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Assessment of the degree of conformity of partner regions to the ideal type ERA_FABRIC conformity assessment approach

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ERA FABRIC

Project ERA_FABRIC

Framing And Bridging Regional research
and Innovation ecosystems Capacities for a renewed ERA

at Glance

What is ERA FABRIC

The ERA FABRIC project is to implement a new ERA Hubs concept across different geographies and structures in Europe, based on common compliance criteria.

The process acts as an incentive for advanced ecosystems to seek recognition, and for less advanced ecosystems to reach the criteria facilitating support from European, national and regional level.

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The European Research Area (ERA)

The European Research Area (ERA) is the ambition to create a single, borderless market for research, innovation and technology across the EU.

It helps countries be more effective together, by strongly aligning their research policies and programmes. The free circulation of researchers and knowledge enables:

- better cross-border cooperation
- building of critical mass
- continent-wide competition

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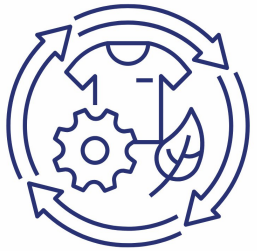
ERA Hubs as...

Knowledge Ecosystems

Multi Stakeholder Platforms

Policy Co Creation Toolbox

Sustainable manufacturing



Biobased circular economy

Clean renewable energy

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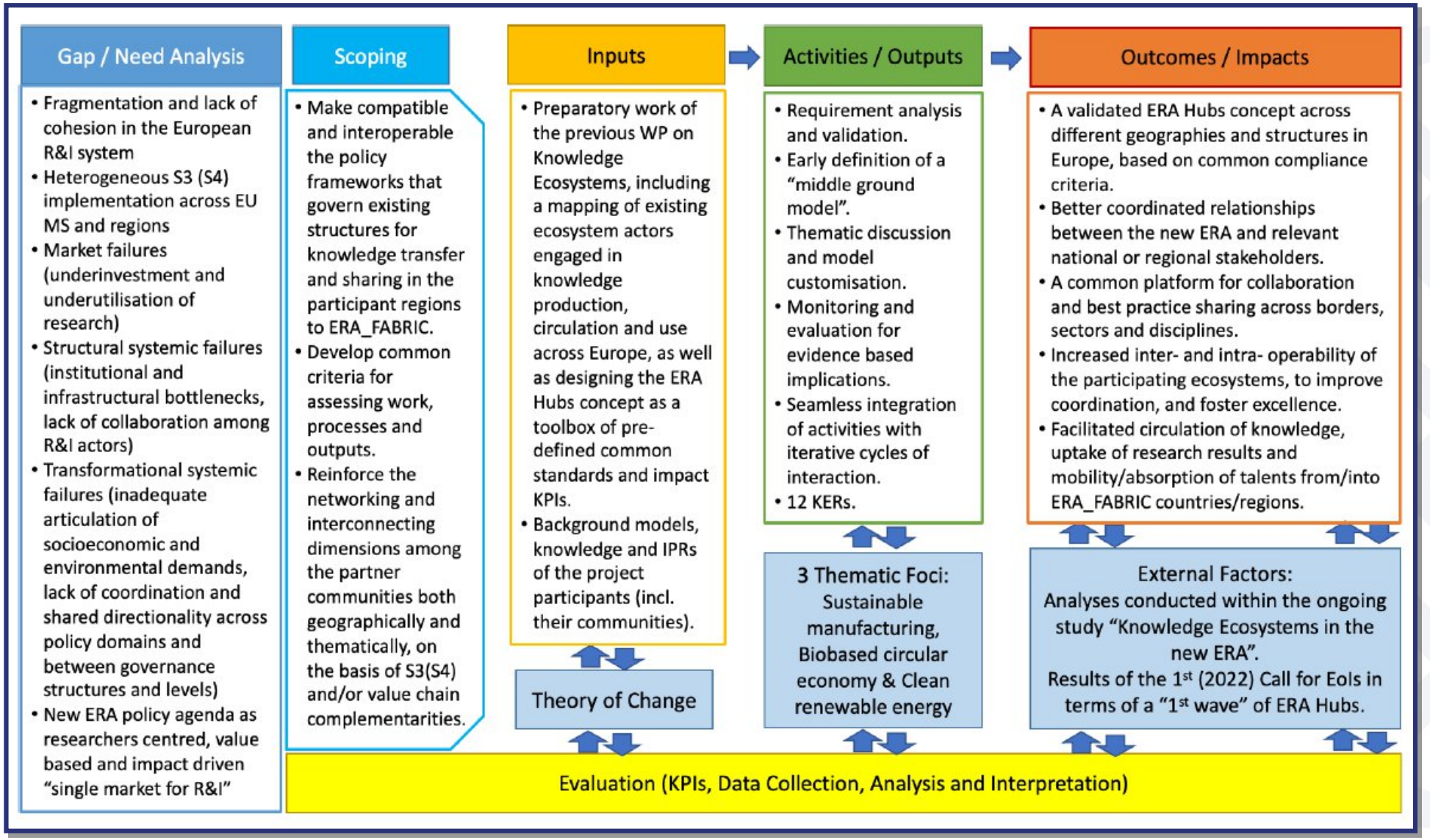
Detailed logic



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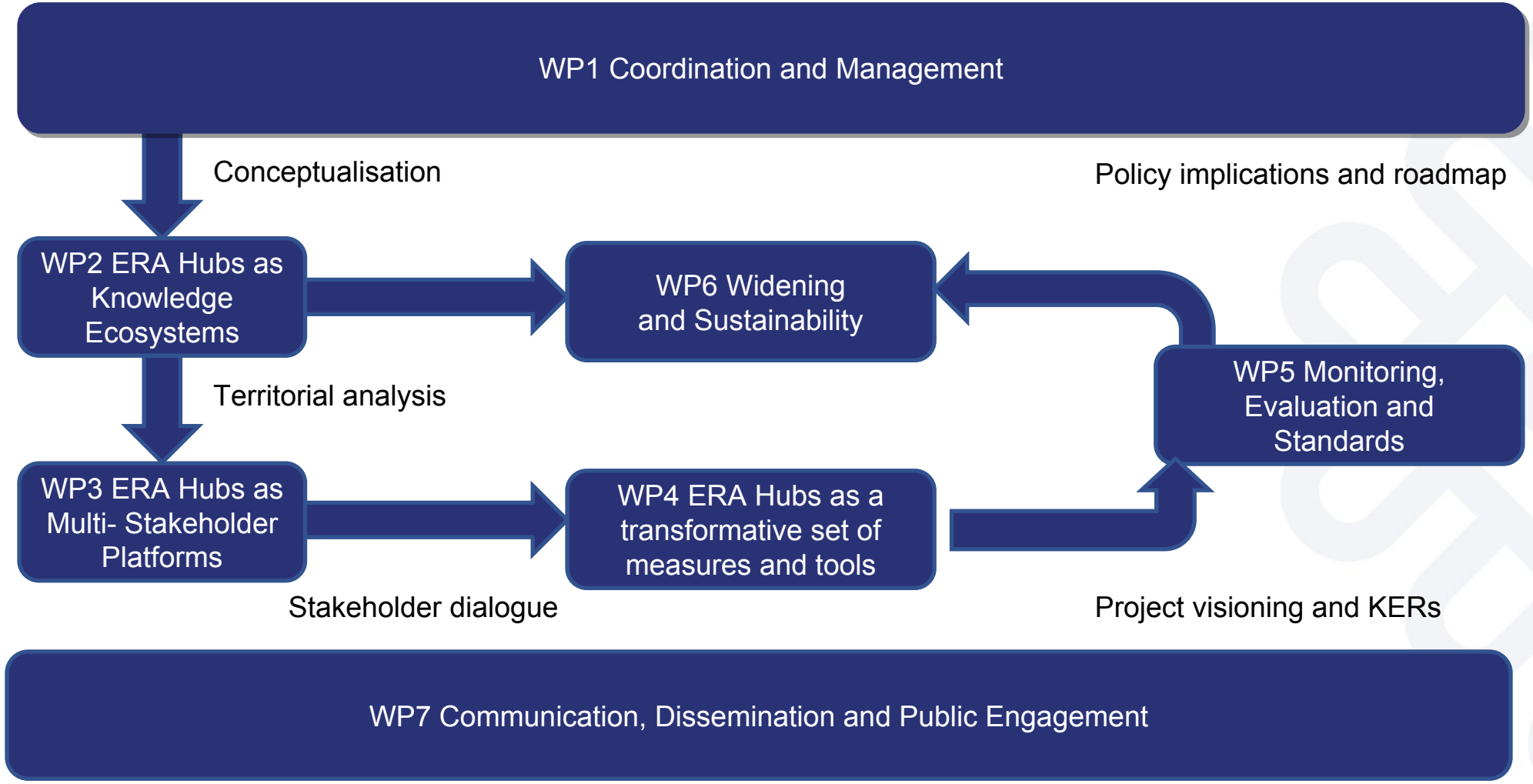
Workpackages



