European Commission

Research and Innovation

Study on metrics and indicators for knowledge valorisation

Acknowledgements
The study team sincerely thanks all workshop participants for their support and thoughtful contributions, which have substantially informed and enriched the development of the framework. All final decisions remain the sole responsibility of the study team and represent the balanced judgments and compromises required during the process.

Study on metrics and indicators for knowledge valorisation

European Commission
Directorate-General for Research and Innovation
Directorate E — Prosperity
Unit E.2 — Knowledge Valorisation & Technology Infrastructures

Contact Florence Roger
Email RTD-KNOWLEDGE-VALORISATION@ec.europa.eu
florence.roger@ec.europa.eu
RTD-PUBLICATIONS@ec.europa.eu
European Commission
B-1049 Brussels

Manuscript completed in March 2026

PDF	ISBN 978-92-68-34294-7	doi: 10.2777/3166614	KI-01-25-235-EN-N

Luxembourg: Publications Office of the European Union, 2026

EUROPEAN COMMISSION

Study on metrics and indicators for knowledge valorisation

CSIL: Alessandra Caputo, Laura Delponte, Francesca Monaco
IDEA Consult: Els Van de Velde, Vincent Van Roy
ICONS: Chiara Fonio, Eva Martinez

2026

Directorate-General for Research and Innovation
Prosperity Directorate

Contents

List of Figures

List of Tables

List of abbreviations

Acronym	Label
API(s)	Application Programming Interface(s)
CIS	Community Innovation Survey
EPO	European Patent Office
ERA	European Research Area
ERAC	European Research Area and Innovation Committee
EU	European Union
EUIPO	European Union Intellectual Property Office
GII	Global Innovation Index
HEIs	Higher Education Institutions
IP	Intellectual Property
IPR	Intellectual Property Rights
JRC	Joint Research Centre
KV	Knowledge Valorisation
KTO	Knowledge Transfer Office
KT	Knowledge Transfer
MS	Member States
OECD	Organisation for Economic Co-operation and Development

Acronym	Label
OpenAIRE	Open Access Infrastructure for Research in Europe
PRO	Public Research Organisation
R&I	Research and Innovation
SSH	Social Sciences and Humanities
STEP	Strategic Technologies for Europe Platform
TTO	Technology Transfer Office
VC	Venture Capital
WIPO	World Intellectual Property Organization

Executive Summary

The purpose of this study was to establish a comprehensive framework for measuring the wide range of knowledge valorisation activities across EU Member States and associated countries within the European Research Area (ERA). Knowledge valorisation (KV) refers to the process of creating societal and economic value from knowledge (i.e. research results, data and know-how). It can happen through the following valorisation channels: academia-industry collaboration and mobility, creation of research-driven start-ups and spin-offs, intermediaries and knowledge transfer professional support, intellectual assets management, standardisation, engagement of citizens, public bodies, and societal actors, and policy uptake.

KV is not fully captured in existing R&I measurement frameworks, which focus primarily on technology transfer indicators and do not adequately account for other valorisation pathways. Additionally, there is no harmonised measurement framework at the EU level, and measurement practices remain fragmented and uneven across Member States. To address this gap, the study pursued two objectives:

- Mapping existing indicators, metrics, and data sources relevant to KV, assessing their strengths, limitations, and feasibility for EU-wide application.
- Developing an exploratory measurement framework covering all KV channels, combining established metrics with emerging ones, and reflecting both economic and societal forms of value.

This framework was developed through a multi-stage process involving documentary reviews and several consultation rounds. The research work included extensive desk research, mapping of institutional and open-access databases, 25 expert interviews, and three stakeholder workshops involving more than 102 participants. This process ensured that the framework is analytically robust, operationally grounded, and aligned with stakeholder needs.

The proposed measurement framework comprises 16 indicators measured through 41 metrics, designed to capture the full spectrum of valorisation activities across seven channels. Indicators operate at a meso-level, summarising key dimensions of performance, while the underlying metrics provide the quantitative basis for cross-country comparison and longitudinal monitoring. Each indicator is supported by a detailed factsheet specifying its conceptual scope, methodology, data sources, coverage, and limitations, ensuring transparency and facilitating future refinement and implementation.

A central strength of the framework lies in its integrated and balanced design. Metrics are mapped across multiple channels, reflecting the interconnected nature of real-world R&I systems, where activities such as co-patenting, start-up creation, intellectual asset management, citizen engagement, and policy uptake frequently overlap and reinforce one another. The measurement framework incorporates 22 output metrics, 18 impact metrics and one input metric, ensuring that both early-stage activities and longer-term effects are captured. Moreover, the balanced inclusion of 22 economic and 19 societal metrics demonstrates that valorisation is understood not only as commercialisation, but also as a driver of public engagement, policy innovation, and broader societal benefit.

From an operational perspective, the framework is largely implementable using existing data. By combining traditional indicators (e.g. patents and collaborative research) with emerging measures (e.g. citizen science, open access, and research-to-policy linkages), the framework offers a multidimensional and flexible system capable of capturing diverse national strengths and different performances in KV. Of the 41 metrics, 18 are already fully available from established sources, while the remaining 23 can be constructed using emerging data or new methodological processes. Importantly, most metrics can be derived from centralised data sources, significantly reducing administrative Burens for Member States.

The development of the measurement framework has generated a range of methodological, conceptual, and practical insights that can guide its future refinement and operationalisation. Conceived as an exploratory and forward-looking tool, the framework tests feasible measurement approaches rather than proposing definitive solutions, and provides evidence on the strengths and limitations of existing data, the maturity of different valorisation channels, and the challenges of capturing multidimensional value creation.

A key lesson from the study is the importance of conceptualising KV as a layered chain of outputs, outcomes, and impacts. While initial ambitions focused on impact indicators, it became clear that such an approach would be neither feasible nor conceptually appropriate, as impacts often materialise over long time horizons and are difficult to attribute. The framework, therefore, captures early-stage outputs, intermediate impacts, and longer-term impacts, accommodating the diversity of valorisation pathways and recognising that robust impact assessment depends on understanding the earlier stages of value creation.

The study also highlights the need for cross-cutting indicators that reflect the interconnected nature of R&I ecosystems. Many metrics, such as co-patenting or start-ups leveraging intellectual assets, contribute to multiple valorisation processes simultaneously. By adopting a cross-cutting approach, rather than a strictly channel-specific logic, the framework mirrors the reality of R&I interactions, where collaboration stimulates innovation, entrepreneurship supports the development of standards, and these processes collectively shape policy and regulatory frameworks.

Implementing a KV measurement framework faces several interrelated challenges. Harmonised definitions for key units, such as “start-up,” “scale-up,” and “spin-out,” are essential to ensure comparability, alignment, and meaningful interpretation. Transparent communication of methodological limitations is crucial, as metrics can be influenced by sectoral composition, voluntary reporting, definitional discrepancies, or citation practices, and should not be treated as universal proxies for value creation. Finally, persistent data gaps and uncertainties highlight the importance of pilot testing to identify and address biases and limitations before full-scale implementation.

Moreover, while some KV channels are supported by robust data, others remain underdeveloped and require innovative measurement approaches. The robustness of metrics depends on reliable data sources, yet emerging channels often rely on provisional or “second-best” solutions, underscoring the need for stakeholder consensus and institutionalised data collection. The documentary review confirmed that channels such as academia–industry collaboration and IP management benefit from well-established, centralised data sources, including Eurostat, OECD, EPO, EUIPO, OpenAIRE, PATSTAT, and Dealroom. In contrast, channels such as standardisation, societal engagement, and policy uptake are less mature and often require new methods, such as text mining or enhanced data collection. Internal variability is also evident within channels: for example, patent data are generally consistent and comparable across countries, whereas information on unprotected or informally managed assets demands alternative measurement strategies to capture their contribution to knowledge valorisation.

Based on these findings, the study proposes targeted recommendations to further refine the methodology and support its effective use. These include pilot-testing the framework in selected countries, strengthening the evidence base for emerging channels, improving definitional harmonisation, investing in data alignment and open-science infrastructures, and communicating the benefits of participation to data providers.

1. Study background and objective

This chapter outlines the foundations and rationale of the study by presenting the concept of knowledge valorisation, the evolving EU policy context, and the study's exploratory objectives.

1.1. The concept of knowledge valorisation

Knowledge valorisation (KV) is *the process of creating social and economic value from knowledge by linking different areas and sectors, and by transforming data, know-how, and research results into sustainable products, services, solutions, and knowledge-based policies that benefit society*. The concept of KV extends beyond the straightforward dissemination of knowledge from researchers to users, emphasising active collaboration between stakeholders across a wider range of activities. Whereas knowledge transfer is based on concepts of intellectual property (IP) protection and the commercialisation of results, KV embraces open access and open innovation, aiming to produce results that benefit society through multiple pathways and stakeholder engagement. KV also encourages multidisciplinary collaborations, not only within the traditional domain of knowledge transfer in technological areas, but also involving disciplines such as the social sciences and humanities (SSH).

As an overarching principle, KV emphasises the need for a systemic approach that connects scientific excellence, societal needs, and economic opportunities. It recognises that R&I investments generate their full impact only when knowledge circulates effectively among stakeholders and is adopted by users, whether businesses, public authorities, communities or citizens. Several channels contribute to value creation, enabling R&I results to be translated into practical, market-ready solutions and establishing collaboration frameworks among various stakeholders. These include collaboration between academia and industry, the creation of research-driven start-ups and spin-offs, the work of intermediaries and knowledge transfer professionals, the engagement of citizens and public bodies, the management and use of intellectual assets, the development and uptake of standards, and the integration of research results into policymaking (see Figure below). Together, these channels reflect the diversity of pathways through which knowledge can contribute to economic competitiveness, societal well-being, and sustainable development. A description of each channel is provided in Table 1.

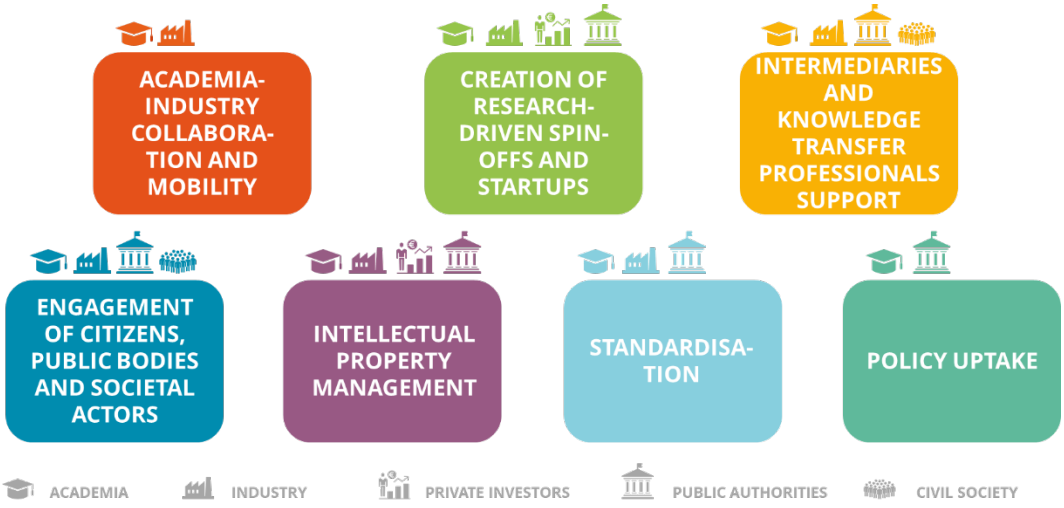

Figure 1 The Knowledge Valorisation channels

Table 1 A definition of the Knowledge Valorisation channels

KV channel	How value is created
Industry-academia collaboration and mobility	By supporting multidisciplinary collaboration and cross-sectoral mobility, this channel fosters the beneficial sharing of new ideas and skills between research institutions and industry. The collaborative efforts of industry and academic institutions have the potential to bridge the gap between theoretical research and practical application, thereby advancing the development of innovative products, processes, and solutions. Moreover, the opportunity to apply research in a practical setting allows academic researchers to gain exposure to real-world challenges. This enables them to refine their research skills and increase their understanding of industry needs.
Creation of research-driven spin-offs and start-ups	Research-driven spin-offs and start-ups serve as crucial mechanisms to translate academic research and innovation into tangible economic and societal benefits. Spin-offs and start-ups provide an entrepreneurial pathway for transforming cutting-edge ideas and technologies developed in academic settings into marketable products, services, or processes. By allowing a possible direct commercialisation path and access to a coherent funding structure to research outcomes, they bring entrepreneurship within academia, fostering a culture of innovation and efficient valorisation and dissemination of knowledge.
Intermediaries and knowledge transfer professionals support	Intermediary organisations, such as Knowledge Transfer Offices (KTOs), Technology Transfer Offices (TTOs), business incubators, and science parks, facilitate the transformation and commercialisation of academic research and innovations. Through supporting mechanisms such as networking, mentoring, coaching, and the exchange of best practices, these entities provide expertise in specific areas of KV, including IP management, commercialisation strategies, and identifying potential partnerships. This support facilitates the translation of research results into marketable products and services, simultaneously promoting the capacity building of professionals and organisations.
Engagement of citizens, public bodies and societal actors	Involving citizens, public bodies and societal actors from the early start of the definition of the R&I agenda ensures that during the key activities of KV, such as knowledge sharing, collaboration and partnership creation, commercialisation and policymaking development, real societal value is reflected and tangible societal challenges are addressed. Active engagement of local communities and co-creation approaches foster innovative solutions, leading to high and effective societal acceptance. Moreover, building trust and support capacity is key to ensuring the faster uptake of R&I solutions.
Intellectual assets management	This channel fosters open science and open innovation. The strategic management of IP ensures the protection, dissemination, and exploitation of research results, thereby maximising their societal and economic value through the creation of instruments such as patents, trademarks, and copyrights. By enhancing the accessibility and availability of R&I results on the market, the valorisation of intellectual assets contributes to EU prosperity, for which timely and innovative solutions are essential.
Standardisation	Engaging in frameworks, guidelines, and benchmark development for new technologies enables effective knowledge and technology transfer, resulting in faster market uptake of R&I results. By creating a common language, communication between different R&I stakeholders is

	facilitated, along with a shared understanding of technology requirements. Early standardisation has the potential to integrate diverse technologies into complex, innovative systems and solutions, enabling interoperability between components, products, and services.
Policy uptake	This channel focuses on the application of science in policymaking. By utilising the best available science, it is possible to develop better-informed public policies that contribute to addressing societal needs and challenges more effectively. Evidence-based policies foster trust among stakeholders and promote broader market adoption of new technologies.

1.2. Policy context

The new Commission (2024-2029) priorities recognise R&I as a core element for improving Europe's prosperity and competitiveness. The Draghi report[1] pointed out that weak interaction between universities and businesses, sub-optimal management of intellectual assets and lack of capacity in TTOs contribute to the root causes limiting the EU's innovation capacity and ultimately economic growth.

The Startup and Scaleup Strategy[2], published in 2025, brings an ambitious package of measures to facilitate the transfer of research results to the market. This includes simplified licensing tools, capacity-building for technology transfer, and increased collaboration with industry on cutting-edge infrastructure. Building a strong startup and scale-up ecosystem originating from higher education institutions and research-performing organisations is an important enabler for knowledge valorisation.

