pressure. The dominant pattern across all institutions is **conflict avoidance** rather than substantive resolution. Formal mechanisms exist but are used inconsistently; "diplomatic" resolution is sometimes explicitly interpreted as postponement rather

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than resolution, creating the illusion of a functional environment while leaving tensions intact.

Senior and leadership perspectives tend to describe conflict resolution as manageable and largely functional, with formal escalation routes available when needed. **The most developed infrastructure** — including a formal institutional safeguard body **— is found in the Established group**, and even here persistent unresolved conflicts are acknowledged, with staff departure as a documented consequence.

Junior researcher perspectives reveal a different reality. Students and early-career researchers rarely approach supervisors directly with problems. The absence of formal training in communication, mentoring, and conflict management among academic staff — **noted across Widening and Associated institutions** — has direct consequences for supervisory relationship quality. Junior researchers in these environments must navigate conflicts without institutional support structures, relying entirely on their own resources or on the goodwill of individual supervisors.

Across Associated institutions, conflict resolution is largely informal and case-specific. The dependence on personal communication and individual willingness to compromise means that quality is highly variable and unpredictable — and that those with less institutional standing are systematically disadvantaged in any conflict with those above them.

Psychological Safety — The PhD Researcher Scenario

The scenario exploring how a PhD researcher proposing an innovative method that contradicts their supervisor's established approach would be received produces the most diagnostically powerful findings regarding psychological safety. Responses reveal a **systematic gradient across country groups that maps directly onto structural vulnerability**.

In Established institutions, constraints are primarily structural rather than interpersonal. Autonomy exists in thesis work but not in project

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work with tight schedules. Senior researchers provide structurally honest frameworks that acknowledge these limits. However, from a junior researcher perspective, successfully challenging established approaches requires "leverage, reputation, and confidence" — resources that PhD students by definition lack. The constraint is the inherent power asymmetry of the supervisory relationship, which formal openness does not dissolve.

In Widening institutions, outcomes are variable and **supervisor-dependent**. Both leaders and senior researchers in this group tend to express strong personal support for innovative ideas. Junior researchers, however, consistently describe outcomes as dependent on the team and supervisor — confirming that personal openness at the leadership level does not translate into institutional safety for those below. This variability is itself a structural finding: the absence of systematic protections means that PhD experience quality is determined by individual supervisor personality rather than institutional culture.

In Associated institutions, accounts are most concerning, and the divergence between senior and junior perspectives is most pronounced. Senior researchers and leaders describe environments as relatively open and supportive — and in some cases this reflects genuine personal commitment. Junior researchers describe a different reality: direct acknowledgement that PhD candidates "may suffer consequences in terms of poor grades, delayed procedures, and career impact" confirms that formal protections do not translate into practical safety. The most serious finding in the entire sample — cases where **student ideas were later presented as the supervisor's own** — comes from a junior researcher's account at an Associated institution. The corresponding leader's account makes no reference to such dynamics, illustrating how profoundly different the institutional experience can be depending on one's position in the hierarchy, and how leaders can be genuinely unaware of what is happening in relationships below them.

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Critical structural finding: Psychological safety for early-career researchers is not systematically guaranteed in any institution in the sample and is universally supervisor-dependent. The gradient runs from structural project constraints (Established) through supervisor personality variability (Widening) to real career risks and documented intellectual appropriation (Associated). The absence of structural protections — independent progress reviews, accessible reporting mechanisms, co-supervision requirements — means that the most vulnerable researchers are also the most exposed to the most serious IIC failures. This is not primarily a cultural problem amenable to training; it is a **governance gap** requiring structural intervention.

Risk Tolerance and Learning from Failure

Evaluation Systems and Career Incentives

With only two exceptions across the entire sample, every respondent — regardless of group, institution, or role — identifies the researcher with conventional, predictable outputs as more likely to receive career advancement than the researcher who took risks, failed, and learned. This near-universal convergence is one of the strongest empirical findings of the analysis.

The senior and leadership perspective tends to frame this as a systemic problem external to the institution — national evaluation frameworks, European metrics culture, competitive funding structures. This framing is not wrong: several institutions are genuinely constrained by nationally defined career advancement criteria that leave little room for institutional differentiation. The signing of CoARA by one Widening institution is the most concrete reform signal in the sample.