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Impacts

Policy
Coordinated national and regional R&I programmes by pooling national resources and contributing to the alignment of national research and innovation policies.

Socioeconomic
Increased number of interconnected knowledge ecosystems, strong in knowledge creation, circulation and use.

Economic/technological
Greater quality of the scientific production and stronger translation of R&I results into sustainable growth and jobs.

Societal
Increased trust in science and R&I outcomes, and greater two-way communication between science and society, education and business.

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Consortium

FABRIC is designed by leading European actors in the domain of regional development, coordinated by ART-ER. The 11 partners represent 8 Member States and 1 Associated State.

ART-ER ATTRACTIVENESS RESEARCH TERRITORY

eurecat

eco plus The Business Agency of Lower Austria

INESC BRUSSELS HUB

Issirfa

TRONDHEIM TECH PORT

NTNU Norwegian University of Science and Technology

University of Split

MUNI

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Warsaw University of Technology

In Synergy with COOPERATE

COOPERATE eu project

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About

A vibrant ecosystem is an essential condition for growth, and with COOPERATE the aim is to pilot the European Research Area (ERA)-Hub concept with a limited number of ecosystems and help provide a toolkit of best practices and activities that ensure a strong basis for a potential scale-up in different geographies across the EU territory in the next phase. COOPERATE will define the ERA Hubs concept through co-creation arenas gathering quadruple helix actors from diverse ecosystems and develop a platform to foster collaboration and knowledge exchange across regions, sectors and disciplines. The pilot phase will test the approach in three ecosystems across Europe to refine and consolidate the framework.

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Assessment of the degree of conformity of partner regions to the ideal type

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Task

Based on the analysis of survey results, the conclusions from Task 2.1 and the selected R&I ecosystems within Task 2.2 it will be possible to compare the current performance of partner regions and countries to the “ideal type” of ERA Hub emerging as a reference model.

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First (simple) approach

The model structure as a one-level list of parameters (survey questions) and some selected statistics as measures of model parameter evaluation.

Advantage: simple and clear interpretation of model results.

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Survey Questions

1.1. There is high alignment of research priorities and industry needs.
1.2. There are joint strategies between private and public actors towards shared goals.
1.3. There is some R&I infrastructure available in my region.
1.4. There are clear and transparent modalities to access the available R&I infrastructure.
1.5. Innovation service needs are identified via interactive and inclusive governance processes.
1.6a. There are professional service providers operating close to UNIVERSITIES (e.g., TTOs, IPR experts, incubators, accelerators, etc).
1.6b. There are professional service providers operating close to COMPANIES (e.g., R&I consulting firms, IPR experts, clusters, incubators, accelerators, etc).
1.7. There should be more demand for innovation support services.
2.1. There is awareness among local policymakers of the importance and benefits of research and innovation.
2.2. The public policies carried out locally are consistent with the needs of private actors.
2.10. The local governance processes are balanced, transparent, open, and evidence-based.
2.11. Good governance models to manage shared resources are put in place.
2.12. The processes of local governance involve active engagement of civil society.
2.13. There is a common focus on environmental sustainability of innovation processes.
2.14. There are none or only minor regulatory hurdles (to e.g., researcher public-private mobility, or research commercialization).
2.3a. Major steps forward are achieved by individual champions.
2.3b. Major steps forward are achieved by inclusive and forward-looking governance.
2.5. There are sufficient incentives and/or resources allocated to retain talent and young researchers.
2.6. There are sufficient incentives targeting collaboration between industry and academia actors.
2.8. There are good levels of trust and exchange among key stakeholders.
2.9. There is a balance of power across key stakeholder groups.
2.4a. There is long-term policy support and availability of REGIONAL funding for innovation.
2.4b. There is long-term policy support and availability of NATIONAL funding for innovation.
2.4c. There is long-term policy support and availability of EU funding for innovation.
2.7. The different financial resources (private fees, public direct funding, public funding to competitive projects etc.) are well balanced.
3.1a. There is an affirmed collaboration culture within your region.
3.1b. There is an affirmed collaboration culture between public and private actors in your region.
3.1c. There is an affirmed collaboration culture between your and other European regions.
3.3. There is a strong collaboration culture between local universities, research organisations, local key industries, large companies, and local SME clusters.
3.2. The regional authority supports collaboration with partners from other European regions (financial or non-financial support).
3.4. There is extensive experience in science-industry collaboration, including shared objectives and common strategies for economic and industrial development.
3.5. There is close collaboration between private investors and entrepreneurs.
3.10. Leading local companies participate in one or more of the following: clustering, corporate venturing, shared resources, and targeted industry need initiatives (e.g., hackathons).
3.6. There should be more commercialisation of local research results.
3.7. Research and project results are effectively and sufficiently communicated to the local community and relevant stakeholders.
3.8. There is good availability of skilled staff.
3.9. There is good knowledge transfer based on collaborations.

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Hypothesis (Task2.2) elements matched with survey items (Task2.3)

CONCLUSIONS FROM PREVIOUS ERA_FABRIC STUDIES	SURVEY QUESTIONS		
	Section 1	Section 2	Section 3
(1) A territorial vocation	1.3	2.4a	3.1a,b 3.2
(2) A multi-level governance process	1.5	2.3b, 2.10, 2.11, 2.12, 2.14	-
(3) Explicit systemic interactions among the actors	1.1, 1.4, 1.6a,b	2.2, 2.6, 2.8, 2.9	3.1a,b,c, 3.2, 3.3, 3.4, 3.7, 3.8
(4) Strong dynamic towards innovation processes	1.5, 1.7	2.1 2.3a,b, 2.5	3.9
(5) Specific and differentiated roles of the actors involved	1.1, 1.2, 1.6a,b	2.1, 2.5, 2.6, 2.7, 2.8, 2.9, 2.12	3.1b, 3.2, 3.3, 3.4, 3.5, 3.10
(6) Balanced equilibrium between private and public actors, private and public aims, and private and public financial sources	1.2	2.2, 2.7, 2.8, 2.9, 2.10, 2.11	-
(7) Common focus (although variable in intensity) on the environmental sustainability of the innovation process	-	2.13	-
(8) An intense mobilisation of the public and private stakeholders around shared objectives and common strategies for economic and industrial development	1.1, 1.2	2.2	3.1b, 3.4, 3.6, 3.10
(9) A clear horizontal integration through widespread connections towards other knowledge ecosystems, independently of regional or national borders	-	2.4b,c	3.1c, 3.2

