ERA Dashboard 2023

Methodology Report

Independent
Expert
Report

ERA Dashboard 2023 – Methodology Report

Brussels: DG Research & Innovation, 2024

EUROPEAN COMMISSION

ERA Dashboard 2023

Methodology Report

Table of contents

1. Introduction

The ERA Dashboard includes a set of indicators aiming to monitoring progress of the EU Member States and the Associated Countries towards the ERA objectives.

This Methodology Report provides more details on the measurement framework (Section 2) and the indicator definitions and data sources (Section 3). All data and processed results are available in the ERA Dashboard 2023 Replication Package.

2. Measurement framework

Based on preparatory work by CSES[1], an analytical report developed by six experts[2] and those agreed upon and provided by the Contracting Authority, the final list of indicators is as follows:

---

[1] CSES, Data gathering and analysis of policy developments and reforms: Study to evaluate the ERA policy framework/ERA monitoring mechanism, RTD/2020/SC/013, European Commission.

[2] Amanatidou, E., H. Hollanders, J. Kolar, B. Mahieu, C. Nauwelaers, and M. Guasp Teschendorff, Design of the new ERA Monitoring System – Analytical Report, European Commission, 2022.

Table 1 : Indicators included in the ERA Dashboard

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
1	Gross Domestic Expenditure on R&D (GERD) as percentage of GDP	General Indicators	Eurostat	Measures research and development expenditure, by sectors of performance. Sum of all sectors divided by each country's GDP.
2	Government Budget Allocations for R&D (GBARD) as share of GDP	General indicators	Eurostat	Total government budget allocations for R&D (GBARD) in million euros as percentage of GDP. The GBARD data measure the level of government support for R&D activities, offering insights into the relative importance assigned by governments to various public R&D funding initiatives.
3	Researchers (in full-time equivalent) per million inhabitants	General indicators	Eurostat	Direct measure of the number of R&D workers per 1 million people. It is identical to UN SDG indicator 9.5.2.
4	Business expenditure on Research and Development (BERD) as percentage of GDP	General Indicators	Eurostat	Measures the business expenditure on R&D (BERD) in million euros as percentage of GDP. The data for BERD was retrieved by accounting for BERD in all economic activities in the European Community by country (NACE Rev. 2).
5	Share of publications available in Open Access (green, gold, and diamond)	Open Science	Open AIRE	Measures the share of publications available in open access.
6	Percentage of the metadata related to publicly funded research datasets which are defined as Open Data that are discoverable through EOSC federated infrastructure	Open Science	NA	Solid data for the EOSC Survey 2022 was not available at the time of analysis, therefore, the information was not included.
7	Share of investments in the EOSC as a percentage of total public R&D and/or per 1000 researchers	Open Science	NA	Solid data for the EOSC Survey 2022 was not available at the time of analysis, therefore, the information was not included.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
8	Share of national public R&D expenditure committed to European research infrastructures	Research Infrastructures	ESFRI	Data for this indicator has been provided by ESFRI. Instead of the Share of national public R&D expenditure committed to joint programmes and initiatives, research infrastructures and European Partnerships the Dashboard report includes the Share of national public R&D expenditure committed to European research infrastructures.
9	Number of European research infrastructures in which a Member State or an Associated Country participates (financially contributes to operations)	Research infrastructures	ESFRI	Indicates an engagement with European research infrastructures at a national level.
10	Share of higher education institutions or public/private research institutions with a Gender Equality Plan	Gender, equality, equal opportunities for all and inclusiveness	NA	Horizon Europe established a requirement of having a Gender Equality Plan for the HEIs applying to Horizon´s funds. Nevertheless, there is no data clarifying the exact number of plans of the HEIs that applied to Horizon Europe.
11	Share of women in grade A positions in HEIs	Gender, equality, equal opportunities for all and inclusiveness	Women in Science Database	Tracks progress in improvements of women's participation in the highest levels of academia.
12	Proportion of papers with mixed gender authorship, 2000-2020	Gender, equality, equal opportunities for all and inclusiveness	Science-Metrix using the Scopus database (Elsevier) and NamSor	Measures the proportion of papers in the Scopus database and NamSor with co-authorship between 2000-2020 with mixed gender authorship, out of all available papers.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
13	Proportion of women in authorships of the top 10% most cited publications	Gender, equality, equal opportunities for all and inclusiveness	Science-Metrix using the Scopus database (Elsevier) and NamSor	This indicator measures the proportion of women in highly cited publications (top 10% most cited publications) in the Scopus database and NamSor between 2000-2018 out of all available papers.