The junior researcher perspective experiences this misalignment as a direct personal constraint. Early-career researchers face the sharpest trade-off: career insecurity makes investment in uncertain approaches individually costly, and the absence of institutional protection for risk-taking means that failure has real career consequences. The rational response — pursuing conventional outputs — is not a failure of ambition

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but an adaptation to the incentive environment. **Without evaluation reform, all other IIC interventions risk being undermined**, because researchers will rationally continue to pursue what is rewarded regardless of how many platforms or programmes are established.

Exploratory Research

All institutions report strategic encouragement of exploratory research. Structural support is rare. The only genuine internal funding mechanism for risk-taking in the entire sample exists at one Established institution. All other institutions rely on **external competitive funding** as the primary vehicle for innovation — a mechanism that by design favours lower-risk, more predictable research designs. This creates a structural paradox: institutions most committed to innovation are using funding mechanisms that systematically reward risk aversion.

This paradox is experienced differently across roles. Senior researchers and leaders describe it as a systemic constraint they navigate strategically. Junior researchers experience it as a closed door: without internal funding mechanisms, exploratory ideas that do not fit existing project frameworks have no institutional home, and the individual cost of pursuing them — in time, career capital, and supervisory goodwill — is borne entirely by the researcher.

Collaboration and Interdisciplinarity

External Stakeholder Collaboration

External collaboration is present across all institutions but is predominantly project-based, individually driven, and insufficiently institutionalised. The strongest models are found in the Established group and in the most advanced Associated institution. A critical knowledge gap — insufficient experience in IP management, contract negotiation, and commercialisation — is identified primarily in Widening institutions but has broader relevance. Junior researchers and early-career staff are particularly exposed to this gap: they may enter industry collaborations without the knowledge or institutional support to

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negotiate equitable terms, sometimes providing services free of charge to establish relationships.

When asked whether the primary barrier to stakeholder integration is external or internal, the majority of respondents identify **internal factors** as primary — academic KPI systems, incentive structures favouring publications, administrative rigidity. This shifts responsibility for change to the institutions themselves.

Interdisciplinary Collaboration and Departmental Silos

Departmental silos are confirmed across all institutions, with varying severity. Root causes consolidate into five categories:

1. **Structural:** Faculty/department-based funding, disciplinary funding streams
2. **Administrative:** Multiple decision-making bodies, rules penalising joint applications
3. **Incentive-based:** Promotion criteria rewarding disciplinary excellence
4. **Cultural:** Historical academic traditions, disciplinary identity, resource competition
5. **Relational:** Insufficient mutual knowledge and trust across disciplinary boundaries

The role dimension is particularly visible here. **Senior researchers and leaders** tend to describe interdisciplinary collaboration as growing and generally positive, pointing to specific programmes and projects as evidence. **Junior researchers** experience silos more directly: they are building their identities and careers in an environment where disciplinary boundaries determine funding, promotion, and recognition, and where interdisciplinary work carries reputational risk if it is not valued by evaluation committees.

A particularly perverse administrative rule documented in one Associated institution — where joint project applications consume each partner's individual project quota — illustrates how administrative structures can actively undermine interdisciplinarity while institutions

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simultaneously claim to prioritise it. Early-career researchers are most affected by such rules because they have fewer projects to "spend" and less institutional standing to challenge the rules.

An important corrective observation from an Established institution: more interdisciplinary platforms do not automatically produce better interdisciplinarity. The constraint may not be the absence of platforms but the **lack of time and incentive to participate in them** — a finding that applies across all groups and is particularly relevant for junior researchers facing heavy workloads.

Diversity, Inclusion and Belonging

Current State

D&I is formally acknowledged across all institutions, but implementation depth varies significantly. The most comprehensive formal framework is in the Established group. Even here, structural support is necessary but not sufficient: international staff report difficulties integrating despite formal welcome mechanisms, suggesting that cultural inclusion requires ongoing attention beyond formal procedures.

In the Widening group, the picture is heterogeneous. at least one institution has minimal D&I investment, reflecting broader IIC underprioritisation at leadership level. Others have formal policies but limited lived practice. **Junior researchers in this group are less likely to be aware of D&I policies and more likely to experience inclusion as dependent on the informal norms of their immediate research group** — a pattern consistent with the broader finding of supervisor and team dependency.