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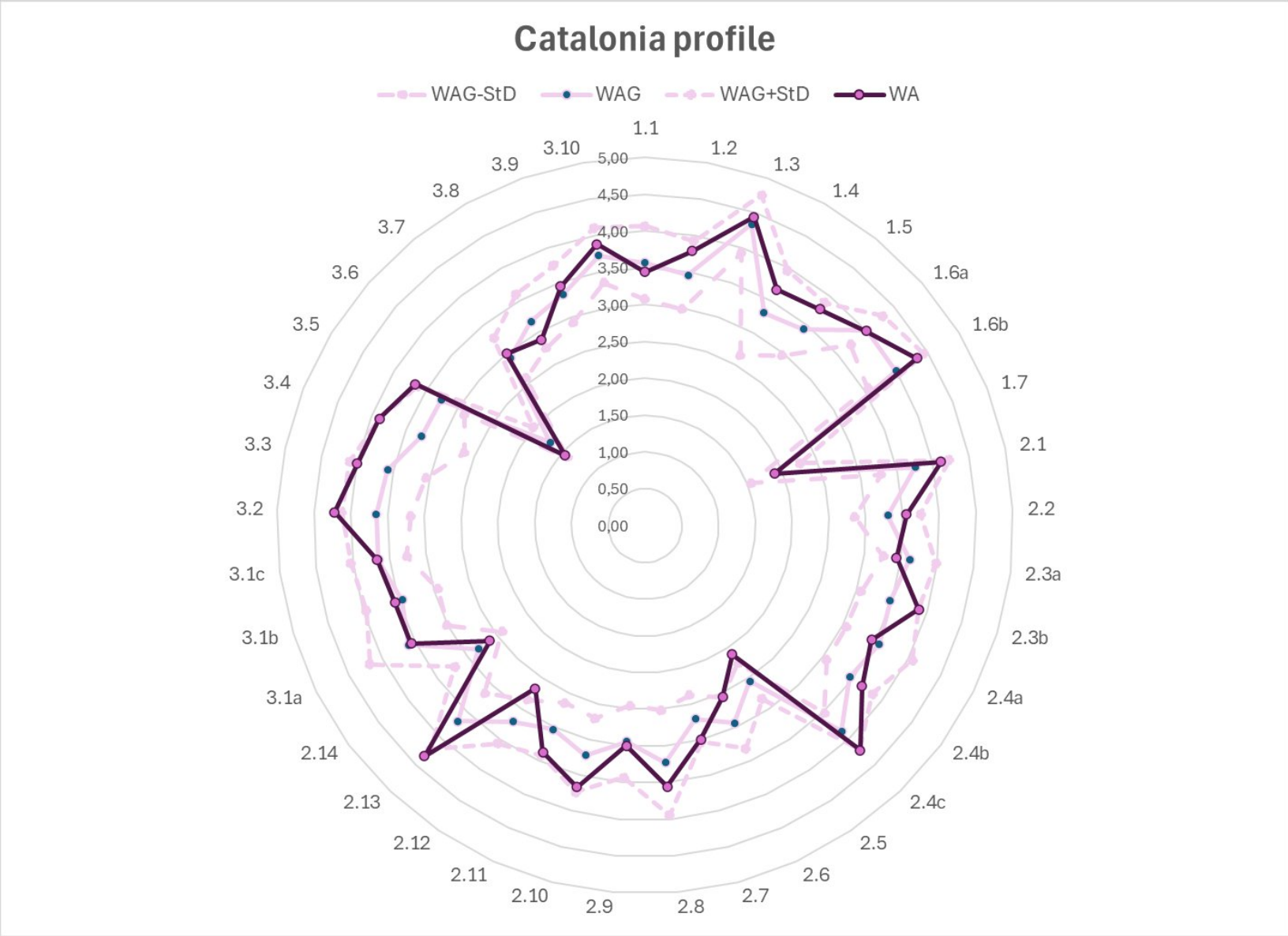
		Catalonia		
		WA	Mediana	MOD
(1) A territorial vocation	1.3.	4,44	5	5
	2.4a.	3,44	4	4
	3.1a.	3,56	4	4
	3.2.	4,22	4	4
(2) A multi-level governance process	1.5.	3,78	4	4
	2.3b.	3,89	4	4
	2.10.	3,67	4	3
	2.11.	3,38	3	3
	2.12.	2,67	3	2
	2.14.	2,63	2,5	1
(3) Explicit systemic interactions among the actors	1.1.	3,44	4	4
	1.4.	3,67	4	4
	1.6a.	4,00	4	4
	1.6b.	4,33	4	4
	2.2.	3,56	4	4
	2.6.	2,56	3	3
	2.8.	3,56	4	4
	2.9.	3,00	3	2
	3.1a.	3,56	4	4
	3.1b.	3,56	4	4
	3.1c.	3,67	4	4
	3.2.	4,22	4	4
	3.3.	4,00	4	3
	3.4.	3,89	4	4
	3.7.	3,00	3	3
	3.8.	2,89	3	2
(4) Strong dynamic towards innovation processes	1.5.	3,78	4	4
	1.7.	1,89	4	5
	2.1.	4,11	4	4
	2.3a.	3,44	4	4
	2.3b.	3,89	4	4
	2.5.	2,11	2	2
	3.9.	3,44	3	3

		Catalonia		
		WA	Mediana	MOD
(5) Specific and differentiated roles of the actors involved	1.1.	3,44	4	4
	1.2.	3,78	4	4
	1.6a.	4,00	4	4
	1.6b.	4,33	4	4
	2.1.	4,11	4	4
	2.5.	2,11	2	2
	2.6.	2,56	3	3
	2.7.	3,00	3	3
	2.8.	3,56	4	4
	2.9.	3,00	3	2
	2.12.	2,67	3	2
	3.1b.	3,56	4	4
	3.2.	4,22	4	4
	3.3.	4,00	4	3
	3.4.	3,89	4	4
	3.5.	3,67	4	3
	3.10.	3,88	4	4
(6) Balanced equilibrium between private and public actors, private and public aims, and private and public financial sources	1.2.	3,78	4	4
	2.2.	3,56	4	4
	2.7.	3,00	3	3
	2.8.	3,56	4	4
	2.9.	3,00	3	2
	2.10.	3,67	4	3
	2.11.	3,38	3	3
(7) Common focus (although variable in intensity) on the environmental sustainability of the innovation process	2.13.	4,33	4	4
(8) An intense mobilisation of the public and private stakeholders around shared objectives and common strategies for economic and industrial development	1.1.	3,44	4	4
	1.2.	3,78	4	4
	2.2.	3,56	4	4
	3.1b.	3,56	4	4
	3.4.	3,89	4	4
	3.6.	1,44	5	5
	3.10.	3,88	4	4
(9) A clear horizontal integration through widespread connections towards other knowledge ecosystems, independently of regional or national borders	2.4b.	3,67	4	4
	2.4c.	4,22	4	4
	3.1c.	3,67	4	4
	3.2.	4,22	4	4

Catalonia ERA Hub profile according to survey results



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Second approach

3-level model structure defined based on logical analysis of survey questions (model parameters) and measures of model parameter evaluation determined by AHP analysis.

Advantage: possibility to define a single aggregated measure of model evaluation (at Level 0 of the model structure).

Survey questions prioritisation

- **Background**

The questionnaire survey provided the list of questions and answers of regional stakeholders. Its scope and results have been adopted to compare ERA_FABRIC partner regions in the context of “ideal type” of ERA Hub emerging as a reference model.