14	Women in Digital Index	Gender, equality, equal opportunities for all and inclusiveness	Eurostat	The Women in Digital (WiD) index is an aggregate indicator that brings together 13 other indicators that assess the performance of Member States in three main areas: (1) Internet use, (2) Internet user skills, and (3) specialist skills and employment.
15	Proportion of women among doctoral graduates by narrow fields of STEM	Gender, equality, equal opportunities for all and inclusiveness	Eurostat	Measures the proportion of women that graduated from a doctoral program or equivalent level in the fields of STEM, including categories such as natural science, mathematics and statistics, or biological and related sciences.
16	Share of foreign doctorate students as a percentage of all doctorate students	Researchers' careers and mobility and research assessment and reward systems	Eurostat	Measures the share of mobile students from abroad enrolled in doctoral positions or equivalent level.
17	New doctorate graduates per 1,000 inhabitants aged 25-34	Researchers' careers and mobility and research assessment and reward systems	Eurostat	Measures the number of individuals with doctoral-level degrees in fields such as science, mathematics, computing, engineering, manufacturing, and construction, per 1000 people aged 25-34.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
18	Job-to-job mobility of Human Resources in Science and Technology	Researchers' careers and mobility	Eurostat	Measures the exchange of knowledge resulting from people moving between one job and another. Not all changes in jobs include the creation of knowledge or the diffusion of knowledge, but it is more likely that knowledge creation and diffusion take place when more employees move between jobs.
19	Share of public-private co-publications per 1 mio inhabitants	Knowledge valorisation	Eurostat & Bibliometrics	Measures the share of public-private publications to the population of the country.
20	Best practice examples and methodologies for knowledge valorisation	Knowledge valorisation	NA	This represents qualitative information that has been added narratively to the Dashboard report.
22	Number of PCT patent applications divided by GDP in million euros	Knowledge valorisation	OECD & Eurostat	Measures the ratio of PCT (Patent Cooperation Treaty) patent applications divided by GDP in million.
23	Share of innovating firms collaborating with higher education institutions or public/private research institutions	Knowledge valorisation	Eurostat	Measures collaboration, and thus exchange of knowledge between the business and public sector.
25	Business enterprise researchers as % of national researchers	Knowledge valorisation	OECD	Measures a share of researchers in the business sector, suggesting private-sector investment in research and development.
26	Business enterprise researchers in full-time equivalent per thousand employees in industry	Knowledge valorisation	OECD	Measures the importance of business enterprise researchers in comparison to employment in the industry.
27	Number of scientific publications among the top 10% most cited publications worldwide as a percentage of all publications	Scientific Leadership	Scopus	Measure for the efficiency of the research system, as highly cited publications are likely to be of higher quality. There could be a bias towards small or English-speaking countries given the coverage of Scopus' publication data.
28	Academic Freedom Index (AFi)	Scientific leadership	Vdem	The Academic Freedom Index is designed to provide an aggregated measure that captures the de facto realization of academic freedom, including the degree to which higher-education institutions are autonomous.
29	ERC grants by total R&D expenditure	Scientific Leadership	NA	Although the DG RTD and the ERC provided data on this indicator, it is not possible to extract the financial information.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
30	International co-publications with non-EU partners per 1,000 researchers	Global engagement	Eurostat and Scopus	International scientific co-publications are a proxy for the quality of scientific research as collaboration increases scientific productivity. Non-EU is defined as non-EU Member States.
31	European and international co-patenting in EPO applications at national and EU level	Global engagement	Eurostat	The indicator measures the number of requests for patent protection of an invention filed with the European Patent Office (EPO) regardless of whether they are granted or not.
32	EU co-patenting at the EPO according to applicants´/inventors´ country of residence by international patent classification (IPC) sections-number	Global engagement	NA	Eurostat only presents data at the EU level. Hence, due to the lack of information at the national level in the countries covered by the dashboard, the indicator is not part of the analysis.
33	Government budget allocations for R&D (GBARD) according to NABS as share of total GBARD	Challenge-based ERA actions	Eurostat	GBARD data are covering all public budget spending related to R&D and are linked to policy issues by means of a classification by "objectives" or "goals" (NABS 2007) - Programmes are allocated between socio-economic objectives.