The upcoming European Innovation Act and the European Research Area Act will both play an important role in improving industry-academia cooperation, management of intellectual assets and KV in the EU. KV plays a role in all these EU R&I policies, building on the EU guidance policies established by the Commission and the Council in the past years. The Guiding Principles on Knowledge Valorisation[3], adopted in 2022 as a Council Recommendation, provide a common line on policy principles for national, regional, and local policymakers to create an enabling environment and increase value creation. The four Codes of Practice provide recommendations addressed to all R&I stakeholders, including researchers, universities,

[1] The Draghi report on the future of EU competitiveness, https://commission.europa.eu/topics/competitiveness/draghi-report_en

[2] EU Startup and Scaleup Strategy, https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/jobs-and-economy/eu-startup-and-scaleup-strategy_en

[3] Guiding Principles for Knowledge Valorisation and implementing Codes of Practice https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/guiding-principles-knowledge-valorisation-and-implementing-codes-practice_en

startups and scaleups, on certain areas of KV valorisation, such as intellectual asset management[4], standardisation[5], industry-academia collaboration[6] and citizen engagement[7].

This new overall guidance encourages stronger cooperation among R&I actors, businesses, policymakers, and civil society to ensure impactful outcomes. It replaces the earlier Commission Recommendation from 2008 on the management of intellectual property in knowledge transfer activities, as well as the Code of Practice for universities and other public research organisations. An update was needed to focus on maximising the value of all knowledge assets generated by different types of actors in a dynamic research and innovation ecosystem. New challenges and developments had to be addressed, such as increasingly complex knowledge value chains, new forms of collaboration between industry, academia, and the public sector, or the involvement of citizens.

KV is an integral part of the European Research Area (ERA) Policy Agenda[8]. The ERA Action on knowledge valorisation in the previous policy cycle (2022-2024) focused on upgrading the EU guidance on knowledge valorisation. The ERA Policy Agenda 2025-2027 addresses the upscaling of knowledge valorisation capacities and activities. The Guiding principles indicated that new indicators are particularly needed in order to capture the wider societal value created by R&I results in the Union. One action of the ERA Policy Agenda is to create a measurement framework that reflects the broader definition of knowledge valorisation and evaluates the performance of EU and associated countries in this area.

This study supports this initiative by developing a set of indicators for KV through a participatory process involving experts and R&I stakeholders. More specifically, its objectives are to review and expand indicators of knowledge transfer and to develop new indicators for measuring policy uptake, standardisation, and community engagement.

1.3. Measuring knowledge valorisation

Currently, measurement practices across the EU are fragmented and focus on a limited set of technology transfer indicators. There is a recognised need for a holistic and harmonised approach that reflects the richness of KV pathways and captures both economic and societal impacts. Efforts to address these gaps have begun through a few initiatives, namely:

- The newly introduced ERA Monitoring Mechanism (EMM) includes an online European Research Area (ERA) Policy Platform[9], an ERA Scoreboard[10] which focuses on outcome

[4] European Commission. (2023, March 1). Commission Recommendation (EU) 2023/499 on a Code of Practice on the management of intellectual assets for knowledge valorisation in the European Research Area (Official Journal of the European Union L 69/75).
[5] European Commission. (2023, March 1). Commission Recommendation (EU) 2023/498 on a Code of Practice on standardisation in the European Research Area (Official Journal of the European Union L 69/63).
[6] European Commission. (2024, March 1). Commission Recommendation (EU) 2024/774 on a Code of Practice on industry-academia co-creation for knowledge valorisation (Official Journal of the European Union L 2024/774).
[7] European Commission. (2024, March 1). Commission Recommendation (EU) 2024/736 on a Code of Practice on citizen engagement for knowledge valorisation (Official Journal of the European Union L 2024/736).
[8] ERA Policy Agenda 2025-2027, https://european-research-area.ec.europa.eu/era-policy-agenda-2025-2027
[9] https://european-research-area.ec.europa.eu/
[10] European Commission, Directorate-General for Research and Innovation, Hollanders, H., Khalilova, A., ERA scoreboard 2023, Publications Office of the European Union, 2024, https://data.europa.eu/doi/10.2777/674915

and impact indicators at the EU level and an ERA Dashboard[11] that encompasses some indicators to cover all ERA priorities and sub-priorities and should help in monitoring and assessing the progress towards ERA objectives.

- The work of the Joint Research Centre (JRC) in defining European-wide harmonised metrics and indicators for knowledge transfer supported the creation of the KT Metrics Platform for technology transfer offices. It also includes a set of quantitative and qualitative indicators to understand and measure value, such as jobs created and retained, aggregate investment in spin-offs, products on the market, internal culture change (in public research organisations), societal benefits, and economic benefits.
- The recent work of the World Intellectual Property Organisation (WIPO) on the Global Innovation Index (GII)[12] has led to the expansion of its set of indicators to include measures for 'technological adoption' and 'socioeconomic impact', including metrics for labour productivity, life expectancy, and carbon dioxide emissions.

However, the metrics and indicators used in the initiatives listed above do not fully capture the wide spectrum of economic and societal value created through valorisation activities. Previous frameworks have often overlooked the fact that knowledge valorisation occurs through multiple channels, including emerging and less explored pathways such as citizen engagement, policy uptake, and standardisation. What differentiates this framework is its attempt to bring all these channels together within a coherent structure, while also accounting for their intersections and interactions, providing a more comprehensive and nuanced view of how knowledge investments create value.

Measuring KV coherently and comprehensively is a complex challenge that requires overcoming the limitations of current measurement frameworks. To achieve this, it is essential to distinguish between two complementary measurement dimensions:

- The process dimension. Metrics and indicators should capture the mobilisation of resources, activities, and interactions across the various KV channels, including collaboration, entrepreneurship, intellectual asset management, societal engagement, standardisation, and policy uptake. These metrics help determine the extent to which channels are activated, how knowledge circulates among actors, and whether favourable conditions for value creation are being established. While this dimension is critical, measuring processes alone is insufficient; KV assessment must go beyond activity tracking and also include measures of impact.
- The impact dimension. This dimension concerns the benefits generated by KV processes and the degree to which valorisation activities translate into meaningful economic and societal outcomes. It focuses on the actual value created rather than the activities undertaken.

In addition, **the measurement framework must recognise that the value created through KV comprises both economic and societal benefits**. Economic benefits include measurable outcomes such as enhanced sustainable competitiveness, economic growth, and increased resilience. Societal benefits, although less easily quantifiable, are equally significant. These include wellbeing, employment, inclusiveness, health, and education. A comprehensive measurement approach must therefore account for all the above-mentioned dimensions, process and impact, as well as both types of value, economic and societal. Only by doing so

[11] European Commission, Directorate-General for Research and Innovation, Al-Ajlani, H., Bubbico, A., Hollanders, H. et al., ERA dashboard 2023, Al-Ajlani, H.(editor), Cvijanović, V.(editor), Publications Office of the European Union, 2024, https://data.europa.eu/doi/10.2777/16305

[12] World Intellectual Property Organisation, Global Innovation Index 2023 - Innovation in the face of uncertainty, 16th edition, 2023

can metrics and indicators fully capture the breadth of outcomes that emerge from KV processes.

1.4. Study's objective and scope

In this context, the study supported the EC in consolidating existing knowledge, systematising dispersed measurement practices, and exploring the foundations of a standardised, shared framework for assessing KV performance across the EU and associated countries.[13]. The rationale for undertaking this work lies in the recognition that current measurement efforts remain fragmented, uneven across countries and predominantly focused on traditional knowledge and technology transfer. The study therefore sought to broaden the evidence base and to provide an integrated approach that reflects the diversity and interconnectedness of modern valorisation processes.

The overarching objective was to define a comprehensive measurement framework that captures the full spectrum of KV activities and provides a structured basis for monitoring progress in the EU and other associated countries. However, rather than proposing a finalised or ready-to-implement system, the study adopted an exploratory perspective. It investigated what can be measured today, identified gaps that hinder a fuller understanding of valorisation, and outlined conceptual and methodological options that can be tested, refined and progressively operationalised.

To achieve this goal, the proposed measurement framework is intended to cover all EU MS and associated countries. The framework is designed to enable systematic and comparable monitoring, with an indicative frequency of annual updates, in line with existing EU monitoring practices. This positioning ensures that the framework can be progressively integrated into current policy cycles and reporting structures. The framework is also designed to complement, rather than duplicate, existing EU monitoring initiatives, including the ERA Monitoring Scoreboard and Dashboard, the Community Innovation Survey, and relevant datasets maintained by Eurostat, the Joint Research Centre, the European Patent Office and the EUIPO.

Notably, the study provides a structured foundation for future measurement efforts while recognising that the proposed framework represents an exploratory exercise. Its purpose is to inform subsequent testing and refinement and to support the Commission's ambition to build a coherent, flexible and policy-relevant approach to monitoring KV across Europe.

2. Methodological approach to measuring knowledge valorisation

This chapter outlines the exploratory process used to design the KV measurement framework, describing the multi-stage methodology, the conceptual logic guiding indicator selection, and the key methodological and practical challenges encountered during its development.

2.1. Framework design process

The development of the measurement framework followed a robust and multi-method approach, combining analytical work, expert consultation, and iterative refinement. The

[13] Third countries associated to Horizon Europe: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-country-participation_horizon-euratom_en.pdf

overall process was designed to progressively build a shared understanding of what KV encompasses and how it can be meaningfully assessed (see Figure below). From the outset, the study adopted an exploratory approach, acknowledging both the novelty and the complexity of measuring valorisation across multiple channels, actors and types of outcomes. The process was therefore organised to expand the evidence base gradually, test emerging ideas and integrate feedback from a broad range of policy, academic and practitioner communities. This stepwise and reflexive design ensured that the resulting framework was grounded in empirical realities, informed by expert judgement and sufficiently flexible to accommodate the evolving nature of KV across Europe.

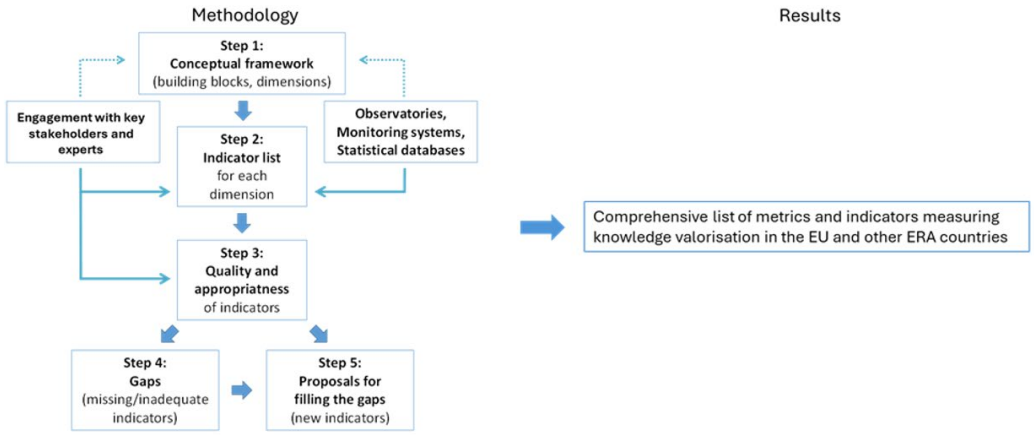

Figure 2 General approach for developing an indicator system to monitor Knowledge Valorisation

The first phase consisted of an extensive desk review of existing literature and relevant indicator systems for KV. This included European and international frameworks, academic studies, methodological guides, statistical surveys, and databases related not only to technology transfer but also to innovation ecosystems, open science, intellectual asset management, standardisation, entrepreneurship and science–society interactions. The desk review served two key purposes: identifying existing metrics and sources that could be leveraged and mapping conceptual and data-related gaps in current measurement practices. Based on this scoping work, the team conducted a systematic mapping and analysis of indicators and databases, examining institutional sources (e.g. Eurostat, OECD, EPO, EUIPO, JRC, ERA Scoreboard), private datasets (e.g. Dealroom, PATSTAT), open-access repositories (e.g. OpenAIRE, Lens, OpenCitations) and survey instruments (e.g. CIS, ASTP survey). The mapping process helped determine where well-established data were available, where proxy indicators could be constructed, and where new data collection methods might be needed.

To validate early findings and strengthen the analytical grounding of the framework, the study included a comprehensive consultation programme (see Annex II)**.** The study team conducted 25 semi-structured interviews with representatives from European institutions, international organisations, research and technology organisations, universities, intermediaries, innovation agencies, and experts in statistics, impact assessment, and valorisation practices. Interviewees were selected to ensure coverage of all KV channels and to balance policy, operational, and analytical perspectives. These discussions helped validate the initial mapping by identifying gaps, overlooked data sources and underexplored practices, particularly in emerging areas such as standardisation. They also provided practical intelligence on the feasibility and limitations of potential indicators, including issues of data access, comparability, methodological consistency and the risk of misinterpretation. Importantly, the interview phase allowed the study to test early assumptions, refine definitions and ensure that the emerging framework reflected real-world operational constraints. These interactions played a decisive role

in the iterative refinement of the indicator set, reinforcing the exercise's exploratory nature and ensuring that the framework was both analytically robust and grounded in practitioner experience.

The iterative dimension of the process was reinforced through three major stakeholder workshops. An exploratory workshop gathered 52 participants and focused on testing the completeness of the initial mapping, identifying blind spots and discussing the relevance of potential indicators across different KV channels. A validation workshop convened 85 participants to discuss the first draft of the measurement framework, assess the realism of the proposed metrics, and explore challenges linked to interpretation, data access, and cross-country comparability. Finally, the refined framework was presented during the final workshop in November 2025, where the underlying logic, indicator set and methodological considerations were discussed with 102 participants. The feedback collected during this final stage informed the refinement of the final framework and the articulation of future needs.

Throughout the consultation process, the framework was progressively shaped through a combination of analytical evidence and stakeholder insights. The first workshop emphasised the need to account for impact metrics more accurately and to exclude indicators focused on measuring the enabling conditions. The second workshop was crucial in the final selection, leading to the exclusion of additional metrics, the addition of new ones, and the broadening of the scope of some others. As an illustrative example, the initial framework included a metric on start-ups with EPO applications; however, it was collectively suggested to focus on start-ups with patent applications, regardless of the patent office. Based on stakeholders' feedback, the framework presented in the second workshop included 29 metrics; it was subsequently expanded to 41. The final workshop highlighted shortcomings and suggested specific metrics, which have been reflected in the methodological considerations included in the factsheets (Annex I).

2.2. Underlying logic for indicator selection

The underlying logic of the measurement framework emerged progressively throughout the analytical and consultation phases of the study, reflecting the inherent complexity of KV and the diversity of its channels, actors and outcomes. At the core of this logic is a holistic understanding of KV as a multi-channel, multi-actor and multi-outcome process. Rather than viewing valorisation as a linear transformation of research into innovation, the framework recognises it as a constellation of interlinked activities, including collaboration, entrepreneurship, intellectual asset management, standardisation, citizen engagement and policy uptake, that collectively contribute to the creation of social and economic value.