- **Prioritisation**

For the evaluation, the WUT team suggests prioritising the questions according to their level of relevance to the ‘ideal type’ of ERA Hubs. In addition, the optional questions also prevent the direct use of some questions as evaluation criteria. The WUT team decided to carry out a group prioritisation exercise by using the analytical hierarchy process (AHP) to define global priorities. The online tool AHP-OS (Saaty, 1989) was used for this purpose.

Survey questions prioritisation approach

- **Defining criteria**

Survey questionnaire was used to define criteria which serve as a basis tool to capture criteria relevant to ecosystem assessment.

- **Constructing Hierarchy**

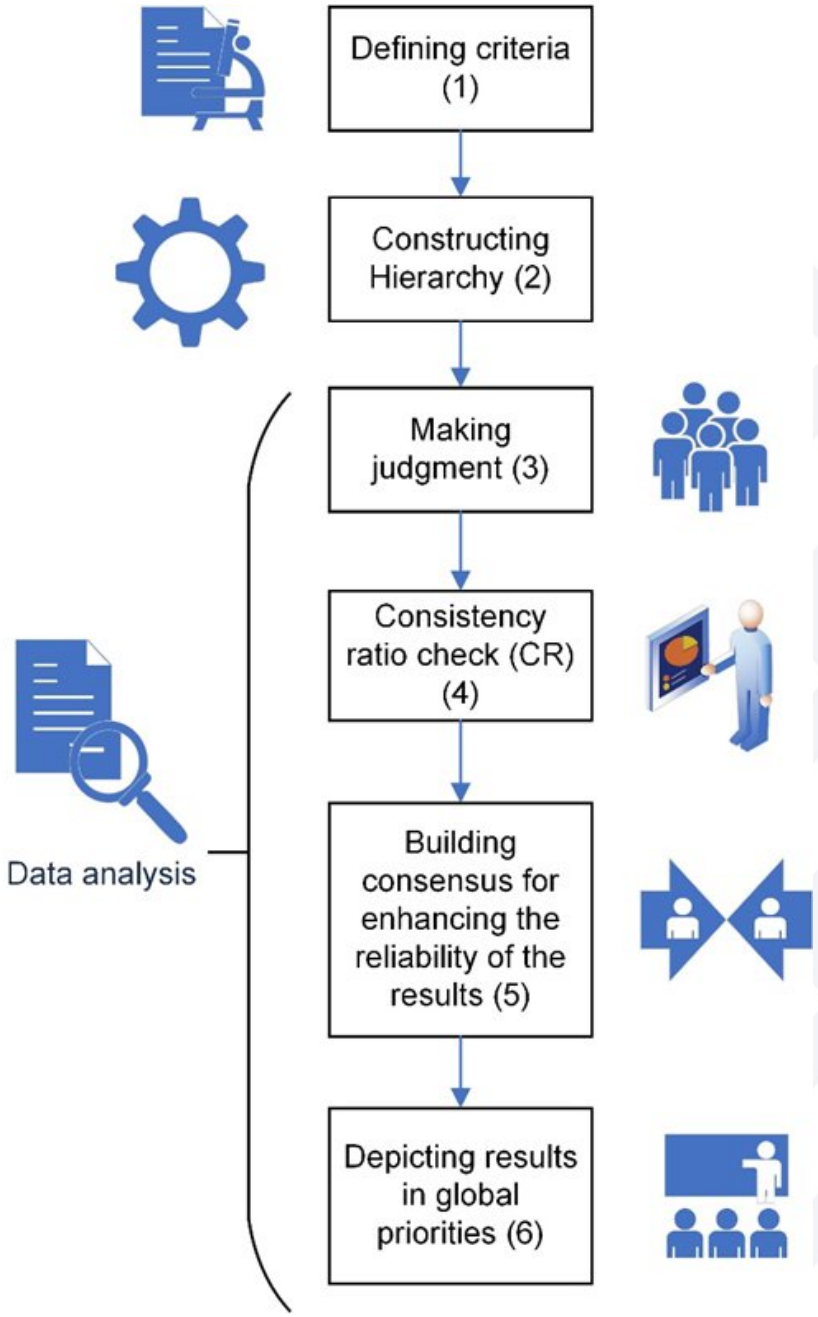
For the sake of better consistency of judgement 3-level hierarchy was built from the initial list of questions by grouping questions into mid-level sub-groups.

- **Making judgment**

Judgements and computations were computer-aided using AHP-OS online tool (Goepel, 2018), ensuring that each criterion is weighed appropriately according to its importance in the hierarchy. This process involves using a scale (from 1 to 9) to assess the extent to which one element is more important than another.

- **Checking consistency ratio (CR)**

CR was checked by each expert independently. Adjustments are made by experts until a CR of less than 10% is achieved, indicating a high level of judgment consistency.



Clustering of survey questions and setting up assessment criteria

LEVEL 1:	LEVEL 2:	LEVEL 3:
S1: Access to Research & Innovation Infrastructure and Services	S1.1: R&I Collaboration Capacities	1.1. There is high alignment of research priorities and industry needs.
		1.2. There are joint strategies between private and public actors towards shared goals.
		1.3. There is some R&I infrastructure available in my region.
		1.4. There are clear and transparent modalities to access the available R&I infrastructure.
	S1.2: Innovation Support Services	1.5. Innovation service needs are identified via interactive and inclusive governance processes.
		1.6a. There are professional service providers operating close to UNIVERSITIES (e.g., TTOs, IPR experts, incubators, accelerators, etc).
		1.6b. There are professional service providers operating close to COMPANIES (e.g., R&I consulting firms, IPR experts, clusters, incubators, accelerators, etc).
		1.7. There should be more demand for innovation support services.
S2: Policy Support & Governance Processes	S2.1: Governence	2.1. There is awareness among local policymakers of the importance and benefits of research and innovation.
		2.2. The public policies carried out locally are consistent with the needs of private actors.
		2.10. The local governance processes are balanced, transparent, open, and evidence-based.
		2.11. Good governance models to manage shared resources are put in place.
		2.12. The processes of local governance involve active engagement of civil society.
		2.13. There is a common focus on environmental sustainability of innovation processes.
		2.14. There are none or only minor regulatory hurdles (to e.g., researcher public-private mobility, or research commercialization).
	S2.2: Stakeholders Engagement	2.3a. Major steps forward are achieved by individual champions.
		2.3b. Major steps forward are achieved by inclusive and forward-looking governance.
		2.5. There are sufficient incentives and/or resources allocated to retain talent and young researchers.
		2.6. There are sufficient incentives targeting collaboration between industry and academia actors.
		2.8. There are good levels of trust and exchange among key stakeholders.
		2.9. There is a balance of power across key stakeholder groups.
	S2.3: Funding Support	2.4a. There is long-term policy support and availability of REGIONAL funding for innovation.
		2.4b. There is long-term policy support and availability of NATIONAL funding for innovation.
		2.4c. There is long-term policy support and availability of EU funding for innovation.
		2.7. The different financial resources (private fees, public direct funding, public funding to competitive projects etc.) are well balanced.
S3: Collaboration & Knowledge Transfer	S3.1: Collaboration Culture	3.1a. There is an affirmed collaboration culture within your region.
		3.1b. There is an affirmed collaboration culture between public and private actors in your region.
		3.1c. There is an affirmed collaboration culture between your and other European regions.
		3.3. There is a strong collaboration culture between local universities, research organisations, local key industries, large companies, and local SME clusters.
	S3.2: Collaboration Model	3.2. The regional authority supports collaboration with partners from other European regions (financial or non-financial support).
		3.4. There is extensive experience in science-industry collaboration, including shared objectives and common strategies for economic and industrial development.
		3.5. There is close collaboration between private investors and entrepreneurs.
		3.10. Leading local companies participate in one or more of the following: clustering, corporate venturing, shared resources, and targeted industry need initiatives (e.g., hackathons).
	S3.3: R&I Activities Outcomes	3.6. There should be more commercialisation of local research results.
		3.7. Research and project results are effectively and sufficiently communicated to the local community and relevant stakeholders.
		3.8. There is good availability of skilled staff.
		3.9. There is good knowledge transfer based on collaborations.