34	R&I investments (transnational cooperation): GBARD (EUR) allocated to Europewide transnational, bilateral or multilateral, public R&D programmes per FTE researcher in the public sector	Challenge-based ERA actions	Eurostat	It measures the share of governmental budget provisions in R&D in public project, institutional and national to transnational, bilateral or multilateral funding, per public researcher.
35	Environmentally related government R&D budget as percentage of total government R&D	Challenge-based ERA actions	OECD Green Growth Indicators Database	Monitors progress on research activities supporting the EU Green deal.
37	National public and private investments as suggested in the SET Plan progress report 2021 (in EUR, million)	Challenge-based ERA actions	SETIS research and innovation data	An absolute measure of national public and private investments.
38	OECD Patents on environment technologies	Challenge-based ERA actions	OECD	Monitors the number of patents in environment-related technologies.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
39	Share of researchers receiving transferable skills training	Synergies with education and the European Skills Agenda	MORE Survey	Measures the extent of formal and informal training received by PhD students.
40	Innovative enterprises that co-operated on R&D and other innovation activities with universities and higher education institutions	Synergies with education and the European Skills Agenda	Eurostat	Measures the number of innovative enterprises that co-operated on R&D and other innovation activities with universities and other higher education institutions.
41	Direct government support plus Indirect government support through R&D tax incentives as a percentage of GDP	Synergies with sectorial policies and industrial policies	Eurostat for data on direct support OECD R&D Tax Incentive Database for data on indirect support	Public financing of R&D can take two forms: direct funding for R&D through instruments such as grants and public procurement, and indirect support through the tax system. Over time, more countries have introduced R&D tax incentives.
46	Share of investments in Citizen Science as a percentage of total public R&D and/or per 1,000 researchers	An active citizen and societal engagement in research and innovation (Trust in Science)	NA	The data is not available in EOSC Observatory and there are no other sources providing a good proxy for the indicator.
48	Trust in Science	An active citizen and societal engagement in research and innovation (Trust in Science)	Eurobarometer	An indicator measuring trust in science.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
49	Increase in total R&D expenditure in widening countries expressed as a percentage of GDP	More investments and reforms in countries and regions with lower R&I performance	Eurostat	Monitors widening countries' share in EU research activities. Widening countries include Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia.
50	Value of participation in Horizon Europe in million EUR in a given year divided by the countries´ GDP	More investments and reforms in countries and regions with lower R&I performance	NA	The data is not available by year. Hence, it is impossible to disaggregate the data and therefore, there is not enough information to compare among countries.
51	Share of Seal of Excellence rewards that received funding from other sources	Synergies between Union, national and regional funding programmes	NA	The data is only available for the number of SoE projects in Horizon Dashboard, but no further financial information is accessible. As there are no alternative data sources, the indicator is not included in the analysis.
52	Number of early career research managers participating in training programmes, staff exchanges, networks as share of total number of researchers	Increased collaborative links and on the excellence-based integration of Research Performing Organisations (RPOs)	NA	The data information is not available from the European Association of Research Managers and Administrators (EARMA). As there are no alternative data sources, the indicator is not included in the analysis.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
53	Number of more experienced research managers participating in training, in order to lead out on the research management teams as share of total number of researchers	Increased collaborative links and on the excellence-based integration of Research Performing Organisations (RPOs)	NA	The data is not available in EARMA. As there are no alternative data sources, the indicator is not included in the analysis.
54	Number of collaboration networks of RPOs in Widening countries with other EU countries	Increased collaborative links and on the excellence-based integration of Research Performing Organisations (RPOs)	NA	The data information was not available in CORDIS. Therefore, as there are no alternative data sources, the indicator is not included in the analysis.
55	Share of public R&D expenditures financed by the private sector	Coordination of R&I investments	Eurostat	Measures public-private co-operation in research. The willingness of the private sector to co-fund public R&I projects could be a proxy for how closely companies work with universities and public research organisations.