From the outset, the framework was shaped by the recognition that KV operates through diverse and interconnected channels (see Table 1)**.** A purely channel-specific measurement system would artificially compartmentalise activities that, in practice, are mutually reinforcing. For example, collaboration between academia and industry can lead to the generation of intellectual property, which may support the creation of start-ups, inform standardisation processes, or influence policy development. To capture these dynamics, the framework employs a cross-cutting approach, enabling indicators and metrics to be applied to multiple channels as appropriate. This reflects the real-world functioning of R&I ecosystems, where boundaries between actors and activities are increasingly porous.

To identify indicators and metrics capable of capturing both the activation of processes and the impacts that valorisation channels may generate, the underlying intervention logics of each channel were reconstructed. This reconstruction drew on existing academic literature and recent EC guidance documents, which provided conceptual foundations and examples of established and emerging practices. Visual diagrams of these intervention logics were developed to illustrate how activities progress across stages; one such chart is presented below as an example. This analytical step ensured that the framework is anchored in a

transparent and coherent logic model and that indicators and metrics are meaningfully linked to the processes and impacts they are intended to measure.

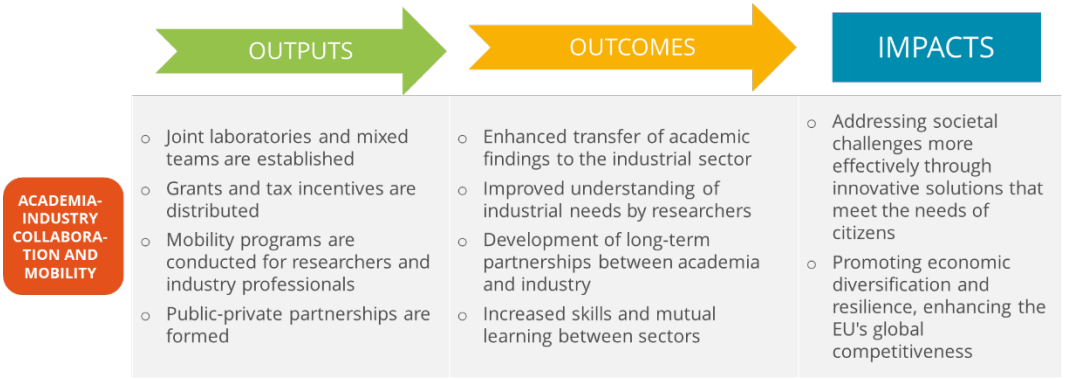

Figure 3 The Knowledge Valorisation chain of the academia-industry collaboration and mobility channel

The framework also seeks to balance traditional and emerging forms of valorisation. While established practices such as patenting, licensing or structured collaboration remain essential and benefit from strong data foundations, the contemporary valorisation landscape is also shaped by newer or less institutionalised practices. These include citizen engagement, user participation in co-creation processes, open science practices, research contributions in standardisation, and the use of scientific evidence in policymaking. Integrating both established and emerging forms ensures that the framework reflects the evolving nature of KV and does not inadvertently perpetuate a narrow or outdated view of value creation.

A further principle concerns the temporal dimension of valorisation. Early consultations revealed that focusing solely on long-term impacts would overlook important intermediate processes that signal whether value creation is underway. For this reason, the framework distinguishes between outputs and impacts, capturing early, intermediate and final stages of valorisation. Immediate outputs include activities such as patent filings, collaborative publications, or prototype development. At the same time, impacts encompass phenomena such as start-up growth, standard adoption, and increased public engagement, as well as broader societal or economic effects, including the integration of research into public policy and improved environmental performance. This layered structure acknowledges that different types of evidence become available at different stages and that capturing the full valorisation journey requires a combination of indicators.

To ensure robustness and coherence, the selection of indicators and metrics was guided by a set of shared and consistently applied criteria. These criteria, developed through analytical work and validated during stakeholder consultations and the final workshop, constitute the methodological backbone of the framework. Indicators and metrics were assessed against the following criteria:

- **Mix of new and existing indicators.** A balanced mix of indicators and metrics was included, drawing on both institutional data sources and more experimental approaches that are not yet consistently implemented across MS but could be developed under certain conditions. By building as much as possible on existing EU monitoring frameworks, such as the ERA Monitoring Scoreboard, the framework aims to minimise administrative burden. At the same time, by exploring new data sources and collection methodologies, it seeks to enhance MS's capacity to understand and monitor how investments in R&I can effectively generate societal value.
- **Link to KV channels and their different impact.** The proposed indicators and metrics are directly linked to one or more of the seven KV channels and assess different forms of value

creation, i.e., economic or societal. Indicators and metrics that measure the progression from outputs to impacts within each channel and capture the specific processes unique to each channel were prioritised, even if further improvements in time and geographical coverage may be necessary.

- **Data availability for MS and associated countries.** A key challenge was that the framework could not rely on customised monitoring systems tailored to specific R&I programmes. It had to be suitable across diverse national contexts, ensuring consistency and comparability in assessing how effectively knowledge is transformed into societal and economic benefits.
- **Accessibility and ease of collection.** The proposed indicators and metrics should not impose an excessive administrative burden on public authorities and stakeholders. Open-access data were prioritised, and the feasibility of automated data extraction was explored.
- **Reliability**. The indicators and metrics should be based on high-quality, representative, and unbiased data, avoiding bias towards specific activities, firms, sectors, or regions.
- **Timeliness**. The underlying data should be updated regularly.

These criteria were applied systematically to a broad list of potential indicators identified during the mapping phase. The selection process resulted in a balanced set of indicators and metrics that effectively combine well-established institutional measures with more experimental or emerging approaches. This mix reflects both the maturity of certain data systems and the need to explore new sources and methodologies to capture evolving valorisation practices. Regardless of the maturity of data systems, priority was given to indicators that drew on open-access data and existing administrative sources, and the feasibility of automated data extraction, e.g., through APIs (Application Programming Interfaces), was explored where possible. Throughout this process, care was taken to ensure that at least one indicator was available for each valorisation channel, while also recognising that several indicators, particularly those related to collaboration, naturally connect multiple channels and therefore serve a cross-cutting purpose.

The final design principle concerns the adaptability and future-proofing of the framework. Given the rapid evolution of KV practices and the new data potentially made available by applying AI and new collaboration models, the framework was intentionally conceived as a flexible, exploratory structure. It provides a coherent basis for monitoring the value-creation potential of R&I systems today, while remaining open to integrating new indicators, refined definitions, and improved data sources as they emerge. This approach supports gradual improvement rather than imposing a rigid or exhaustive model and ensures that the framework can evolve alongside the ecosystems it seeks to measure.

2.3. Challenges encountered

The exploratory nature of the study necessitated addressing several methodological and practical challenges throughout the design of the framework.

A first challenge concerned the heterogeneity and uneven maturity of the KV channels, which reflects the heterogeneous data availability. While some channels, such as academia–industry collaboration, are supported by well-established, consistently collected data, data availability at the country level remains highly uneven across other channels. Areas such as citizen engagement or standardisation are characterised by limited or fragmented data, reflecting the fact that these valorisation channels have historically been less explored and less systematically monitored across countries. In addition, some channels exhibit substantial internal heterogeneity: for example, within the intellectual property management channel, data on patents are widely available, standardised, and comparable across countries, whereas information on non-protected or informally managed assets remains largely unavailable,

requiring the identification of alternative indicators and more experimental data collection approaches. This asymmetry required careful balancing between ambition and feasibility, highlighting the need for ongoing refinement and targeted data development.

A second challenge was related to data availability and quality. Many potential indicators and metrics could not yet be proposed meaningfully due to gaps in coverage, inconsistent definitions across countries, limited frequency of updates, or reliance on non-public data sources. This was particularly evident in emerging fields or in areas where monitoring practices vary widely across Member States. Importantly, several biases might be introduced not only by data limitations but also by the way indicators themselves are defined, which can inadvertently favour certain activities, actors or national contexts over others. This aspect emerged as a point of notable disagreement among stakeholders, reflecting different interpretations of what should be measured and how. As highlighted during the workshops, these limitations underscore the importance of pilot testing to identify and correct such biases and to validate the robustness and comparability of the proposed metrics.

A third challenge concerned comparability. Differences in national innovation systems, data collection capacities and institutional arrangements complicate the construction of harmonised metrics. To mitigate this, the study favoured centralised data sources where possible and prioritised indicators and metrics derived from established databases, surveys or international scoreboards.

A fourth challenge related to the conceptual boundaries of KV. The expanding scope of the concept can blur distinctions between valorisation activities, innovation outputs and socioeconomic impacts. Ensuring conceptual clarity while maintaining sufficient breadth required iterative adjustments and extensive consultation with experts and practitioners.

Taken together, these limitations have had a substantial influence on the development of the measurement framework, shaping both the scope of what could be proposed and the level of precision achievable at this stage. The exploratory nature of the study, combined with heterogeneous data availability, definitional inconsistencies, comparability constraints and conceptual ambiguities, required continuous adjustments and careful methodological choices. As a result, the framework presented in this report should be understood as an exploratory and provisional starting point, reflecting the best possible synthesis of current evidence and operational feasibility. Its refinement and full operationalisation will necessarily depend on further testing, improved data infrastructures and sustained efforts to enhance the consistency and maturity of measurement practices across all KV channels and countries.

3. A measurement framework for knowledge valorisation

This chapter presents the framework in full, describing its architecture, the distribution of metrics across channels, the nature of its outputs, outcomes, and impacts, as well as the empirical patterns that emerge from its descriptive structure.

At its core, the framework recognises that KV is a multi-channel, multi-actor and multi-outcome process, and that no single dataset or linear chain of events can capture its complexity. R&I systems generate value in many different ways: through collaboration between universities and businesses; through the creation and scaling of start-ups rooted in scientific knowledge; through the work of intermediaries and knowledge transfer professionals; through the management of intellectual assets; through contributions to standardisation; through citizen participation and co-creation; and through the uptake of scientific evidence in policymaking. Each of these channels represents a distinct pathway through which knowledge circulates, is transformed and ultimately generates public value. Because the channels operate in parallel

and interact continuously, the framework adopts a cross-cutting architecture that is not confined to isolated categories but reflects the interconnected nature of valorisation processes.

The resulting framework comprises 16 indicators, measured through 41 metrics. These indicators represent "meso-level" constructs, summarising core aspects of valorisation performance, while the underlying metrics provide the quantitative data necessary to compare countries and monitor changes over time. In other words, metrics are quantifiable measures, while indicators are broader than metrics, encompassing qualitative measurements or any other criterion that can be measured by performance. Each represents a specific and measurable dimension of valorisation activity. Together, the indicators cover, as far as possible, the full spectrum of the seven valorisation channels identified earlier in the report. The Figure below shows the full list of indicators and metrics.

Citizen science	Collaborative processes	Goods or services co-created with users	Industry-academia co-patenting activities
• Organisations involved in citizen science • Citizen science projects	• Innovative enterprises that co-operated on R&D and other innovation activities with universities and HEIs • Products and/or processes by innovative firms cooperating with HEIs or public/private research institutions	• Firms involved in co-creation activities with users • Turnover from co-created or customised products	• Industry-academia co-patents • Average citation of industry-academia co-patents
Industry-academia co-publishing activities	**Intellectual property disclosures**	**Intellectual property rights**	**Knowledge Transfer Organisation (KTO)**
• Industry-academia co-publications • Average citation of industry-academia co-publications	• IP disclosures	• Use from IPR • Intangible asset value • IPR transactions • Public-private transactions • Industrial designs • Trademark applications • Patents and utility model	• New business creation by KTO • KTO agreements • Income from KTO agreements
Mobility	**Open access publications**	**PhD start-ups**	**Researchers in standardisation**
• Employed doctorate degree holders • Business enterprise researchers	• Open-access publications • Citations of open-access publications	• Share of PhD start-ups • VC funding in PhD start-ups • Employment in PhD start-ups	• Researchers in standardisation
Standards incorporating R&I	**Research to policy**	**Start-ups and spin-offs with intellectual assets**	**University spinout**
• Standards citing scientific publications • Penetration/adoption rates of standards incorporating R&I • Citation of standards incorporating R&I	• Researchers in government • R&I policy uptake	• Start-ups with patent applications • VC funding in start-ups with patent applications • Employment in start-ups with patent applications • Start-ups and spin-offs with IP assets	• University spinout • VC funding in university spinout • Employment in university spinout

Figure 4 The full list of Knowledge Valorisation indicators and metrics

As evident from the Figure above, **each indicator is composed of one or more metrics, which in turn rely on established statistical sources, administrative records, open-access datasets or innovative evidence-collection methods.** The indicators have been designed to reflect both the maturity of existing evidence and the emergence of new forms of valorisation that have not yet been systematically monitored in the EU.

Indicator factsheets have been developed to provide a precise definition of each unit of measurement and to identify the corresponding data sources (Annex I). These factsheets summarise the key characteristics of each the proposed metrics, serving as a foundation for future testing, refinement, and implementation. Specifically, each factsheet details the indicator's conceptual scope, measurement methodology, data sources, coverage across regions and sectors, frequency of data collection, and any known limitations or assumptions (Table 2).

Table 2 Indicator factsheet structure

Covered dimension	Description
Metric definition	It describes how the indicator is calculated.
Rationale for selection	It specifies how the indicator was selected based upon one or more of the following criteria: (i) ease of access, i.e., data is publicly available or easily obtainable from existing databases or institutional repositories; (ii) no, or at most, low administrative burden for MS, i.e., data collection and reporting impose minimal additional effort on national authorities, making the indicator sustainable over time, (iii) institutional data source with no additional calculation required, i.e., the indicator is derived directly from established data sources, requiring no further modelling, transformation, or estimation, (iv) high relevance and good proxy for measuring countries' capacity to activate the KV channel, i.e., the indicator effectively captures the ability of MS to engage in and support KV (v) high relevance and good proxy for assessing the impact of value creation within the KV channel, i.e., the indicator serves as a meaningful approximation of the societal or economic impacts of KV processes, (vi) closes coverage gaps, the indicator fills a known data gap in existing data sources, (vii) comparability across countries, i.e., the indicator allows for harmonised measurement and benchmarking across ERA countries, (viii) scalability and flexibility, i.e., the indicator framework can be scaled to increase country coverage, (ix) alignment with EU Policy Priorities and Frameworks, i.e., the indicator supports monitoring of key EU objectives, such as those outlined in the ERA Policy Agenda, New European Innovation Agenda, Competitiveness Compass for the EU, the EU Startup and Scaleup Strategy, (x) timeliness and update potential, i.e., underlying data is regularly updated or expected to be maintained over time, ensuring the indicator remains relevant for longitudinal monitoring.
Objective	It specifies whether the indicator is intended to measure the immediate output (activities or products resulting directly from the KV process) or the broader impact (changes or benefits resulting from the application or uptake of that knowledge) of the KV channel under scope.
Channels	It identifies the relevant channels within which the metrics apply
Type	It describes the nature of the measurement approach, distinguishing whether it is qualitative or quantitative in form, and whether it is aimed at capturing societal or economic dimensions of the KV channel under analysis.
Disaggregation	It specifies the levels at which the data can be disaggregated, such as by country, sector, or gender, allowing for more detailed analysis and comparison across different contexts and groups.