In the Associated group, formal commitments exist but implementation is uneven. Political influences on governance in at least one institution raise fundamental questions about the substantive integrity of formal merit-based processes — a concern that affects junior researchers and women disproportionately, as they are most dependent on transparent and fair recruitment and career advancement procedures.

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The Cognitive Diversity Gap

A cross-cutting finding is the **limited understanding of diversity beyond demographic categories**. Across virtually all institutions, diversity is primarily conceptualised in terms of gender, nationality, and disability. For bioeconomy research — requiring integration of natural scientific, social scientific, economic, and technological perspectives — this is a significant gap.

This gap has a role dimension: **senior researchers and leaders** are more likely to frame D&I in terms of formal demographic targets and compliance. **Junior researchers**, particularly those from interdisciplinary or non-traditional backgrounds, are more likely to experience the limits of this framing — finding that their methodological approaches or knowledge types are not valued within the informal norms of their research environment, even where demographic diversity formally exists. Addressing this gap requires not only demographic diversity policies but active efforts to value diverse epistemological approaches and forms of knowledge.

Creativity, Critical Thinking, and Meeting/Discussion Culture

Support for Creativity

Support for creativity and critical thinking follows the same gradient as other IIC dimensions. In Established institutions, creative thinking is more genuinely embedded — particularly at the educational level — but daily project work constrains practice at the research level. In Widening institutions, isolated initiatives exist but no systematic programmes. In Associated institutions, creativity support is largely spontaneous and unstructured.

The role dimension is consistent across all groups: **Leaders and senior researchers describe creativity as valued and encouraged**; **junior researchers describe it as permitted but unsupported** — no time, no resources, no mentoring, no institutional recognition. The pattern of encouragement without support is one of the most consistent findings

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of the analysis. It reflects a fundamental misunderstanding of what supporting creativity requires: not just permission, but the structural conditions for creative work to be sustained and recognised.

Meeting/Discussion Culture

Meeting culture serves as a practical indicator of lived psychological safety. A clear gradient is evident:

- **Established:** Discussions are described as active, critical, and constructive, with relatively flat hierarchies. Crucially, this account is **consistent across both leaders and researchers** — a rare convergence suggesting genuine rather than merely claimed openness.
- **Widening:** More variable. Leaders describe their own teams as open and collaborative; researchers confirm this in some cases but describe hierarchical dynamics in others. At least one institution illustrates directly how hierarchical position shapes discussion outcomes: ideas carry more weight depending on who proposes them, regardless of formal meeting openness.
- **Associated:** Most hierarchically influenced. Leaders describe meetings as open; junior researchers describe top-down communication and a culture where challenging or contradicting is avoided. This is the most pronounced manifestation of the leader-researcher perception gap in the dataset — and it matters because meeting culture is where psychological safety is either built or eroded in daily practice.

Cross-Cutting Findings

The Leader-Researcher Perception Gap

The systematic discrepancy between leader and researcher accounts of the same institutional environments is the most consistent methodological and substantive finding of this analysis. It is most pronounced in Associated institutions but visible across all groups. Its implication is clear: **institutional self-assessments by leaders alone are insufficient for diagnosing IIC gaps.** The most serious IIC failures —

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intellectual appropriation, career retaliation, informal gatekeeping — are often invisible from the top of the hierarchy and only visible from positions of structural vulnerability.

Supervisor Dependency as a Structural Problem

Across all groups, the IIC experience of early-career researchers is overwhelmingly determined by the individual supervisor rather than by institutional structures, policies, or culture. This creates:

- **Inequality of experience** within institutions, based solely on supervisor assignment
- **Fragility** of research environment quality, dependent on individual personalities
- **Invisibility** of problems occurring in private supervisory relationships
- **Compounding disadvantage** for researchers without access to open-minded supervisors

This is not primarily a cultural problem amenable to attitude change. It is a **governance gap**: the absence of structural protections — independent progress reviews, co-supervision requirements, accessible reporting mechanisms — means that early-career researchers have no recourse when supervisory relationships fail. The most extreme consequence documented — intellectual appropriation — is a research integrity failure requiring specific institutional and potentially regulatory attention.