	ERA Dashboard indicator	ERA Pact sub-priorities	Source	Rationale
56	Government budget allocations for R&D (GBARD) allocated to Europe-wide transnational, as well as bilateral or multilateral, public R&D programmes per FTE researcher	Support to prioritise and secure long-term R&I investments and policy reforms	Eurostat	Reflects the emphasis on collaboration and sharing of experiences in R&D across borders, whether national, regional or organisational. Europe-wide transnational public R&D programmes include R&D programmes that involve the flow of funds across borders for research purposes, as well as those that include transnational cooperation. Bilateral or multilateral public R&D programmes comprise non-European Commission funded R&D research conducted jointly by at least two Member State governments, involving either the flow of funds or transnational cooperation.

3. Indicator definitions and data sources

This chapter provides the definitions, data sources, and calculation rules for each of the indicators used in the ERA Dashboard.

Indicator #1	Gross Domestic Expenditure on R&D (GERD) as a percentage of GDP
Data source	Eurostat
Dataset	GERD by sector of performance [RD_E_GERDTOT] https://ec.europa.eu/eurostat/databrowser/product/view/rd_e_gerdtot?lang=en
Last update	29 March 2023
Time frequency	Annual
Time coverage	2010 - 2021
Unit of measure	Percentage of gross domestic product (GDP)
Countries	EU, 27 Member States, Iceland, Montenegro, Norway, Serbia, Türkiye
Data source	OECD (https://stats.oecd.org/)
Dataset	Main Science and Technology Indicators
Last update	March 2023 edition
Time frequency	Annual
Time coverage	2010 - 2021
Unit of measure	Percentage of gross domestic product (GDP)
Countries	Israel
Data source	UNESCO Institute for Statistics (http://data.uis.unesco.org/)
Dataset	Science, technology and innovation
Last update	February 2023 edition
Time frequency	Annual
Time coverage	2015 - 2021
Unit of measure	Percentage of gross domestic product (GDP)
Countries	Armenia, Georgia

Indicator #2	Government Budget Allocations for R&D (GBARD) as share of GDP
Calculation rule	100 * Numerator / Denominator
Numerator	
Data source	Eurostat
Dataset	GBARD by socioeconomic objectives (NABS 2007) [GBA_NABSFIN07] https://ec.europa.eu/eurostat/databrowser/view/gba_nabsfin07/default/table?lang=en

Last update	03 August 2023
Time frequency	Annual
Time coverage	2010 - 2022
Unit of measure	Million euros
Countries	EU, 27 Member States, Norway, Turkey, Serbia, Iceland, Montenegro, Georgia, Armenia and Israel
Denominator	
Data source	Eurostat
Dataset	GDP and main components (output, expenditure and income) [NAMA_10_GDP] https://ec.europa.eu/eurostat/databrowser/view/nama_10_gdp/default/table?lang=en
Last update	20 October 2023
Time frequency	Annual
Time coverage	2010 - 2021
Unit of measure	Million euro (current prices)
Countries	EU, 27 Member States, Norway, Türkiye, Serbia, Iceland and Montenegro
Variable	
Data source	World Bank
Dataset	GDP (current US$) [NY.GDP.MKTP.CD] https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
Last update	19 September 2023
Time frequency	Annual
Time coverage	2010 - 2022
Unit of measure	USD (current prices)
Countries	Georgia, Armenia and Israel

Indicator #3	Researchers (in full-time equivalent) per million inhabitants
Calculation rule	1,000,000 * Numerator / Denominator
Numerator	
Data source	Eurostat
Dataset	R&D personnel by sector of performance, professional position and sex [RD_P_PERSOCC] https://ec.europa.eu/eurostat/databrowser/product/view/rd_p_persocc?lang=en
Last update	29 March 2023
Time frequency	Annual
Time coverage	2010 - 2021