Value format	It defines the format in which the data is presented, such as a percentage, raw count, or ratio, to clarify how the measured values are expressed and interpreted.
Frequency of reporting	It specifies the frequency with which the underlying data is reported, if already available, or the expected interval for data collection in cases where it is yet to be gathered.
Metric availability	It identifies the availability status of the data: (i) whether it is already available from the proposed data sources, (ii) not directly available but could potentially be derived from existing data, or (iii) not available at all and would require new data collection.
Data availability	It specifies whether the underlying data is expected to be regularly updated or if there is uncertainty regarding the continuity and frequency of future updates.
Data Source(s):	It lists the proposed data sources. If the indicator already exists, it identifies the specific provider (e.g., ERA Monitoring Scoreboard). If the indicator needs to be developed from existing data, it specifies the relevant data providers from which the necessary information can be drawn.
Countries covered	It lists the countries covered by the data source
Missing countries	It lists the countries not covered by the data source
Proposed data collection level	It outlines the proposed data collection strategy, distinguishing between indicators that are best gathered or constructed at the central (EU) level and those more appropriately collected at the Member State (MS) level. A centralised approach is preferred in cases where: (i) the indicator is already available from a single data source; (ii) it needs to be constructed from scratch using repositories covering all ERA countries; or (iii) it can be built by scaling up previous EU initiatives or research projects.
Methodological considerations	This field highlights potential risks, signalling the need for caution in data interpretation and, where necessary, further verification of the underlying data sources.
Notes	When needed, it provides additional context

A key feature of the framework is the way metrics map across multiple channels. An integrated mapping reveals that indicators traditionally associated with academia–industry collaboration, entrepreneurial activity or intellectual asset management often extend into adjacent channels. For instance, co-patenting activities are not limited to academia-industry joint research alone; they also inform aspects of intellectual asset management. Similarly, metrics capturing start-ups and spin-offs with intellectual assets intersect with intellectual property rights, research-driven entrepreneurship and intermediary capacity. This cross-channel mapping confirms that the structure of the framework aligns with real-world R&I ecosystems, where activities are not confined to silos but often overlap, reinforce one another and produce value through their interaction.

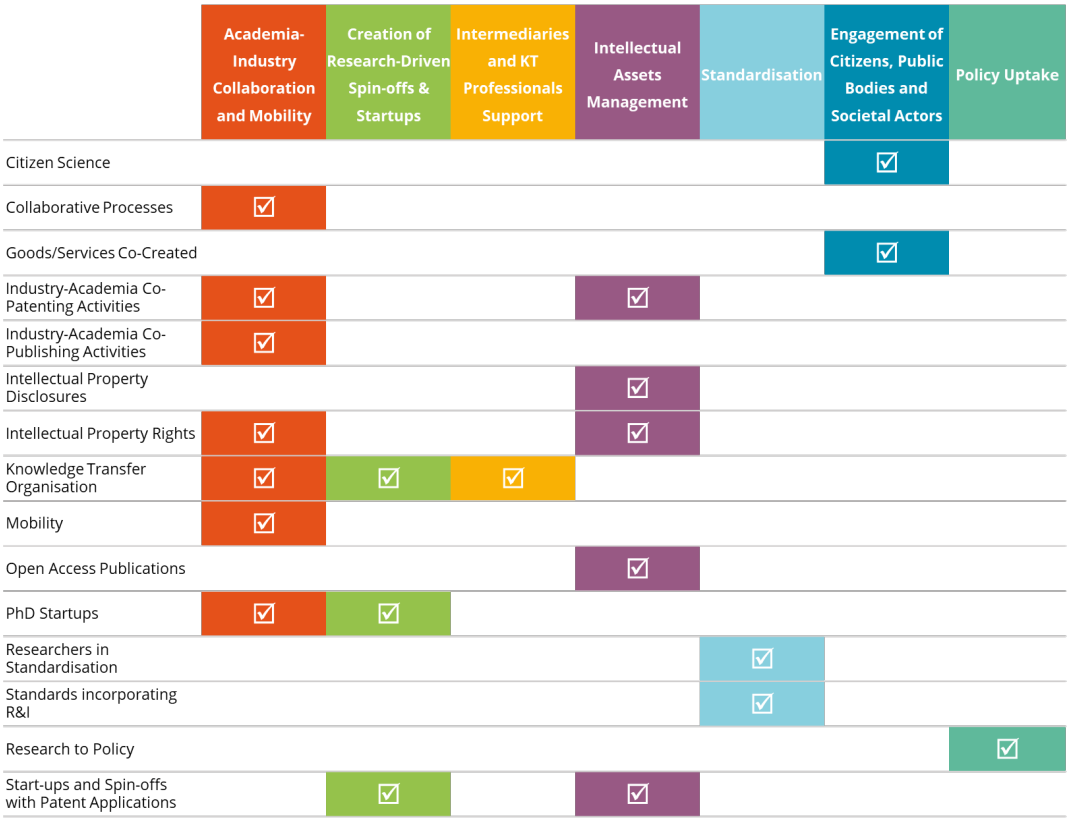

Figure 5 Mapping of indicators across Knowledge Valorisation channels

The framework's coverage is not only broad but also balanced across channels. The Figure below shows the analysis of metric distribution. It highlights that while channels such as academia–industry collaboration, intellectual asset management, and start-up creation benefit from dense metric coverage, reflecting established statistical traditions, newer channels, including citizen engagement, standardisation, and policy uptake, are also represented, but fewer metrics were identified. Although their metrics are fewer in number, their inclusion is essential as these channels capture forms of value creation that have become increasingly important in EU R&I policy. The presence of metrics for citizen science participation, co-creation of goods and services, researchers' involvement in standardisation and research-to-policy linkages highlights the intentional broadening of the measurement landscape.

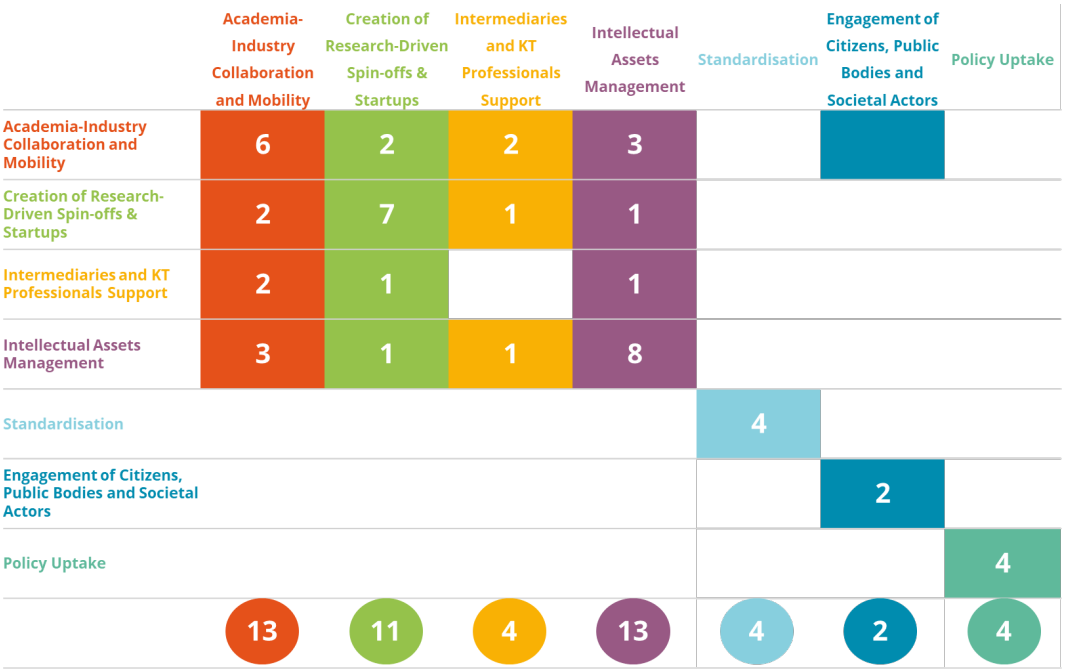

Figure 6 Mapping metrics across Knowledge Valorisation

The system incorporates 22 output metrics, 18 impact metrics and one input metric, demonstrating that it is designed not only to capture end-results but also to register early signals and intermediate developments along the valorisation pathway (see Figure below). Outputs include actions such as intellectual property disclosures, co-publications and open-access publication levels. These are essential markers of early-stage valorisation activity, particularly in areas where impacts may materialise only after long time lags. Impacts include developments such as start-up growth, the use of intellectual property, citations, or employment in start-ups, capturing the broader and more mature manifestations of knowledge-driven value creation.

A parallel classification reveals that the framework encompasses 22 economic metrics and 19 societal metrics, ensuring that it allocates equal attention to both commercial and non-commercial forms of value creation (see Figure below). Economic metrics encompass indicators related to intellectual property transactions, venture capital financing, start-up employment, licensing income and growth of firms using intangible assets. Societal metrics capture activities connected to public engagement, citizen participation, open science, evidence-based policymaking, and the diffusion of standards incorporating R&I. This balanced distribution reflects the dual nature of KV as both an economic engine and a contributor to societal well-being, public trust, environmental improvements and policy innovation.

	N. METRICS	OUTPUT vs IMPACT		ECONOMIC vs SOCIETAL	
Citizen Science	2		2		2
Collaborative processes	2		2	1	1
Goods/Services co-created	2	1	1	1	1
Industry-Academia co-patenting activities	2	1	1		2
Industry-Academia co-publishing activities	2	1	1		2
Intellectual Property Disclosures	1		1		1
Intellectual Property Rights	7	4	3	4	3
Knowledge transfer organisation	3	1	2		3
Mobility	2		2		2
Open Access publications	2	1	1		2
PhD startups	3	1	2		3
Researchers in standardisation	1	N.A.			1
Standards incorporating R&I	3	1	2		3
Research to Policy	2		2		2
Start-ups and spin-offs with intellectual assets	4	2	2		4
University spinouts	3	1	2		3

Figure 7 Indicators and metrics distribution by type

The internal logic of the framework becomes particularly clear when examining the value-creation pathways linking metrics across the system. Many indicators serve as building blocks for others, revealing sequential or mutually reinforcing relationships. For example, co-publications and co-patents may lead to new knowledge through citations, and may also precede the establishment of university spinouts, which in turn may underpin contributions to standardisation or accumulate investment in IP-intensive sectors. Similarly, citizen science initiatives and co-created products can feed into broader societal adoption or inform public-sector innovation. Open-access publications may lead to their inclusion in standards or citations in regulatory texts, which subsequently influence the uptake of standards incorporating R&I in the market. The presence of these logical chains underscores that the framework does not treat metrics as isolated datapoints but as elements within a dynamic and interconnected system.

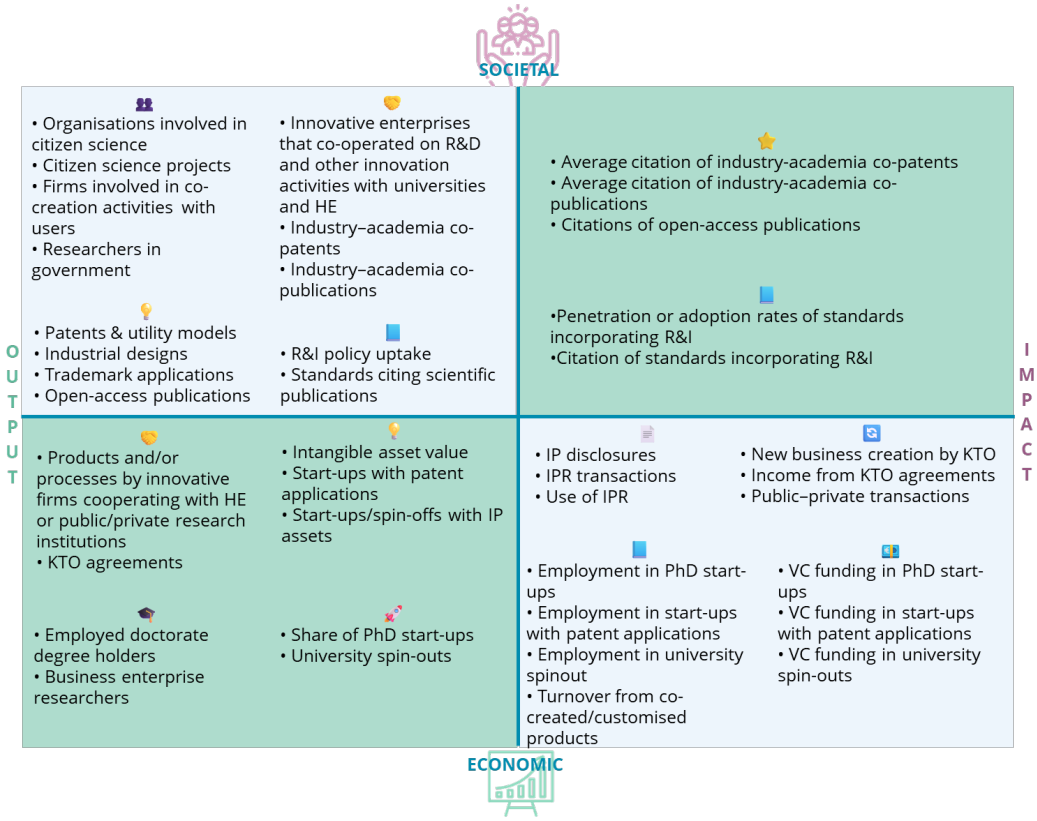

Figure 8 The logical links between metrics

The maturity and availability of data vary across metrics, but the majority can already be operationalised using existing centralised sources (see Figure below). Out of the 41 metrics, 18 are fully available from established statistical infrastructures, while 23 will require construction using either emerging data sources or new methodological processes. Encouragingly, the vast majority of metrics can be derived from centralised sources, minimising the administrative burden on Member States and associated countries. These sources include:

- Statistical databases such as Eurostat and OECD
- Patent and trademark registers from the European Patent Office and EUIPO
- Public and open-access bibliographic repositories such as OpenAIRE, OpenCitations and Lens
- Private databases such as PATSTAT, Dealroom and Overton
- Existing surveys, including CIS, ASTP surveys and research personnel statistics
- Scoreboards and dashboards such as the ERA Scoreboard, ERA Dashboard and EU Innovation Scoreboard.

	N. METRICS	EXISTING vs NEW		CENTRALISED vs MS
Citizen Science	2		2	2
Collaborative processes	2	2		2
Goods/Services co-created	2	2		2
Industry-Academia co-patenting activities	2	2		2
Industry-Academia co-publishing activities	2	1	1	2
Intellectual Property Disclosures	1	1		1
Intellectual Property Rights	7	4	3	7
Knowledge transfer organisation	3	2	1	3
Mobility	2	2		2
Open Access publications	2	1	1	2
PhD startups	3		3	3
Researchers in standardisation	1		1	1
Standards incorporating R&I	3		3	3
Research to Policy	2	1	1	2
Start-ups and spin-offs with intellectual assets	4		4	4
University spinouts	3		3	3

Figure 9 Indicators and metrics distribution by availability

Bringing together the descriptive structure of the framework reveals several broader insights. First, the metric distribution confirms that traditional and emerging indicators co-exist naturally within a holistic valorisation measurement system. Traditional indicators, such as patents, licensing, collaborative research, or IP-based entrepreneurship, continue to play an essential role but are complemented by indicators that capture open science, civil society participation, standardisation, and policy influence. Second, the framework exhibits balanced coverage across economic and societal dimensions, demonstrating that valorisation is not limited to commercialisation but encompasses diverse processes of knowledge utilisation and public benefit. Third, by incorporating output and impact metrics, the framework provides a layered and temporally sensitive perspective on how value is created, avoiding overreliance on long-term impacts that are difficult to attribute or measure. Fourth, the internal logic linking metrics across channels supports a systems-level understanding of valorisation, enabling policymakers to trace how early activities translate into broader impacts.