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Structuring assessment criteria of the 'ideal type' reference model

AHP1:	LEVEL1:	AHP2:	LEVEL2:	AHP3:	
0,341787	S1: Access to Research & Innovation Infrastructure and Services	0,59291	S1.1: R&I Collaboration Capacities	0,418967	1.1. There is hig
				0,290118	1.2. There are j
				0,182645	1.3. There is so
				0,108270	1.4. There are c
		0,40709	S1.2: Innovation Support Services	0,216310	1.5. Innovation s
				0,334273	1.6a. There are
				0,318720	1.6b. There are
				0,130697	1.7. There shou
0,198732	S2: Policy Support & Governance Processes	0,1581	S2.1: Governence	0,205946	2.1. There is aw
				0,154430	2.2. The public
				0,113504	2.10. The local
				0,178769	2.11. Good gov
				0,177973	2.12. The proce
				0,098269	2.13. There is a
				0,071108	2.14. There are
		0,68381	S2.2: Stakeholders Engagement	0,061518	2.3a. Major step
				0,123600	2.3b. Major step
				0,186978	2.5. There are s
				0,169052	2.6. There are s
				0,240889	2.8. There are g
				0,217963	2.9. There is a b
		0,1581	S2.3: Funding Support	0,371058	2.4a. There is lo
				0,234417	2.4b. There is lo
				0,263847	2.4c. There is lo
				0,130678	2.7. The differe
0,459481	S3: Collaboration & Knowledge Transfer	0,45331	S3.1: Collaboration Culture	0,149774	3.1a. There is a
				0,341608	3.1b. There is a
				0,175452	3.1c. There is a
				0,333166	3.3. There is a s
		0,20342	S3.2: Collaboration Model	0,212159	3.2. The regiona
				0,498863	3.4. There is ex
				0,212377	3.5. There is clo
				0,076601	3.10. Leading lo
		0,34327	S3.3: R&I Activities Outcomes	0,196232	3.6. There shou
				0,158882	3.7. Research a
				0,200578	3.8. There is go
				0,444307	3.9. There is go

Building consensus for enhancing the reliability of the results

Consensus among experts was checked/ achieved. If the level was moderate to very high, resulting priorities were accepted. If the level was low, consensus session was performed, and judgements for the specific node of the hierarchy were corrected using consensus session.

Details Node: ERA-FABRIC - CR: 2% - AHP group consensus: 50.3% low

Details Node: S1 Access to Research & Innovation Infrastruc - CR: 0% - AHP group consensus: 79.4% high

Details Node: S1.1 R&I Collaboration Capacities - CR: 1.7% - AHP group consensus: 84.5% high

Details Node: S1.2 Innovation Support Services - CR: 2.2% - AHP group consensus: 73.7% moderate

Details Node: S2 Policy Support & Governance Processes - CR: 0% - AHP group consensus: 92.0% very high

Details Node: S2.1 Governance - CR: 1.8% - AHP group consensus: 66.2% moderate

Details Node: S2.2 Stakeholders Engagement - CR: 0.7% - AHP group consensus: 59.1% low

Details Node: S2.3 Funding Support - CR: 3.1% - AHP group consensus: 76.9% high

Details Node: S3 Collaboration & Knowledge Transfer - CR: 1% - AHP group consensus: 55.0% low

Details Node: S3.1 Collaboration Culture - CR: 0.7% - AHP group consensus: 63.7% moderate

Details Node: S3.2 Collaboration Model - CR: 1.3% - AHP group consensus: 92.8% very high

Details Node: S3.3 R&I Activities Outcomes - CR: 1.5% - AHP group consensus: 71.7% moderate

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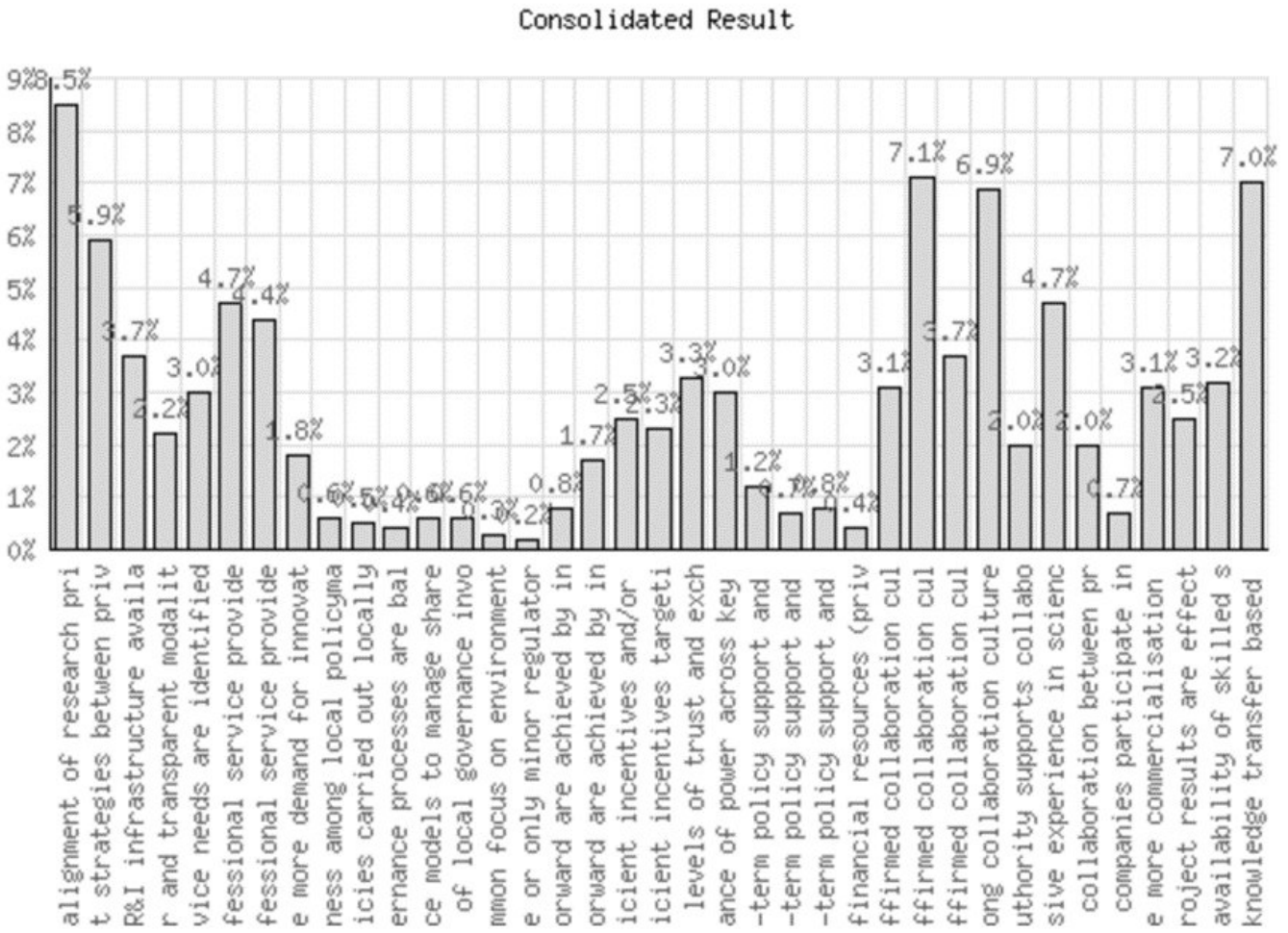
Depicting results in global priorities

AHP structure and resulting global priorities allow to assess the level of ecosystem development from the expert perspective. Each bar in the graph corresponds to a specific criterion, and the height of the bar indicates the percentage importance of that criterion relative to the others in the analysis. The labels along the horizontal axis detail the specific criteria being evaluated, while the percentages on the vertical axis quantify their importance.