Administrative Burden

Administrative burden is the single most universally shared constraint. It manifests differently by group — from rigid procedural barriers (Established) through weak research support offices (Widening) to multi-layered governance deterring initiative (Associated) — but its effect is consistent: it consumes researcher time, deters initiative, and privileges the status quo. Junior researchers and those without established institutional standing are most affected, as they lack the experience and networks to navigate complex procedures efficiently.

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Evaluation Misalignment

The near-universal finding that conventional research outputs are rewarded over innovative risk-taking is the deepest structural barrier to IIC. This misalignment operates at individual, institutional, national, and European levels simultaneously. Junior researchers face this constraint most acutely: career insecurity makes the cost of risk-taking highest precisely at the stage when innovative capacity is most developmentally important.

The Bioeconomy Dimension

Bioeconomy is a strategic priority across all institutions, but its operational embedding as a genuinely interdisciplinary, transdisciplinary, and societally engaged framework is significantly underdeveloped. It tends to function as a thematic label applied to existing research rather than as a transformative framework. The role dimension is relevant here: **leaders frame bioeconomy as a strategic priority**; **junior researchers experience it as a project category** within which they work, often without the interdisciplinary or societal engagement dimensions that the framework implies.

Table A 22 summarises IIC gaps identified at BEAMING partners' institutions across three regions.

IIC Pillar	***Established***	***EU Widening***	***Associated***
Openness & Collaboration	Strong at HEI level; constrained at institute level	Moderate; individually driven	Moderate; project-based; significant structural constraints
Psychological Safety	Moderate; supervisor-dependent; project pressure	Moderate; supervisor-dependent; no formal safety nets	Weak–Moderate; real career risks; intellectual appropriation documented
Freedom of Thought / Risk Tolerance	Moderate; formally encouraged; funding constrains practice	Moderate; evaluation and resource constraints limit practice	Weak–Moderate; funding scarcity drives risk aversion

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IIC Pillar	Established	EU Widening	Associated
Learning from Failure	Partially present; mechanisms exist but inconsistently applied	Not embedded; no formal recognition	Not embedded; failure sometimes penalised
Diversity & Inclusion	Strong formal framework; integration challenges persist	Moderate; formal policies; limited lived practice	Moderate; formal commitments; uneven implementation
Inter-/Trans-disciplinarity	Good; some silo dynamics within projects	Moderate; growing project-based collaboration	Moderate–Weak; significant silos; administrative obstacles
Industry/ Stakeholder Collaboration	Very Strong–Moderate	Strong–Moderate	Moderate; limited institutionalisation
Creativity & Critical Thinking	Embedded educationally; project-constrained in research	Limited systematic support	Largely spontaneous; no systematic programmes
Evaluation & Incentive Alignment	Partially misaligned; some reform awareness	Misaligned; traditional metrics dominant	Strongly misaligned; national frameworks limit agency
Leadership for IIC	Partially developed	Underdeveloped; variable commitment	Significantly underdeveloped
Administrative Efficiency	Moderate constraints	Significant constraints; support offices weak	Severe constraints; bureaucratic deterrence

Table A 22: Consolidated Gap Analysis

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Table A 23 summarises key root causes for IIC gaps identified at BEAMING partners' institutions across three regions.

Root Cause	*Most Affected*
Evaluation systems reward conventional outputs	All; most acute for junior researchers
Administrative burden and bureaucratic deterrence	All; most severe in EU Associated Countries
Supervisor-dependent psychological safety	All; most severe in EU Associated Countries
Third-party funding dominance	All; most severe in EU Widening and Associated Countries
Absence of systematic IIC leadership training	EU Widening and Associated Countries
Lack of formal learning-from-failure mechanisms	All; most severe in EU Widening and Associated Countries
Disciplinary silos reinforced by funding structures	All; most severe in EU Widening and Associated Countries
Absence of dedicated research support	EU Widening and Associated Countries
IP management and tech transfer knowledge gap	EU Widening and Associated Countries
Limited cognitive/disciplinary diversity	All
Individual initiative dependency	EU Widening and Associated Countries
Political influences on academic governance	EU Associated Countries
Conformity culture / learned helplessness	EU Associated Countries
IIC not yet a defined concept	EU Widening and Associated Countries
Informal gatekeeping of innovation opportunities	All; most severe in EU Widening and Associated Countries

Table A 23: Consolidated Gap Analysis

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