Another important insight emerging from the descriptive assessment is the heterogeneity of national performance potential. Because different channels rely on different types of evidence and are embedded in different institutional logics, no country is expected to perform strongly across all indicators. A country with a strong industrial R&D base may demonstrate high performance in co-patenting and collaborative research, while another with strong civil-society

traditions may excel in citizen engagement or co-creation. Countries with mature innovation ecosystems may register high volumes of research-driven start-ups or strong IP-based entrepreneurship, while others may show particular strengths in policy uptake or standardisation participation. This diversity underscores the need for a multidimensional and flexible measurement system capable of capturing different models of excellence in valorisation.

4. Lessons learned and recommendations

This chapter synthesises the key lessons learned throughout the study and proposes a set of targeted recommendations to support future improvement, consolidation and adoption of the framework.

4.1. Lessons learned

The development of the measurement framework for KV has generated a series of methodological, conceptual, and practical insights that can be useful in guiding its future refinement and successful operationalisation. Because the framework was conceived as an exploratory and forward-looking instrument, one that tests feasible measurement approaches rather than proposing definitive solutions, the process of its construction provided valuable evidence on the strengths and limitations of existing data, the maturity of different valorisation channels, and the interpretative challenges associated with capturing multidimensional value creation.

As the study progressed through its various stages, a series of key lessons became evident:

- **The value of a layered KV chain.** A central lesson concerns the need to conceptualise KV as a chain of outputs, outcomes and impacts. While the initial ambition was to focus primarily on impact indicators, it became clear that such an approach would be neither feasible nor conceptually appropriate. Impact-level evidence is difficult to generate in several channels, either because impacts materialise over long time horizons or because attribution is complex. As a result, the framework adopts a layered structure that captures early-stage outputs (e.g., disclosures, co-publications, co-created goods), intermediate impacts (e.g., uptake of standards, growth of research-based start-ups) and longer-term impacts (e.g., evidence use in policy, employment growth in IP-based firms). This layered approach is a strength because it accommodates the diversity of valorisation pathways and recognises that robust impact assessment depends on measuring and understanding the earlier stages of value creation.
- **Cross-cutting indicators reflect the interconnected nature of valorisation.** The process of indicator selection revealed that many metrics transcend channel boundaries. Co-patenting, start-ups using intellectual assets, and others contribute to multiple valorisation processes simultaneously. This insight led to the decision to move away from a strictly channel-specific measurement logic and to adopt a cross-cutting approach, where indicators are grouped conceptually but allowed to interact. This mirrors the reality of R&I ecosystems: collaboration stimulates IP generation, IP supports entrepreneurship, and entrepreneurial innovations in turn contribute to the development of standards, shaping new industry practices and related policy and regulatory frameworks. Recognising these interactions is crucial to avoid siloed interpretations and to ensure coherence.
- **Definitions matter, and consensus is essential.** The development of indicators highlighted the importance of agreeing on shared definitions for key units of measurement. Concepts such as “start-up”, “scale-up”, “spinout”, and “IP-based firm” vary across data providers and national systems. Achieving consensus on definitions is a gateway to comparability, international alignment and meaningful interpretation. Without harmonised

definitions, even the best-designed metrics risk producing inconsistent or non-comparable results. Regarding start-ups and scale-ups, the European Commission is developing a common definition.

- **Channels vary significantly in maturity and evidence availability.** The seven KV channels differ considerably in the maturity of their practices and data availability. Traditional channels, such as academia-industry collaboration, intellectual asset management and entrepreneurial activity, benefit from longstanding monitoring practices, rich datasets and internationally harmonised definitions. Emerging channels, such as citizen engagement, standardisation or research-to-policy linkages, are conceptually robust but measured unevenly across Member States and rely on newer data sources or innovative collection methods. This heterogeneity necessitates ongoing contextualisation when interpreting results, underscoring that some channels will require iterative development and methodological innovation before they achieve full measurement maturity.
- **The selection of data sources is critical, and a broad consensus is required.** The robustness and credibility of the proposed metrics depend heavily on the reliability of the underlying data sources. For several metrics, well-established institutional sources exist and can provide a solid foundation for comparable monitoring. However, in other cases, particularly in emerging or less-institutionalised channels, the absence of well-established institutional data sources forces reliance on compromises or "second-best" solutions, at least temporarily. This situation highlights the importance of reaching a shared understanding among stakeholders on which sources should be considered valid and trustworthy, as disagreements arose during the consultation process regarding the appropriateness of certain datasets. Over time, institutionalising and standardising data collection in these areas will be essential to ensure that metrics become more robust, consistent and widely accepted.
- **The need for transparency about limitations.** The process highlighted the importance of clear communication regarding the limitations of certain data sources and methods. Patent-based metrics, for instance, depend on sectoral composition, firm size and regulatory environments, and should not be interpreted as universal proxies for innovation or value creation. Likewise, policy citations of academic research outputs may be problematic because policy documents do not generally follow scientific citation norms, and citations, which differ across policy fields, may end up capturing a narrow dimension of evidence use. Similarly, some data sources, such as survey-based indicators or administrative registers, contain inconsistencies across Member States, voluntary reporting items or definitional discrepancies. A transparent account of such limitations is essential to support responsible interpretation and to maintain trust in the framework's analytical outputs.
- **Data gaps and uncertainties are inherent in an evolving measurement field.** Some metrics rely on evidence that is not yet consistently available, or that requires construction through text mining, algorithmic extraction or merging of disparate sources, such as metrics related to standardisation. In these cases, suitability and robustness can only be confirmed once metrics are operationalised. Potential biases, such as variations in textual conventions across policy documents, may only become apparent during implementation. This underlines the necessity of pilot testing, during which these data gaps, distortions or biases can be identified and addressed.

4.2. Recommendations

Building on the above-mentioned lessons, some areas for improvement emerged. These suggestions are intended to inform future revisions of the framework, guide pilot testing and support the development of a harmonised European monitoring system for knowledge valorisation.

- **Metric finetuning and pilot validation.** Before full-scale implementation, the framework should undergo a structured pilot phase across a representative set of countries. Pilot testing will help identify methodological biases, inconsistent data across countries, gaps in coverage, unintended overlaps between indicators, and challenges in data extraction or harmonisation. Based on pilot findings, metrics may require recalibration, consolidation, disaggregation or redefinition.
- **Expanding the evidence base in emerging channels.** For channels such as citizen engagement, standardisation or policy uptake, the evidence base should be gradually strengthened. This may include expanding the use of text-mining tools for policy citation analysis, improving the tracking of participation in standardisation bodies, developing more refined proxies for citizen science and co-creation, and fostering open-access infrastructure to support traceability of R&I results. Over time, these improvements will contribute to a more comprehensive and consistent understanding of KV processes and their impacts.
- **Enhancing flexibility and allowing disaggregation.** The framework is intentionally sector-agnostic, focusing on system-level dynamics. However, additional levels of granularity could be introduced where feasible, for instance, by disaggregating by scientific field or industrial sector, or by gender or diversity breakdowns in start-up creation or mobility, or by differentiating across types of public bodies in policy uptake metrics. Such disaggregation should be optional and used selectively to avoid undue reporting burden.
- **Strengthening consensus on definitions.** A coordinated effort should be undertaken to harmonise definitions used in measurement across Member States and data providers. This applies particularly to start-ups, spinouts, and scale-ups, as well as IP-based firms, various forms of collaboration, and types of co-creation activities, including indicators of research-to-policy linkage. Common definitions would significantly enhance comparability, while also strengthening confidence in the framework itself and in its ability to capture the full value of knowledge creation.
- **Improving data alignment and consistency.** Ensuring high-quality data requires strengthening coordination among national statistical offices, research organisations, patent offices, open-science infrastructures and private data providers. Priorities include reducing definitional inconsistencies, aligning data collection schedules, improving documentation of methods, ensuring continuity of data series, and encouraging harmonised reporting schemes for emerging channels. Efforts should focus especially on data sources known to exhibit variability, such as survey-based indicators and third-party commercial datasets.
- **Incorporating informal knowledge transfer where feasible.** Future versions of the framework could include proxies or narratives capturing informal valorisation mechanisms. These might draw on researcher surveys, mobility patterns, advisory roles or secondments, open-source development communities, and participatory innovation platforms. Acknowledging informal channels would provide a more holistic representation of knowledge circulation, although their continuous monitoring poses significant challenges, as they rely on unconventional, less frequent, and often discontinuous data collection processes.
- **Finally, supporting practical use and long-term adoption**. Beyond the technical design of the framework, effective communication is essential for the sustainable adoption of the framework. It is essential to clarify who will use each indicator, for what purpose, and what added value it will provide for institutions supplying the data. Communicating benefits, such as improved strategic insight, visibility of valorisation efforts or alignment with EU priorities, can help overcome potential resistance to data provision, especially in resource-constrained organisations.

ANNEX I - Indicators' factsheets

This Annex includes factsheets that summarise the main attributes of each metric.

Metric	Metric name
Metric definition	It describes how the metric is calculated.
Rationale for selection	It specifies how the metric was selected based upon one or more of the following criteria: (i) ease of access, i.e., data is publicly available or easily obtainable from existing databases or institutional repositories; (ii) no, or at most, low administrative burden for MS, i.e., data collection and reporting impose minimal additional effort on national authorities, making the metric sustainable over time, (iii) institutional data source with no additional calculation required, i.e., the metric is derived directly from established data sources, requiring no further modelling, transformation, or estimation, (iv) high relevance and good proxy for measuring countries' capacity to activate the KV channel, i.e., the metric effectively captures the ability of MS to engage in and support KV (v) high relevance and good proxy for assessing the impact of value creation within the KV channel, i.e., the metric serves as a meaningful approximation of the societal or economic impacts of KV processes, (vi) closes coverage gaps, the metric fills a known data gap in existing data sources, (vii) comparability across countries, i.e., the metric allows for harmonised measurement and benchmarking across ERA countries, (viii) scalability and flexibility, i.e., the metric framework can be scaled to increase country coverage, (ix) alignment with EU policy priorities and frameworks, i.e., the metric supports monitoring of key EU objectives, such as those outlined in the ERA Policy Agenda, Competitiveness Compass for the EU, the EU Startup and Scaleup Strategy, (x) timeliness and update potential, i.e., underlying data is regularly updated or expected to be maintained over time, ensuring the metric remains relevant for longitudinal monitoring.
Objective	It specifies whether the metric is intended to measure the immediate output (activities or products resulting directly from the KV process) or the broader impact (changes or benefits resulting from the application or uptake of that knowledge) of the KV channel under scope.
Channels	It specifies the knowledge valorisation channels that are captured by the metric.
Type	It describes the nature of the measurement approach, distinguishing whether it is qualitative or quantitative in form, and whether it aims to capture the societal or economic dimensions of the KV channel under analysis.
Disaggregation	It specifies the levels at which the data can be disaggregated, such as by country, sector, or gender, allowing for more detailed analysis and comparison across different contexts and groups.
Value format	It defines the format in which the data is presented, such as a percentage, raw count, or ratio, to clarify how the measured values are expressed and interpreted.

Frequency of reporting	It specifies the frequency with which the underlying data is reported, if already available, or the expected interval for data collection in cases where it has not yet been gathered.
Metric availability	It identifies the availability status of the data: (i) whether it is already available from the proposed data sources, (ii) not directly available but could potentially be derived from existing data, or (iii) not available at all and would require new data collection.
Data availability	It specifies whether the underlying data is expected to be regularly updated or if there is uncertainty regarding the continuity and frequency of future updates.
Data Source(s):	It lists the proposed data sources. If the metric already exists, it identifies the specific provider (e.g., ERA Monitoring Scoreboard). If the metric needs to be developed from existing data, it specifies the relevant data providers from which the necessary information can be drawn.
Countries covered in the proposed data source	It lists the countries covered by the data source
Missing countries in the proposed data source	It lists the countries not covered by the data source
Proposed data collection level	It outlines the proposed data collection strategy, distinguishing between metrics that are best gathered or constructed at the central (EU) level and those more appropriately collected at the Member State (MS) level. A centralised approach is preferred in cases where: (i) the metric is already available from a single data source; (ii) it should be created entirely from the outset using repositories covering all ERA countries; or (iii) it can be built by scaling up previous EU initiatives or research projects.
Methodological considerations	When needed, it provides methodological considerations on the metric.
Notes	When needed, it provides additional context.

Annex I.1 Metrics on Citizen Science

Metric	ORGANISATIONS INVOLVED IN CITIZEN SCIENCE PROJECTS
Metric definition	Number of organisations involved in citizen science projects and research per million inhabitants
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Closes coverage gaps Comparability across countries Scalability and flexibility

	Alignment with EU policy priorities and frameworks
Objective	Measures the extent of institutional engagement in participatory research and knowledge co-creation, reflecting the inclusiveness and societal reach of a country's science and innovation ecosystem.
Channels	The engagement of citizens, public bodies and societal actors
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Uncertain
Data Source(s):	European Citizen Science (ECS) Platform (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	EU27 MS, Albania, Bosnia and Herzegovina, Canada, Switzerland, Iceland, Israel, Norway, Serbia, Ukraine, United Kingdom.
Missing countries in the proposed data source	Armenia, Egypt, Georgia, Kosovo, Macedonia, Moldova, Montenegro, Morocco, New Zealand, Tunisia, Türkiye.
Proposed data collection level	Centralised: it can be built by scaling up previous EU initiatives or research projects
Methodological considerations	The metric builds on data provided by an EU-funded project, whose geographical coverage could potentially be expanded to include missing ERA countries.
Notes	

Metric	CITIZEN SCIENCE PROJECTS
Metric definition	Number of projects engaging the public in research via citizen science activities per million inhabitants
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Closes coverage gaps Comparability across countries Scalability and flexibility

	Alignment with EU policy priorities and frameworks
Objective	Assesses the extent and diffusion of participatory research activities engaging the public in scientific processes, reflecting the breadth of citizen involvement in knowledge creation relative to population size.
Channels	The engagement of citizens, public bodies and societal actors
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Uncertain
Data Source(s):	European Citizen Science (ECS) Platform (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	EU27 MS, Albania, Bosnia and Herzegovina, Canada, Switzerland, Iceland, Israel, Norway, Serbia, Ukraine, United Kingdom.
Missing countries in the proposed data source	Armenia, Egypt, Georgia, Kosovo, Macedonia, Moldova, Montenegro, Morocco, New Zealand, Tunisia, Türkiye.
Proposed data collection level	Centralised: it can be built by scaling up previous EU initiatives or research projects
Methodological considerations	The metric builds on data provided by an EU-funded project, whose geographical coverage could potentially be expanded to include missing ERA countries.
Notes	

Annex I.2 Metrics on Collaborative Processes

Metric	INNOVATIVE ENTERPRISES THAT CO-OPERATED ON R&D AND OTHER INNOVATION ACTIVITIES WITH UNIVERSITIES AND HIGHER EDUCATION INSTITUTIONS
Metric definition	Number of innovative enterprises that cooperated on R&D and other innovation activities with universities and higher education institutions
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required

	High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	Assesses the extent to which innovative companies have collaborated with academia on R&D or other innovation activities. This indicator evaluates the role of collaboration in driving innovation within the private sector. A higher share suggests that a significant portion of innovative firms are leveraging external expertise and research, reflecting that the private sector recognises the importance of knowledge exchange with academia.
Channels	Academia-industry collaboration and mobility
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Each even year
Metric availability	Already available at data source
Data availability	Data are expected to be updated every even year
Data Source(s):	ERA Monitoring Scoreboard (based on Community Innovation Survey)
Countries covered in the proposed data source	EU27, Iceland, Norway, Serbia, Türkiye, United Kingdom
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Canada, Egypt, Georgia, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Serbia, Switzerland, Tunisia, Ukraine
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	This indicator builds on a voluntary question included in the CIS questionnaire. In the future, we suggest liaising with Eurostat to discuss the possibility of making the relevant question mandatory.
Notes	This indicator lacks a corresponding impact indicator, which could be captured by including an additional question in the Community Innovation Survey on the benefits generated by the collaboration.