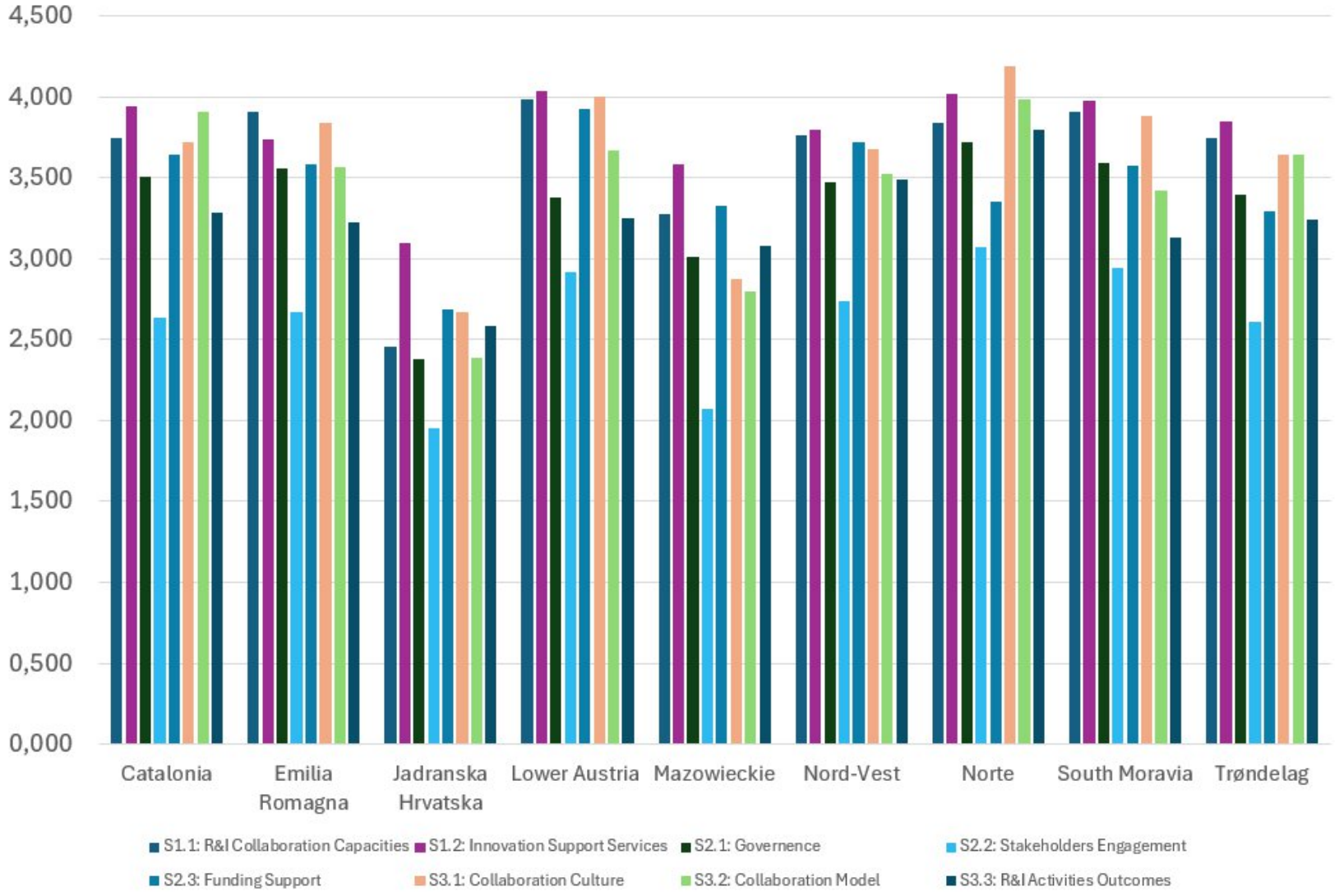


Conclusions

- While the previously developed research survey question may ultimately serve as criteria for an ecosystem assessment, the AHP structure and associated weight values enable the determination of importance levels from an experts' knowledge or preference.
- Additionally, indicators aggregated at intermediate levels of the structure identify scopes for improvement that are broader and more valuable than single evaluation criteria. The highest level of aggregation indicator is also convenient and quick for positioning within a benchmarking group. Therefore, using this approach ensures that expert knowledge is applied, assessment is consistently performed, and indications for area improvement are obtained in alignment with the logic of the AHP structure.
- Through consensus, particularly when initial consensus was low, experts were able to discuss and recalibrate their assessments, leading to more refined and agreed-upon outcomes.
- Therefore, proposed approach is based on experts' knowledge, each time considers assessment, and simultaneously indications for improvements in specific areas (level 1 & level 2) are delivered accordingly with the proposed decision hierarchy.

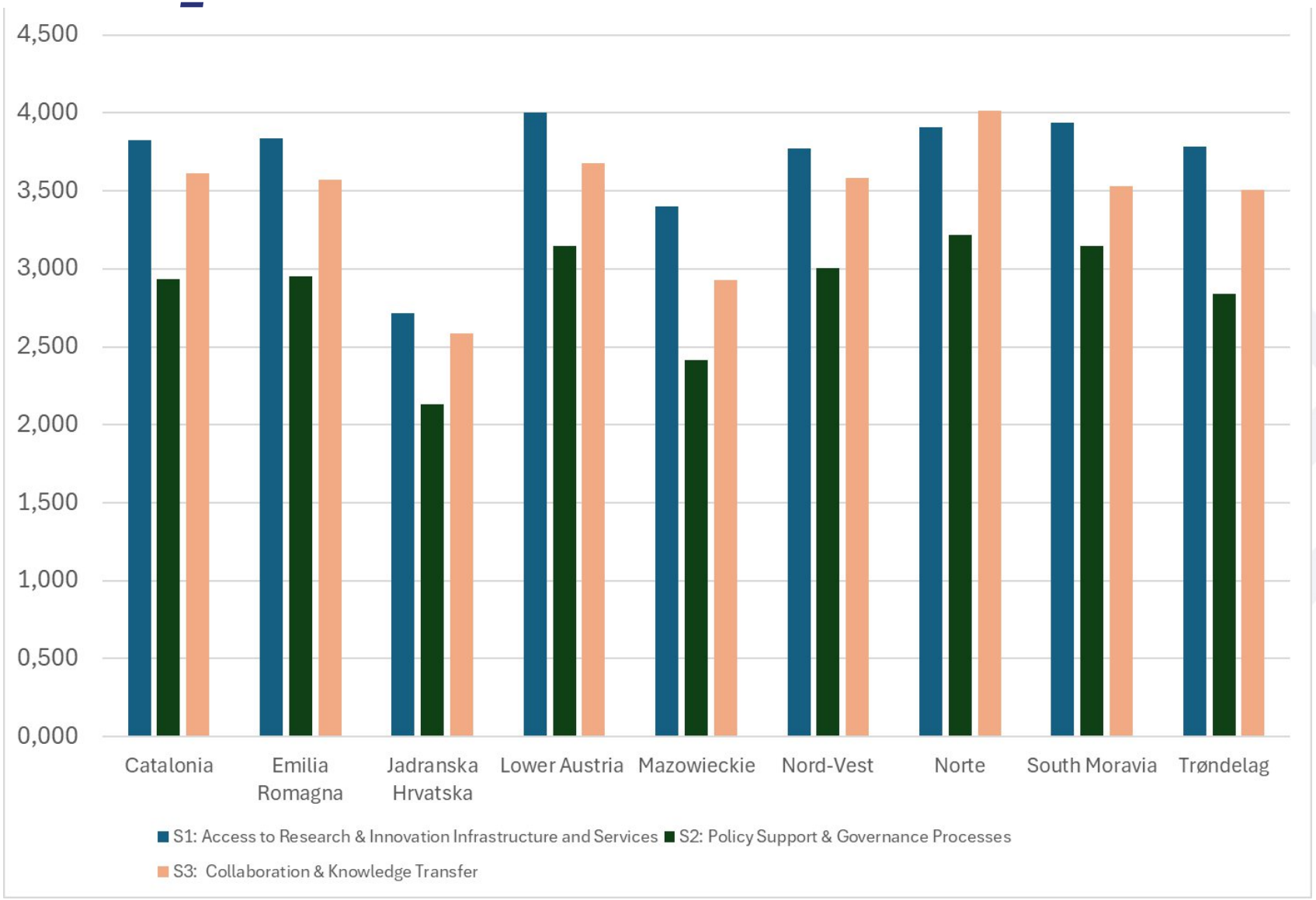
ERA_FABRIC confirmity assessment results