Metric	PRODUCTS AND/OR PROCESSES BY INNOVATIVE FIRMS COOPERATING WITH HIGHER EDUCATION INSTITUTIONS OR PUBLIC/PRIVATE RESEARCH INSTITUTIONS
Metric definition	The share of products and/or processes by innovative firms cooperating with higher education institutions or public/private research institutions over the total number of firms
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	Assesses the extent to which innovative companies have collaborated with academia or research institutions to produce products or processes. This indicator evaluates the role of collaboration in driving innovation within the private sector. A higher share suggests that a significant portion of innovative firms are leveraging external expertise and research to enhance their products or processes, reflecting the impact of knowledge exchange between industry and academia in fostering innovation.
Channels	Academia-industry collaboration and mobility
Type	Output Quantitative Economic
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Each even year
Metric availability	Already available at data source
Data availability	Data are expected to be updated every even year
Data Source(s):	ERA Monitoring Scoreboard (based on Community innovation survey)
Countries covered in the proposed data source	EU27, Iceland, Norway, Serbia, Türkiye, United Kingdom
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Canada, Egypt, Georgia, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Serbia, Switzerland, Tunisia, Ukraine.
Proposed data collection level	Centralised: the indicator is already available from a single data source

Methodological considerations	This indicator builds on a voluntary question included in the CIS questionnaire. In the future, we suggest liaising with Eurostat to discuss the possibility of making the relevant question mandatory.
Notes	This indicator lacks a corresponding impact indicator, which could be captured by including an additional question in the Community Innovation Survey on the revenues generated by products and/or processes developed by innovative firms cooperating with higher education institutions or public/private research institutions.

Annex I.3 Metrics on Goods and Services Co-created with Users

Metric	FIRMS INVOLVED IN CO-CREATION ACTIVITIES WITH USERS
Metric definition	Share of firms that offer goods and services co-created with users, i.e., the user (either the end customer or an enterprise that uses the product as an intermediate) had an active role in the creation of the idea, design, and development of the product.
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the extent to which firms involve users as active contributors in the ideation, design, and development of goods and services, thereby measuring the integration of societal and market needs into innovation processes. Information on the sector could be exploited to focus on innovative firms.
Channels	The engagement of citizens, public bodies and societal actors
Type	Output Quantitative Societal
Disaggregation	Country Sector
Value format	Percentage
Frequency of reporting	Every even year
Metric availability	Already available at data source

Data availability	Data are expected to be updated every even year
Data Source(s):	Community Innovation Survey
Countries covered in the proposed data source	EU27 MS, Norway, Türkiye
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Egypt, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Serbia, Switzerland, Tunisia, Ukraine, United Kingdom.
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	This indicator builds on a voluntary question included in the CIS questionnaire. In the future, we suggest liaising with Eurostat to discuss the possibility of making the relevant question mandatory.
Notes	

Metric	**TURNOVER FROM CO-CREATED OR CUSTOMISED PRODUCTS**
Metric definition	Share of turnover derived from customisation or co-creation
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	This indicator measures the share of firm turnover that results from products or services shaped through direct collaboration with users, whether through customisation or co-creation. It thus captures the monetary value of participatory innovation practices. It evaluates the economic contribution of citizen and user engagement in R&I by measuring the proportion of business revenue generated from goods and services that have been customised or co-created with end-users or societal actors. Information on the sector could be exploited to focus on innovative firms.
Channels	The engagement of citizens, public bodies and societal actors
Type	Impact Quantitative Economic

Disaggregation	Country Sector
Value format	Percentage
Frequency of reporting	Every even year
Metric availability	Already available at data source
Data availability	Data are expected to be updated every even year
Data Source(s):	Community Innovation Survey
Countries covered in the proposed data source	EU27 MS, Norway, Türkiye
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Egypt, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Serbia, Switzerland, Tunisia, Ukraine, United Kingdom.
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	This indicator builds on a voluntary question included in the CIS questionnaire. In the future, we suggest liaising with Eurostat to discuss the possibility of making the relevant question mandatory.
Notes	

Annex I.4 Metrics on Industry-Academia Co-patenting Activities

Metric	INDUSTRY-ACADEMIA CO-PATENTS
Metric definition	The share of industry-academia co-patents over the total number of academic patents
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the extent to which industry and academia collaborations have generated new knowledge as proxied by the number of patents they filed together. This indicator assesses the extent to which academic research is effectively transferred and applied in

	innovative products or technologies. A higher share of co-patents indicates a stronger collaboration between academia and industry, reflecting the integration of academic research into real-world solutions and commercialisation efforts.
Channels	Academia-industry collaboration and mobility Intellectual assets management
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	EPO's Observatory on Patents and Technology – share of academic patent applications filed with companies
Countries covered in the proposed data source	EU27 MS, Albania, Switzerland, Iceland, Norway, Türkiye, United Kingdom.
Missing countries in the proposed data source	Armenia, Bosnia and Herzegovina, Canada, Egypt, Georgia, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Serbia, Tunisia, Ukraine.
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	While underlying data are available at the source, this indicator does not currently exist in a consolidated form and would need to be newly developed to ensure broad geographical coverage and regular updates. The data sources that will allow to construct this indicator are: EPO-Patstat, Orbis IP, or Lens.org. However, all three data sources require a licence.
Notes	

Metric	AVERAGE CITATION OF INDUSTRY-ACADEMIA CO-PATENTS
Metric definition	The average number of citations industry-academia co-patents received over the total number of industry-academia co-patents co-filed.
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required

	High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assess the extent to which industry and academia collaborations have generated new knowledge (i.e., publications) that have then been used in further research activities. This indicator assesses the extent to which industry-academia co-patents are recognised and utilised within the innovation and scientific communities. A higher average citation count per co-filed patent indicates that the collaborative patents are not only being generated but also recognised as valuable contributions to their respective fields, highlighting the impact of these partnerships.
Channels	Academia-industry collaboration and mobility Intellectual assets management
Type	Impact Quantitative Societal
Disaggregation	Country
Value format	Raw-count
Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	EPO's Observatory on Patents and Technology – share of academic patent applications filed with companies
Countries covered in the proposed data source	EU27 MS, Albania, Switzerland, Iceland, Norway, Türkiye, United Kingdom.
Missing countries in the proposed data source	Armenia, Bosnia and Herzegovina, Canada, Egypt, Georgia, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Serbia, Tunisia, Ukraine
Proposed data collection level	Centralised: the indicator is already available from a single data source.
Methodological considerations	While underlying data are available at the source, this indicator does not currently exist in a consolidated form and would need to be newly developed to ensure broad geographical coverage and regular updates. The data sources that will allow to construct this indicator are: EPO-Patstat, Orbis IP, or Lens.org. However, all three data sources require a licence.

Notes	When analysing this metric, it is worth considering that citation frequency is sector-specific.

Annex I.5 Metrics on Industry-Academia Co-publishing Activities

Metric	INDUSTRY-ACADEMIA CO-PUBLICATIONS
Metric definition	The share of industry-academia co-publications over the total number of publications
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the extent to which industry and academia collaborations have generated new knowledge as proxied by the number of publications they produced together.
Channels	Academia-industry collaboration and mobility
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	ERA Monitoring Scoreboard (based on ScienceMetrix) – share of public-private co-publications
Countries covered in the proposed data source	EU27 MS, Albania, Armenia, Bosnia and Herzegovina, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Norway, Serbia, Tunisia, Türkiye, Ukraine, United Kingdom.
Missing countries in the proposed data source	Canada, Egypt, Switzerland

Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	While underlying data are available at the source, this indicator does not currently exist in a consolidated form and would need to be newly developed to ensure broad geographical coverage and ensure consistency with the corresponding impact indicator, “Average citation of Industry-academia co-publications”. The data sources that will allow to construct this indicator are: ScienceMetrix, Scopus, Web of Science, Lens.org, OpenAire, and OpenAlex.
Notes	

Metric	**AVERAGE CITATION OF INDUSTRY-ACADEMIA CO-PUBLICATIONS**
Metric definition	The number of citations industry-academia co-publications received over the number of industry-academia co-publications produced
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries’ capacity to activate the channel Comparability across countries Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the extent to which industry and academia collaborations have generated new knowledge (i.e., publications) that have then been used in further research activities. This indicator measures the visibility, influence, and relevance of industry-academia collaborations within the scientific community. A higher citation-to-publication ratio suggests that the co-produced research is being widely recognised and applied, reflecting its value in advancing knowledge and contributing to the broader research and innovation ecosystem.
Channels	Academia-industry collaboration and mobility
Type	Impact Quantitative Societal
Disaggregation	Country
Value format	Raw count
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated

Data Source(s):	ScienceMetrix (or alternatively: Scopus, Web of Science, Lens.org, OpenAire, OpenAlex)
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it must be created anew, using data repositories that include all ERA countries.
Methodological considerations	For the development of this indicator, it is advisable to rely on the same data source used for the indicator “Industry-academia co-publications” in order to ensure consistency. It implies that if “Industry-academia co-publications” rely on the ERA Monitoring Scoreboard, then it would be preferable to gather data on relevant publications and their citations from ScienceMetrics.
Notes	

Annex I.6 Metrics on Intellectual Property Disclosures

Metric	IP DISCLOSURES
Metric definition	Number of IP disclosures (inventions, software, know-how)
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the KV channel Scalability and flexibility Timeliness and update potential
Objective	Assesses the intensity of knowledge generation and codification within research and innovation actors, capturing early-stage outputs of inventive and creative activity prior to formal intellectual property protection.
Channels	Intermediaries and knowledge transfer professional support Intellectual assets management
Type	Impact Quantitative Economic
Disaggregation	Country
Value format	Raw count
Frequency of reporting	Annual

Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	ASTP Annual Survey
Countries covered in the proposed data source	17 EU MS (Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovenia, Spain), Switzerland, Norway, Türkiye, United Kingdom.
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Cyprus, Egypt, Estonia, Georgia, Greece, Hungary, Iceland, Israel, Kosovo, Latvia, Lithuania, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Romania, Serbia, Slovakia, Sweden, Tunisia, Ukraine
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	To expand the geographical coverage, this survey could be launched at the EU level.
Notes	ASTP is a pan-European association of Knowledge Transfer professionals that collects and analyses data, supported by National Associations, combining their own surveys with national surveys.

Annex I.7 Metrics on Intellectual Property Rights

Metric	USE FROM INTELLECTUAL PROPERTY RIGHTS
Metric definition	Charges for the use of intellectual property (e.g., royalties and licences) over GDP in PPP
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	Assesses the capacity of a country to generate economic returns from intellectual property through royalties and licence fees, reflecting the commercialisation and international competitiveness of its knowledge assets relative to economic output.
Channels	Intellectual assets management
Type	Impact Quantitative Economic
Disaggregation	Country

Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Eurostat (both numerator and denominator)
Countries covered in the proposed data source	EU27 MS, Albania, Bosnia and Herzegovina, Switzerland, Iceland, Montenegro, North Macedonia, Norway, Serbia, Türkiye, United Kingdom.
Missing countries in the proposed data source	Armenia, Canada, Egypt, Georgia, Israel, Moldavia, Morocco, New Zealand, Tunisia, Ukraine
Proposed data collection level	Centralised: the data is already available from a single data source
Methodological considerations	
Notes	

Metric	**INTANGIBLE ASSET VALUE**
Metric definition	Intangible asset value as a percentage of the firm's total value, average of the top 15 firms
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	Assesses the relative importance of knowledge-based and intangible assets—such as intellectual property, data, software, and brand value—in driving firm valuation, reflecting the knowledge intensity and innovation orientation of leading enterprises.
Channels	Intellectual assets management
Type	Output Quantitative Economic
Disaggregation	Country
Value format	Percentage

Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	WIPO Global Innovation Index
Countries covered in the proposed data source	EU27 MS, Albania, Armenia, Bosnia and Herzegovina, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Norway, Serbia, Tunisia, Türkiye, Ukraine, United Kingdom.
Missing countries in the proposed data source	Canada, Egypt, Switzerland
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	
Notes	The data cover a global list of firms for which intangible asset value and total firm value are observed. Only the top 15 firms of each economy are considered, ranked by intangible assets in absolute terms (in USD). Countries with fewer than 15 firms are not considered. The calculation of the metric at the country level occurs in two steps. First, the ratio of intangible asset value over total firm value is calculated for each firm. Then, the firm-level ratios of the top 15 firms within each country are averaged using the arithmetic mean to get the metric at the country level.

Metric	**IPR TRANSACTIONS**
Metric definition	Number of companies that licenced out, sold, or exchanged intellectual property rights
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for assessing the impact of value creation within the KV channel Comparability across countries Timeliness and update potential
Objective	Assesses the extent to which companies actively engage in the external exploitation and market transfer of intellectual property rights as a strategy for KV and economic return on intangible assets. This indicator captures not only the registration of IPRs but also their commercial deployment through licensing, sales, or exchanges. It reflects how companies treat IP not only as a protective legal tool but as a strategic, tradable asset with market value.

Channels	Intellectual assets management
Type	Impact Quantitative Economic
Disaggregation	Country
Value format	Raw count
Frequency of reporting	Each even year
Metric availability	Already available at data source
Data availability	Data are expected to be updated every even year
Data Source(s):	Community Innovation Survey
Countries covered in the proposed data source	18 EU MS (Austria, Belgium, Croatia, Cyprus, Czech Republic, Estonia, Finland, Greece, Hungary, Italy, Malta, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden).
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Denmark, Egypt, France, Germany, Georgia, Iceland, Ireland, Israel, Kosovo, Latvia, Lithuania, Luxembourg, Moldova, Montenegro, Morocco, Netherlands, New Zealand, North Macedonia, Norway, Serbia, Switzerland, Tunisia, Türkiye, Ukraine, United Kingdom
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	This indicator builds on a voluntary question included in the CIS questionnaire. In the future, we suggest liaising with Eurostat to discuss the possibility of making the relevant question mandatory.
Notes	

Metric	**PUBLIC-PRIVATE IPR TRANSACTIONS**
Metric definition	Number of companies that purchased or licensed-in patents or other IPRs from public research organisations, universities or higher education institutions
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for assessing the impact of value creation within the KV channel Comparability across countries Timeliness and update potential
Objective	Assesses the extent of knowledge transfer and commercialisation between public research institutions and the private sector, reflecting the capacity of the innovation system to translate publicly funded research into market-oriented applications. This indicator

	captures not only the registration of IPRs but also their commercial deployment through licensing, sales, or exchanges.
Channels	Academia-industry collaboration and mobility Intellectual assets management
Type	Impact Quantitative Economic
Disaggregation	Country
Value format	Raw count
Frequency of reporting	Each even year
Metric availability	Already available at data source
Data availability	Data are expected to be updated every even year
Data Source(s):	ERA Monitoring Scoreboard (based on Community Innovation Survey)
Countries covered in the proposed data source	27 EU MS, Switzerland, Egypt, Iceland, Norway, Türkiye
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Egypt, Georgia, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Serbia, Tunisia, Ukraine, United Kingdom
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	This indicator builds on a voluntary question included in the CIS questionnaire. In the future, we suggest liaising with Eurostat to discuss the possibility of making the relevant question mandatory.
Notes	

Metric	INDUSTRIAL DESIGNS
Metric definition	Number of design applications over GDP in PPP
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	Evaluates the extent to which economic actors engage in the legal protection and strategic management of market-facing intangible assets (namely, industrial designs) in proportion to the country's economic output, adjusted for purchasing power.

Channels	Intellectual assets management
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	1. EUIPO (numerator) and Eurostat (denominator) 2. WIPO Global Innovation Index
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Not available at all and would require new data collection
Methodological considerations	Two distinct approaches are suggested: (i) develop the metric anew, retrieving data on design applications from EUIPO and data on GDP in PPP from Eurostat and IMF, (ii) use the existing metric available in the Global Innovation Index.
Notes	

Metric	TRADEMARK APPLICATIONS
Metric definition	Number of trademark applications over GDP in PPP
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	Evaluates the extent to which economic actors engage in the legal protection and strategic management of market-facing intangible assets (namely, trademarks) in proportion to the country's economic output, adjusted for purchasing power.
Channels	Intellectual assets management

Type	Output Quantitative Societal
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	EUIPO (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Not available at all and would require new data collection
Methodological considerations	
Notes	

Metric	PATENTS AND UTILITY MODEL
Metric definition	Sum of resident patent applications filed at a given national or regional patent office and resident utility model applications filed at the national patent office over GDP in PPP
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	Assesses the intensity and efficiency of knowledge codification and protection efforts (through patents and utility models) in relation to a country's economic output, adjusted for purchasing power.
Channels	Intellectual assets management
Type	Output Quantitative Societal

Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not yet available: it needs to be constructed based on available data sources
Data availability	Data are expected to be annually updated
Data Source(s):	1. Patstat (numerator) and Eurostat/IMF (Denominator) 2. Global Innovation Index (GII)
Countries covered in the proposed data source	1. Potentially all ERA countries 2. GII covers: EU27 MS, Albania, Armenia, Bosnia and Herzegovina, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Norway, Serbia, Tunisia, Türkiye, Ukraine, United Kingdom.
Missing countries in the proposed data source	1. None 2. GII does not cover: Canada, Egypt, Switzerland
Proposed data collection level	Centralised (data collection could be implemented by the European Commission).
Methodological considerations	Two distinct approaches are suggested: (i) develop the metric anew, retrieving data on patent applications and utility models from Patstat and data on GDP in PPP from Eurostat and IMF, (ii) sum the existing metrics available in the Global Innovation Index.
Notes	Whereas the latter approach allows reliance on existing metrics and thus reduces the burden on the Commission, the former would enable coverage of all ERA countries, including Canada, Egypt, and Switzerland, and would allow for independent updates of the metric from the GII updates.

Annex I.8 Metrics on Knowledge Transfer Organisations

Metric	NEW BUSINESS CREATION BY KTO
Metric definition	Average number of spin-offs and start-ups created per KTOs
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for assessing the impact of value creation within the KV channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks

	Timeliness and update potential
Objective	Measures the capacity of KTOs to facilitate entrepreneurial outcomes by supporting the creation of spin-offs and start-ups based on public research outputs, thereby assessing the systemic effectiveness of intermediary institutions in translating knowledge into economic and innovation activity.
Channels	Creation of research-driven spin-offs and start-ups Intermediaries and knowledge transfer professional support
Type	Impact Quantitative Economic
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	ASTP Annual survey
Countries covered in the proposed data source	17 EU MS (Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovenia, Spain), Switzerland, Norway, Türkiye, United Kingdom.
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Cyprus, Egypt, Estonia, Georgia, Greece, Hungary, Iceland, Israel, Kosovo, Latvia, Lithuania, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Romania, Serbia, Slovakia, Sweden, Tunisia, Ukraine
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	To expand the geographical coverage, this survey could be launched at the EU level.
Notes	ASTP is a pan-European association of Knowledge Transfer professionals that collects and analyses data, supported by National Associations, combining their own surveys with national surveys.

Metric	**KTO AGREEMENTS**
Metric definition	Number of collaborative research, contract research, and consultancy agreements signed by KTOs, by the number of active companies
Rationale for selection	Ease of access No, or at most, low administrative burden for countries

	High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Timeliness and update potential
Objective	This indicator reflects the number of formal agreements negotiated and signed by KTOs to transfer academic or institutional expertise to external actors. It measures the operational activity and effectiveness of KTOs in facilitating formalised partnerships between research organisations and external stakeholders through collaborative research, contract research, and consultancy agreements, thereby assessing their contribution to the external exploitation and valorisation of publicly funded knowledge.
Channels	Academia-industry collaboration and mobility Intermediaries and knowledge transfer professional support
Type	Output Quantitative Economic
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	ASTP Annual survey
Countries covered in the proposed data source	17 EU MS (Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovenia, Spain), Switzerland, Norway, Türkiye, United Kingdom.
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Cyprus, Egypt, Estonia, Georgia, Greece, Hungary, Iceland, Israel, Kosovo, Latvia, Lithuania, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Romania, Serbia, Slovakia, Sweden, Tunisia, Ukraine
Proposed data collection level	Centralised: it can be built based on existing metrics
Methodological considerations	To expand the geographical coverage this survey could be launched at the EU level.
Notes	ASTP is a pan-European association of Knowledge Transfer professionals that collects and analyses data, supported by National Associations, combining their own surveys with national surveys.

Metric	INCOME FROM KTO AGREEMENTS
Metric definition	Total income received by KTOs from collaborative research, contract research, and consultancy agreements over GDP (PPP)
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for assessing the impact of value creation within the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the financial scale and economic relevance of knowledge transfer activities conducted by KTOs, by measuring their total income from collaborative research, contract research, and consultancy agreements relative to national economic output (GDP in PPP). This reflects the extent to which research institutions contribute to the economy through externally funded, application-oriented services.
Channels	Academia-industry collaboration and mobility Intermediaries and knowledge transfer professional support
Type	Impact Quantitative Economic
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	ASTP Annual survey
Countries covered in the proposed data source	17 EU MS (Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovenia, Spain), Switzerland, Norway, Türkiye, United Kingdom.
Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Cyprus, Egypt, Estonia, Georgia, Greece, Hungary, Iceland, Israel, Kosovo, Latvia, Lithuania, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Romania, Serbia, Slovakia, Sweden, Tunisia, Ukraine

Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	To expand the geographical coverage this survey could be launched at the EU level.
Notes	ASTP is a pan-European association of Knowledge Transfer professionals that collects and analyses data, supported by National Associations, combining their own surveys with national surveys.

Annex I.9 Metrics on Mobility

Metric	DOCTORATE DEGREE HOLDERS EMPLOYED IN INDUSTRY
Metric definition	Share of employed doctorate holders in industry over the total number of PhD holders
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Measures the extent to which doctorate holders contribute to industrial R&D and innovation, indicating the alignment between higher education outcomes and labour market demand.
Channels	Academia-industry collaboration and mobility
Type	Output Quantitative Economic
Disaggregation	Country Sector
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	The Research and Innovation Careers Observatory (ReICO)
Countries covered in the proposed data source	EU27 MS, Switzerland, Iceland, Israel, New Zealand, Norway, Türkiye, United Kingdom.

Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Canada, Egypt, Georgia, Kosovo, Moldova, Montenegro, Morocco, North Macedonia, Serbia, Tunisia, Ukraine
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	
Notes	

Metric	BUSINESS ENTERPRISE RESEARCHERS
Metric definition	Business enterprise researchers in full-time equivalent per thousand employment in the industry
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the research intensity of the business sector by measuring the concentration of R&D personnel within industry employment, reflecting the capacity of firms to generate and apply new knowledge for innovation and competitiveness.
Channels	Academia-industry collaboration and mobility
Type	Output Quantitative Economic
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	OECD Main STI [included in the ERA Monitoring]
Countries covered in the proposed data source	EU27 MS, Switzerland, Iceland, Israel, New Zealand, Norway, Türkiye, United Kingdom

Missing countries in the proposed data source	Albania, Armenia, Bosnia and Herzegovina, Canada, Egypt, Georgia, Kosovo, Moldova, Montenegro, Morocco, North Macedonia, Serbia, Tunisia, Ukraine
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	
Notes	

Annex I.10 Open Access Publications

Metric	OPEN ACCESS PUBLISHING
Metric definition	Share of publications available in open access (green, gold, and diamond) over the total number of publications
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the extent to which publicly funded, or research-based knowledge is made openly accessible, thereby enabling broader dissemination, uptake, and reuse of intellectual outputs beyond traditional commercial or proprietary channels. The indicator captures the openness of knowledge dissemination.
Channels	Intellectual assets management
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Already available at data source
Data availability	Data are expected to be annually updated
Data Source(s):	ERA Monitoring Scoreboard (based on OpenAire) – share of publications available in open access

Countries covered in the proposed data source	EU27 MS, Albania, Armenia, Bosnia and Herzegovina, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, Morocco, New Zealand, North Macedonia, Norway, Serbia, Tunisia, Türkiye (Turkey), Ukraine, United Kingdom.
Missing countries in the proposed data source	Egypt, Switzerland
Proposed data collection level	Centralised: the indicator is already available from a single data source
Methodological considerations	
Notes	Gold Open Access: immediate open publication with publisher-provided access Green Open Access: self-archiving by authors in repositories Diamond Open Access: fully open without author fees.

Metric	CITATIONS OF OPEN ACCESS PUBLICATIONS
Metric definition	Share of publications available in open access (green, gold, and diamond) that have received a forward citation
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the KV channel Comparability across countries Timeliness and update potential
Objective	Measures the extent to which openly accessible research publications are subsequently cited by other works, thereby capturing their diffusion, influence, and contribution to knowledge advancement, innovation, and valorisation.
Channels	Intellectual assets management
Type	Impact Quantitative Societal
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	OpenAire, Lens.Org, OpenCitations

Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it must be created anew, using data repositories that include all ERA countries.
Methodological considerations	
Notes	

Annex I.11 Metrics on PhD Start-ups

Metric	SHARE OF PHD START-UPS
Metric definition	Share of PhD startups over the total number of start-ups
Rationale for selection	No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the contribution of research-based entrepreneurship to the innovation ecosystem, reflecting the extent to which advanced scientific knowledge and doctoral expertise are transformed into new business ventures.
Channels	Academia-industry collaboration and mobility Creation of research-driven spin-offs and start-ups
Type	Output Quantitative Economic
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom

Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it must be created anew, using data repositories that include all ERA countries.
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Metric	VC FUNDING IN PHD START-UPS
Metric definition	Amount of VC funding in PhD start-ups by GDP (PPP)
Rationale for selection	No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the intensity of investment in research-based entrepreneurship, reflecting the capacity of the innovation and finance systems to support the growth and commercialisation of science-driven ventures relative to economic output.
Channels	Creation of research-driven spin-offs and start-ups
Type	Impact Quantitative Economic
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom
Countries covered in the proposed data source	Potentially all ERA countries

Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it must be created anew, using data repositories that include all ERA countries.
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Metric	EMPLOYMENT IN PHD START-UPS
Metric definition	Employment growth rate in PhD start-ups over the country's employment growth rate
Rationale for selection	No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Measures the relative employment growth of PhD-founded start-ups, indicating the role of science-driven ventures in expanding high-skilled jobs within the economy.
Channels	Creation of research-driven spin-offs and start-ups
Type	Impact Quantitative Economic
Disaggregation	Country
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None

Proposed data collection level	Centralised: it must be created anew, using data repositories that include all ERA countries.
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Annex I.12 Metrics on Researchers in Standardisation

Metric	RESEARCHERS IN STANDARDISATION
Metric definition	Number of researchers participating in the standardisation organisation or technical committees
Rationale for selection	High relevance and good proxy for measuring countries' capacity to activate the channel Alignment with EU policy priorities and frameworks
Objective	Measures the participation of researchers in standard-setting activities, indicating the integration of scientific expertise into the development of technical and industrial standards.
Channels	Standardisation
Type	Input Quantitative Societal
Disaggregation	Country Gender
Value format	Raw count
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	National standardisation offices (NSO)
Countries covered in the proposed data source	EU27
Missing countries in the proposed data source	
Proposed data collection level	Member States
Methodological considerations	

Notes	Raw count

Annex I.13 Metrics on Standards incorporating R&I

Metric	STANDARDS CITING SCIENTIFIC PUBLICATIONS
Metric definition	Share of standards that cited a scientific publication over the total number of standards
Rationale for selection	No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Closes coverage gaps Alignment with EU policy priorities and frameworks
Objective	Measures the extent to which scientific knowledge contributes to the development of standards by calculating the share of standards that explicitly reference scientific publications out of the total number of standards. This reflects the degree of integration between research outputs and standardisation processes, indicating the effectiveness of the standardisation channel as a means of knowledge valorisation.
Channels	Standardisation
Type	Output Quantitative Societal
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	National standardisation offices (NSO)
Countries covered in the proposed data source	Not applicable
Missing countries in the proposed data source	Not applicable
Proposed data collection level	Centralised: it must be created anew.
Methodological considerations	Through the NSO, it will be necessary to obtain access to the full text of standards to identify those citing scientific publications. This metric might underestimate the phenomenon of R&I contribution to standardisation since it comes from multiple sources (EU- and

	nationally funded projects, technical liaisons, and the participation of researchers and innovators in technical committees, among others). Currently, it is the best definition of standards incorporating R&I, but further refinement may be anticipated.
Notes	

Metric	STANDARDS INCORPORATING R&I'S PENETRATION OR ADOPTION RATES
Metric definition	Share of standards incorporating R&I adopted as national standards by national standardisation offices or companion standardisation offices over the total number of standards.
Rationale for selection	No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the KV channel Closes coverage gaps Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Measures the impact of standards that incorporate R&I inputs through recognition and usage by national standardisation offices and companion standardisation offices.
Channels	Standardisation
Type	Impact Quantitative Societal
Disaggregation	Country Sector
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	CEN-CENELEC and ETSI
Countries covered in the proposed data source	Potentially all countries
Missing countries in the proposed data source	Not applicable

Proposed data collection level	Centralised: it needs to be developed anew
Methodological considerations	
Notes	

Metric	STANDARDS INCORPORATING R&I'S CITATIONS
Metric definition	Average number of citations received by standards incorporating R&I inputs in patents and research papers
Rationale for selection	No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the KV channel Closes coverage gaps Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Quantifies the influence and relevance of standards incorporating R&I inputs by measuring the average number of citations these standards receive in patents and research publications. This reflects the extent to which standards incorporating R&I contribute to technological development and the advancement of scientific knowledge.
Channels	Standardisation
Type	Impact Quantitative Societal
Disaggregation	Sector
Value format	Raw count
Frequency of reporting	Annual
Metric availability	Not available at all and would require new data collection
Data availability	Data are expected to be annually updated
Data Source(s):	CEN-CENELEC and ETSI, and citation databases such as Lens or OpenCitation
Countries covered in the proposed data source	Not applicable (unless we refer to the country of the citing affiliation)
Missing countries in the proposed data source	Not applicable (unless we refer to the country of the citing affiliation)

Proposed data collection level	Centralised: it needs to be developed anew
Methodological considerations	
Notes	CEN-CENELEC has initiated this monitoring exercise on a voluntary basis. The resulting data should be expanded using patent or scholarly citation databases.