LEVEL_2



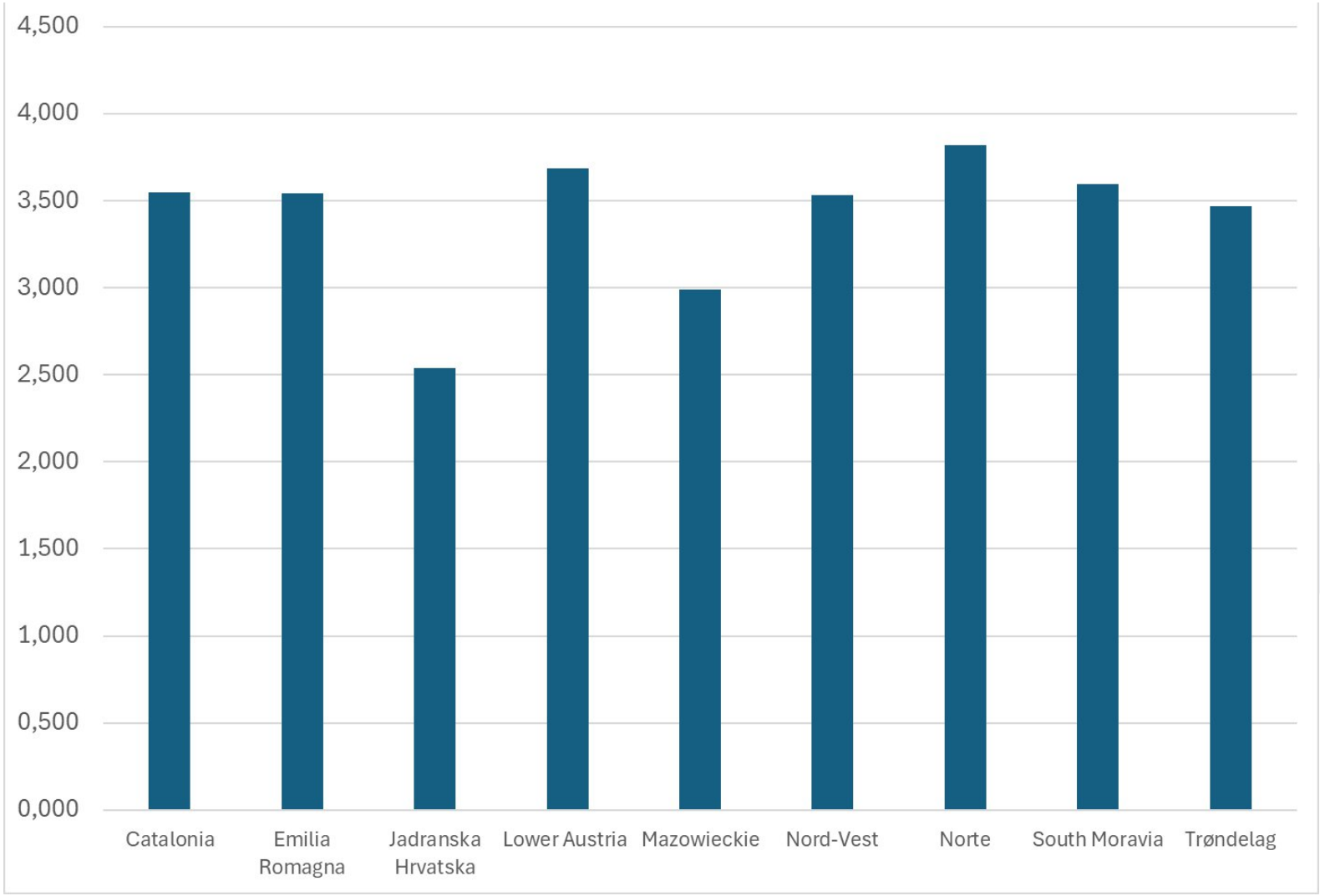
ERA_FABRIC conformity assessment results

LEVEL_1



ERA_FABRIC conformity assessment results

ERAHubs composite Index per region



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Concerns

- There might be an issue with right assignment of questions to subgroups
- There might be a lack of consensus on importance and order of criteria in each sub-group for #ERAHubs
- There is a clear issue with two `should` questions
- A lack of representativeness of the responses

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Third approach

Structuring of the 3-level model based on structural equation modelling (SEM) and establishment of evaluation measures based on the results of the AHP analysis.

Advantage: both the model structure and the evaluation measures of the model parameters are justified by the analytical approach used, not just by arbitrary choices.

Structural equation model (SEM) – calculations

The analysis of the questions and answers was carried out by structural equation modelling with confirmatory factor analysis, which extends classical factor analysis to test hypotheses about the structure of factor loadings and their intercorrelations (identification of latent variables at Level 2 of the model structure).

	Korelacje (Survey Results)Oznaczone wsp. korelacji są istotne z p < ,05000N=6 (Braki danych usuwano przy									
Zmienna	Średnia	Odch.std	1.1.	1.2.	1.3.	1.4.	1.5.	1.6a	1.6b	1.7.
1.1.	28,16667	27,64356	1,000000	0,978064	0,646538	0,951666	0,943033	0,943919	0,940501	0,783052
1.2.	28,16667	29,72821	0,978064	1,000000	0,480505	0,990540	0,964509	0,875019	0,864330	0,659484
1.3.	28,16667	35,89661	0,646538	0,480505	1,000000	0,417381	0,472166	0,803349	0,836575	0,927326
1.4.	28,16667	19,62057	0,951666	0,990540	0,417381	1,000000	0,982342	0,840508	0,822423	0,634605
1.5.	28,16667	22,19384	0,943033	0,964509	0,472166	0,982342	1,000000	0,842505	0,820786	0,701604
1.6a	28,16667	37,24200	0,943919	0,875019	0,803349	0,840508	0,842505	1,000000	0,993829	0,912833
1.6b	28,16667	34,23108	0,940501	0,864330	0,836575	0,822423	0,820786	0,993829	1,000000	0,912017
1.7.	28,16667	29,10269	0,783052	0,659484	0,927326	0,634605	0,701604	0,912833	0,912017	1,000000
2.1.	28,16667	28,05293	0,943111	0,869543	0,796785	0,841124	0,870165	0,983938	0,969472	0,927918
2.2.	28,16667	23,84464	0,794608	0,854849	0,238996	0,909204	0,947020	0,669315	0,622090	0,546683
2.3a	28,16667	24,61233	0,898870	0,885314	0,585135	0,906936	0,942744	0,903508	0,865710	0,832025
2.3b	28,16667	21,16050	0,941901	0,936259	0,562365	0,950349	0,987083	0,883140	0,856450	0,788803
2.4a	28,16667	26,96974	0,995744	0,988282	0,605674	0,972797	0,961916	0,931860	0,926087	0,763884
2.4b	28,16667	31,03170	0,964958	0,986829	0,463194	0,989007	0,980331	0,876855	0,850052	0,684047
2.4c	28,16667	32,41245	0,964253	0,911373	0,755452	0,889325	0,899368	0,992596	0,980400	0,899795
2.5.	28,16667	23,50674	0,267104	0,380025	########	0,394537	0,388278	########	########	########