Annex I.14 Metrics on Research to Policy

Metric	RESEARCHERS IN GOVERNMENT
Metric definition	Share of full-time equivalent researchers in the government sector over the total number of full-time equivalent researchers
Rationale for selection	Ease of access No, or at most, low administrative burden for countries Institutional data source with no additional calculation required High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Timeliness and update potential
Objective	This indicator aims to assess the extent to which the government sector possesses internal research capacity that can support evidence-based policymaking. By measuring the share of full-time equivalent researchers employed in the government relative to the total researcher workforce, this indicator provides insight into the ability of public institutions to produce, absorb, and utilise research outputs directly. A higher share suggests a larger potential for integrating scientific knowledge into policy development, thereby enhancing the impact of research on societal outcomes through more informed and effective governance.
Channels	Policy uptake
Type	Output Quantitative Societal
Disaggregation	Country Gender
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated

Data Source(s):	Eurostat
Countries covered in the proposed data source	EU27, Albania, Bosnia and Herzegovina, Switzerland, Iceland, Liechtenstein, Montenegro, North Macedonia, Norway, Serbia, Türkiye, United Kingdom.
Missing countries in the proposed data source	Armenia, Canada, Egypt, Georgia, Israel, Kosovo, Moldova, Morocco, New Zealand, Tunisia, Ukraine
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering some ERA countries
Methodological considerations	
Notes	An alternative measure to capture the process dimension would be the share of full-time equivalent researchers in the government sector over the total number of government employees.

Metric	R&I POLICY UPTAKE
Metric definition	Number of national laws, regulations, and policy documents citing academic research outputs per million inhabitants
Rationale for selection	Ease of access High relevance and good proxy for measuring countries' capacity to activate the channel Closes coverage gaps Comparability across countries Scalability and flexibility Timeliness and update potential
Objective	Measures the extent to which academic research outputs are formally referenced and integrated into national policymaking processes, as reflected in citations within laws, regulations, and policy documents.
Channels	Policy uptake
Type	Output Quantitative Societal
Disaggregation	Country Sector
Value format	Raw count
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data

Data availability	Data are expected to be annually updated
Data Source(s):	Overton and Eurostat
Countries covered in the proposed data source	Potentially all countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering some ERA countries
Methodological considerations	Caution is needed since academic-style referencing is not commonly used in most policy fields, meaning that the absence of citations does not necessarily indicate an absence of evidence use, posing the risk of underestimation. Additionally, it is worth noting that the proposed source employs broad definitions of "policy documents."
Notes	Overton is not an open-source database. Therefore, a licence would be needed.

Annex I.15 Metrics on Start-ups and Spin-offs with Intellectual Assets

Metric	STARTUPS WITH PATENT APPLICATIONS
Metric definition	Share of startups with patent applications over the total number of start-ups
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the extent to which start-ups and spin-offs originating from research activities seek formal IP protection for their innovations, thereby measuring their orientation toward high-value, knowledge-intensive innovation and long-term competitive positioning.
Channels	Creation of research-driven spin-offs and start-ups Intellectual assets management
Type	Output Quantitative

	Economic
Disaggregation	Country Sector
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering all ERA countries
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Metric	FUNDING IN STARTUPS WITH PATENT APPLICATIONS
Metric definition	Amount of VC funding in start-ups with patent applications by GDP (PPP)
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the channel Comparability across countries Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	This indicator captures the volume of VC investment mobilised in support of start-ups and spin-offs rooted in scientific research or advanced technologies. A higher VC investment volume signals that these ventures are perceived as commercially viable and scalable by professional investors, a strong proxy for external validation of knowledge valorisation potential. It assesses the capacity of the innovation ecosystem to attract private investment for scaling research-based start-ups and spin-offs by measuring the total amount of venture capital (VC) funding raised relative to the

	country's national economic output (GDP in purchasing power parity). This reflects the maturity, market readiness, and investment appeal of research-driven entrepreneurship.
Channels	Creation of research-driven spin-offs and start-ups
Type	Impact Quantitative Economic
Disaggregation	Country Sector
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering all ERA countries
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Metric	EMPLOYMENT IN STARTUPS WITH PATENT APPLICATIONS
Metric definition	Employment growth rate in start-ups with patents over the country's employment growth rate
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for assessing the impact of value creation within the channel Comparability across countries Alignment with EU policy priorities and frameworks Timeliness and update potential

Objective	Evaluates how effectively science-based and IP-rich ventures contribute to employment growth. By focusing on start-ups and spin-offs with patent applications, it isolates those likely to be engaged in: high-value innovation, scalable business models, and technology-driven market creation. The employment growth rate in these ventures serves as a proxy for their economic dynamism and potential for expansion.
Channels	Creation of research-driven spin-offs and start-ups
Type	Impact Quantitative Economic
Disaggregation	Country Sector
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering all ERA countries
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Metric	**STARTUPS AND SPIN-OFFS WITH IP ASSETS**
Metric definition	Number of start-ups and spin-offs with IP assets (beyond patents) over the total number of start-ups
Rationale for selection	No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Scalability and flexibility Alignment with EU policy priorities and frameworks

	Timeliness and update potential
Objective	Assesses the extent to which start-ups and spin-offs strategically leverage diverse intellectual property assets beyond patents, reflecting the maturity of knowledge management practices and the role of intangible assets in driving innovation and competitiveness.
Channels	Creation of research-driven spin-offs and start-ups Intellectual assets management
Type	Output Quantitative Economic
Disaggregation	Country
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering all ERA countries
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Annex I.16 Metrics on University Spin-outs

Metric	UNIVERSITY SPINOUT
Metric definition	Number of university spin-outs per million inhabitants
Rationale for selection	Ease of access No, or at most, low administrative burden for countries High relevance and good proxy for measuring countries' capacity to activate the channel Comparability across countries

	Scalability and flexibility Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the capacity of universities and public research institutions to generate new ventures based on academic research, reflecting the effectiveness of technology transfer, knowledge commercialisation, and research-based entrepreneurship relative to population size.
Channels	Academia-industry collaboration and mobility Creation of research-driven spin-offs and start-ups
Type	Output Quantitative Economic
Disaggregation	Country Sector
Value format	Percentage
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering all ERA countries
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Metric	FUNDING IN UNIVERSITY SPINOUTS
Metric definition	Amount of VC funding in university spinouts by GDP (PPP)
Rationale for selection	Ease of access No, or at most, low administrative burden for countries

	High relevance and good proxy for assessing the impact of value creation within the channel Comparability across countries Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the intensity of investment in university-originated ventures, reflecting the capacity of the innovation and finance systems to support the growth, scaling, and commercialisation of academic research relative to economic output.
Channels	Creation of research-driven spin-offs and start-ups
Type	Impact Quantitative Economic
Disaggregation	Country Sector
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering all ERA countries
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

Metric	EMPLOYMENT IN UNIVERSITY SPIN-OUTS
Metric definition	Employment growth rate in university spinouts over the country's employment growth rate
Rationale for selection	Ease of access No, or at most, low administrative burden for countries

	High relevance and good proxy for assessing the impact of value creation within the channel Comparability across countries Alignment with EU policy priorities and frameworks Timeliness and update potential
Objective	Assesses the employment-generating capacity and growth performance of university-originated ventures relative to the wider economy, reflecting the contribution of research-based entrepreneurship to job creation, innovation diffusion, and economic development.
Channels	Creation of research-driven spin-offs and start-ups
Type	Impact Quantitative Economic
Disaggregation	Country Sector
Value format	Ratio
Frequency of reporting	Annual
Metric availability	Not directly available but could potentially be derived from existing data
Data availability	Data are expected to be annually updated
Data Source(s):	Dealroom (numerator) and Eurostat (denominator)
Countries covered in the proposed data source	Potentially all ERA countries
Missing countries in the proposed data source	None
Proposed data collection level	Centralised: it needs to be developed anew using repositories covering all ERA countries
Methodological considerations	
Notes	Dealroom is a licence-based database that the Commission has access to.

ANNEX II - List of stakeholders consulted

- ANI - Agência Nacional de Inovação
- ANR - Agence Nationale de la Recherche (French National Research Agency)
- Alliance Manchester Business School
- Asociación Española de Normalización
- ASTP - Association of European Science and Technology Transfer Professionals
- ASTP-NAAC - Association of European Science and Technology Transfer Professionals – Network of Academic Centres (network hosted byFondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico)
- Austrian Centre for Social Innovation
- Austrian Federal Ministry for Innovation
- Babraham Institute
- BELSPO - Belgian Science Policy Office
- BMFWF - Bundesministerium für Bildung, Wissenschaft und Forschung (Austrian Federal Ministry of Education, Science and Research)
- Board of the Swiss Federal Institutes of Technology
- Bpifrance
- Brunel University London
- CEN-CENLEC - European Committee for Standardization (CEN) and European Committee for Electrotechnical Standardization (CENELEC)
- CERN - European Organization for Nuclear Research (*Conseil Européen pour la Recherche Nucléaire*)
- Consejo Superior de Investigaciones Científicas
- CRG - Centre for Genomic Regulation
- CWTS - Centre for Science and Technology Studies, Leiden University
- Department of Enterprise, Tourism and Employment
- DevStat (Spain)
- DG EAC -Directorate-General for Education, Youth, Sport and Culture (European Commission)
- DG ESTAT - Directorate-General for Statistics (Eurostat)
- DG RTD - Directorate-General for Research and Innovation
- EARTO / TNO - EARTO - European Association of Research and Technology Organisations / TNO - Netherlands Organisation for Applied Scientific Research
- ECIU -European Consortium of Innovative Universities
- ECSA - European Citizen Science Association
- Eindhoven University of Technology

- EIT Manufacturing – European Institute of Innovation and Technology
- Enterprise Ireland
- Enterprise Estonia
- ERCEA - European Research Council Executive Agency
- ETSI - European Telecommunications Standards Institute
- EU-LIFE - Alliance of Leading European Research Centres in Life Sciences
- EASSH - European Alliance for Social Sciences and Humanities
- European Citizen Science Association
- European Institute of Oncology
- EPO - European Patent Office
- ERT - European Roundtable for Industry
- EUIPO - European Union Intellectual Property Office
- European University Association
- Fraunhofer-Gesellschaft
- GIMM - Gulbenkian Institute for Molecular Medicine
- General Secretariat for Research and Innovation/Ministry of Development of Greece
- Government of Flanders, Belgium Department WEWIS
- Humanities Venture Lab - University of Amsterdam
- INEGI - Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography, Mexico)
- Institut Curie
- Instituto Nacional de Estadistica
- IASP - International Association of Science Parks and Areas of Innovation
- International Institute of Molecular and Cell Biology in Warsaw
- JCU - James Cook University
- JRC - Joint Research Centre (European Commission)
- JSI - Jožef Stefan Institute
- LERU - League of European Research Universities
- Leiden University
- Linköping University
- MCCA - Marie Curie Alumni Association
- Max Delbrück Center
- Ministry of Culture, Innovation and Higher Education
- Ministry of Economic Affairs and Employment
- Ministry of Education and Culture

- Ministry of Education and Research
- Ministry of Education, Science and Sport
- Ministry of Science, Education and Youth of Croatia
- Ministry of Education and Research of Norway
- Ministry of Science, Innovation and Universities (Spain)
- MSEY Ministry of Science, Education and Youth (Croatia)
- National Institute of Biology
- Netherlands Cancer Institute
- NOSC-UA DIH - National Open Science Cloud – Ukraine Digital Innovation Hub
- Nova University (Lisbon)
- NovaUCD, University College Dublin
- OECD - Organisation for Economic Co-operation and Development
- Rathenau Instituut
- REA - European Research Executive Agency
- Research Council of Lithuania
- Saxion UAS - University of Applied Sciences
- Science Europe
- Science Metrix
- Social Innovation Factory
- SPW EER - Service Public de Wallonie – Économie, Emploi et Recherche
- Stickydot
- Stifterverband
- SwissCore
- Techleap
- Technology Agency of the Czech Republic
- Ternopil National Medical University, Scientific Committee of the National Council of Ukraine for the Development of Science and Technology
- The Guild
- TUBITAK - Scientific and Technological Research Council of Türkiye
- Universidad Carlos III de Madrid
- UM – Universiteit Maastricht
- University of Antwerp
- University of Copenhagen
- University of Cyprus
- University of Eastern Finland

- University of Ljubljana
- University of Luxembourg
- University of Rijeka
- University of South-Eastern Norway
- University of Southern Denmark
- University of Stavanger
- University of Trento
- UPF - Barcelona School of Management
- Vilnius University
- Vinnova - Sweden's Innovation Agency
- VLAIO - Vlaams Agentschap Innoveren en Ondernemen (Flanders Innovation & Entrepreneurship Agency)
- VTT - Technical Research Centre of Finland
- WEWIS - Economy, Science and Innovation Department (Flanders)
- World Bank
- WIPO - World Intellectual Property Organization
- Xjenza Malta - Malta Council for Science and Technology
- YERUN – Young European Research Universities Network

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union.
You can contact this service:

– by freephone: **00 800 6 7 8 9 10 11** (certain operators may charge for these calls),

– at the following standard number: **+32 22999696**,

– via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU Publications

You can view or order EU publications at op.europa.eu/en/publications.
Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

As part of an action of the European Research Area (ERA) Policy Agenda 2025-27, the study investigates how research and innovation activities generate economic and societal value across the EU and associated countries, responding to growing interest in knowledge valorisation as a key driver of economic growth, innovation capacity, and strategic autonomy. The study reviews current evidence and establishes an exploratory framework that integrates 16 indicators and 41 metrics, combining established measures with emerging ones from open data, administrative sources and new analytical methods. It includes a selection of indicators on knowledge transfer and academia-industry collaboration, as well as indicators that capture other value creation pathways, such as research in standardisation, policy-making, and citizen engagement. It highlights weaknesses in the evidence base, including data gaps, inconsistent definitions and differences in national practices. The study concludes with recommendations for pilot testing, methodological refinement and greater data alignment to support a harmonised EU approach to monitoring knowledge valorisation in Member States and associated countries.

Studies and reports

Publications Office
of the European Union