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Structural equation model (SEM) – results

The effect of the selected explicit variables (research questionnaire questions - Level 3 of the ideal model) on the value of the latent variable (measurement index defined at Level 2 of the ideal model) was modelled. The statistical significance of the result obtained is indicated by highlighting the parameter in red in the model evaluation matrix.

Rozwiązania zbieżne normalnie:

S1.1	Oceny modelu (Survey Results.sta)			
	Ocena parametru	Błąd standard.	Statystyka T	Poziom prawdop.
(S1.1)-1->[1.3.]	28,602	13,263	2,157	0,031
(S1.1)-2->[1.4.]	16,503	7,054	2,34	0,019
(S1.1)-3->[1.7.]	27,005	9,822	2,749	0,006
(S1.1)-4->[2.1.]	28,053	8,871	3,162	0,002
(S1.1)-5->[2.2.]	17,33	9,148	1,895	0,058
(DELTA1)-->[1.3.]				
(DELTA2)-->[1.4.]				
(DELTA3)-->[1.7.]				
(DELTA4)-->[2.1.]				
(DELTA5)-->[2.2.]				
(DELTA1)-6-(DELTA1)	470,499	297,569	1,581	0,114
(DELTA2)-7-(DELTA2)	112,607	71,219	1,581	0,114
(DELTA3)-8-(DELTA3)	117,702	74,441	1,581	0,114
(DELTA4)-9-(DELTA4)	0	0		

S1.2	Oceny modelu (Survey Results.sta)			
	Ocena parametru	Błąd standard.	Statystyka T	Poziom prawdop.
(S1.2)-1->[1.1.]	27,037	8,929	3,028	0,002
(S1.2)-2->[1.2.]	29,728	9,401	3,162	0,002
(S1.2)-3->[2.5.]	8,933	10,126	0,882	0,378
(S1.2)-4->[2.6.]	15,842	9,259	1,711	0,087
(DELTA1)-->[1.1.]				
(DELTA2)-->[1.2.]				
(DELTA3)-->[2.5.]				
(DELTA4)-->[2.6.]				
(DELTA1)-5-(DELTA1)	33,158	20,971	1,581	0,114
(DELTA2)-6-(DELTA2)	0	0		
(DELTA3)-7-(DELTA3)	472,766	299,003	1,581	0,114
(DELTA4)-8-(DELTA4)	303,185	191,751	1,581	0,114

Structural equation models (SEM) – results

All tested models were statistically valid, i.e. they were proven to converge normally. The value of a parameter in the model evaluation matrix indicates the strength of the influence of the parameter value on the indicator value. Thus, the model structure is described by an arrangement of Level 3 parameters and Level 2 indicators, while the weighting priorities can be derived directly from the evaluation value of a specific parameter in the model.

S1.2	Oceny modelu (Survey Results.sta)			
	Ocena parametru	Błąd standard.	Statystyka T	Poziom prawdop.
(S1.2)-1->[1.1.]	27,037	8,929	3,028	0,002
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Structural equation models (SEM) – results

- The question is what to do with those parameters where the error exceeds 50% of the parameter assessment value and should not be treated as a reliable statistical measure (all parameters marked in black in the model assessment matrix). It may be possible to consider removing them from the ideal model, as they are statistically insignificant and have no impact on the Level 2 indicator.
- Another question is whether it is too hasty to get rid of a parameter which, even if currently insignificant, may become so in the future.

Structural equation models (SEM) – new questions structure

LEVEL 1:	LEVEL 2:	LEVEL 3:
S1: Access to Research & Innovation Infrastructure and Services	S1.1 R&I Landscape	1.3. There is some R&I infrastructure available in my region.
		1.4. There are clear and transparent modalities to access the available R&I infrastructure.
		1.7. There should be more demand for innovation support services.
		2.1. There is awareness among local policymakers of the importance and benefits of research and innovation.
		2.2. The public policies carried out locally are consistent with the needs of private actors.
	S1.2 R&I Strategy	1.1. There is high alignment of research priorities and industry needs.
		1.2. There are joint strategies between private and public actors towards shared goals.
		2.5. There are sufficient incentives and/or resources allocated to retain talent and young researchers.
		2.6. There are sufficient incentives targeting collaboration between industry and academia actors.
	S1.3 Innovation Support Services	1.5. Innovation service needs are identified via interactive and inclusive governance processes.
		1.6a. There are professional service providers operating close to UNIVERSITIES (e.g., TTOs, IPR experts, incubators, accelerators, etc).
		1.6b. There are professional service providers operating close to COMPANIES (e.g., R&I consulting firms, IPR experts, clusters, incubators, accelerators, etc).
		2.13. There is a common focus on environmental sustainability of innovation processes.
S2: Policy Support & Governance Processes	S2.1 Stakeholders Engagement Landscape	2.9. There is a balance of power across key stakeholder groups.
		2.10. The local governance processes are balanced, transparent, open, and evidence-based.
		2.11. Good governance models to manage shared resources are put in place.
		2.12. The processes of local governance involve active engagement of civil society.
	S2.2 Stakeholders Engagement Strategy	2.3a. Major steps forward are achieved by individual champions.
		2.3b. Major steps forward are achieved by inclusive and forward-looking governance.
		2.14. There are none or only minor regulatory hurdles (to e.g., researcher public-private mobility, or research commercialization).
		3.10. Leading local companies participate in one or more of the following: clustering, corporate venturing, shared resources, and targeted industry need initiatives (e.g., hackathons).
	S2.3 Funding Support	2.4a. There is long-term policy support and availability of REGIONAL funding for innovation.
		2.4b. There is long-term policy support and availability of NATIONAL funding for innovation.
		2.4c. There is long-term policy support and availability of EU funding for innovation.
		2.7. The different financial resources (private fees, public direct funding, public funding to competitive projects etc.) are well balanced.
S3: Collaboration & Knowledge Transfer	S3.1: Collaboration Culture	2.8. There are good levels of trust and exchange among key stakeholders.
		3.1a. There is an affirmed collaboration culture within your region.
		3.1b. There is an affirmed collaboration culture between public and private actors in your region.
		3.1c. There is an affirmed collaboration culture between your and other European regions.
		3.3. There is a strong collaboration culture between local universities, research organisations, local key industries, large companies, and local SME clusters.
	S3.2: Collaboration Model	3.2. The regional authority supports collaboration with partners from other European regions (financial or non-financial support).
		3.4. There is extensive experience in science-industry collaboration, including shared objectives and common strategies for economic and industrial development.
		3.5. There is close collaboration between private investors and entrepreneurs.
	S3.3: R&I Activities Outcomes	3.6. There should be more commercialisation of local research results.
		3.7. Research and project results are effectively and sufficiently communicated to the local community and relevant stakeholders.
		3.8. There is good availability of skilled staff.
		3.9. There is good knowledge transfer based on collaborations.

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