Professional position	Researchers
Unit of measure	Full-time equivalent (FTE)
Countries	EU, 27 Member States, Iceland, Montenegro, Norway, Serbia, Türkiye
Denominator	
Data source	Eurostat
Dataset	Population on 1 January by age and sex [DEMO_PJAN] https://ec.europa.eu/eurostat/databrowser/product/view/demo_pjan?lang=en
Last update	3 July 2023
Time frequency	Annual
Time coverage	2010 - 2021
Unit of measure	Number
Countries	EU, 27 Member States, Iceland, Montenegro, Norway, Serbia, Türkiye
Variable	
Data source	UNESCO Institute for Statistics (http://data.uis.unesco.org/)
Dataset	Science, technology and innovation
Last update	February 2023 edition
Time frequency	Annual
Time coverage	2015 - 2021
Unit of measure	Researchers per million inhabitants (FTE)
Countries	Georgia
No data	Armenia, Israel

Indicator #4	Business expenditure on Research and Development (BERD) as percentage of GDP
Calculation rule	100 * Numerator / Denominator
Numerator	
Data source	Eurostat
Dataset	BERD by NACE Rev. 2 activity [RD_E_BERDINDR2__custom_5031360] https://ec.europa.eu/eurostat/databrowser/view/rd_e_berdindr2/default/table?lang=en
Last update	27 January 2023
Time frequency	Annual
Time coverage	2010 - 2022
Unit of measure	Million euros
Countries	EU, 27 Member States, Norway, Türkiye, Serbia, Montenegro, Georgia, Armenia, Iceland and Israel
Denominator	

Data source	Eurostat
Dataset	GDP and main components (output, expenditure and income) [NAMA_10_GDP] https://ec.europa.eu/eurostat/databrowser/view/nama_10_gdp/default/table?lang=en
Last update	20 October 2023
Time frequency	Annual
Time coverage	2010 - 2021
Unit of measure	Million euro (current prices)
Countries	EU, 27 Member States, Norway, Türkiye, Serbia, Montenegro and Iceland
Variable	
Data source	World Bank
Dataset	GDP (current US$) [NY.GDP.MKTP.CD] https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
Last update	19 September 2023
Time frequency	Annual
Time coverage	2010 - 2022
Unit of measure	USD (current prices)
Countries	Georgia, Armenia and Israel

Indicator #5	Share of publications available in open access
Data source	DG Research and Innovation - Common R&I Strategy and Foresight Service - Chief Economist Unit based on Science-Metrix using the Scopus database and 1findrdatabases
Report	European Commission, Science, Research and Innovation Performance of the EU (SRIP) report https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/publications/all-publications/science-research-and-innovation-performance-eu-2022-report_en
Source	Figure 6.1-6 Open access scientific publications with digital object identifier (DOI) as % of total scientific publications with (DOI), 2009 and 2019
Time frequency	Annual
Time coverage	2009, 2019
Unit of measure	Percentage share
Countries	EU, 27 Member States, Iceland, Israel, Montenegro, Norway, Serbia, Türkiye
No data	Armenia, Georgia

Indicator #6	Percentage of the metadata related to publicly funded research datasets which are defined as Open Data that are discoverable through EOSC federated infrastructure
Data source	NA
	Solid data for the EOSC Survey 2022 was not available at the time of analysis, therefore, the information was finally not included.

Indicator #7	Share of investments in the EOSC as a percentage of total public R&D and/or per 1,000 researchers
Data source	NA
	Solid data for the EOSC Survey 2022 was not available at the time of analysis, therefore, the information was finally not included.

Indicator #8	Share of national public R&D expenditure committed to European research infrastructures
Data source	ESFRI, the European Strategy Forum on Research Infrastructures
Time coverage	2022
Unit of measure	Percentage
Calculation rule	$$I_8 = \frac{Fees\ and\ host\ contributions}{R\&D\ (HES + GOV)} * 100$$
Numerator	Fees and host contributions
Source	ESFRI - Annual participation fees and host contributions about European Research Infrastructures, with at least three MS contributing, in the year 2022. For participation fees, in-cash contributions are reported, while host premium contributions can be either in cash or in-kind.
Denominator	Public R&D expenditures (HES + GOV)
Source	ESFRI
Countries	Belgium, Bulgaria, Spain, France, Greece, Hungary, Italy, Latvia, Malta, The Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Iceland and Norway
No Data	Armenia, Austria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Georgia, Ireland, Israel, Lithuania, Luxembourg, Serbia, Sweden and Türkiye

Indicator #9	Number of European research infrastructures in which a Member State or an Associated Country participates (financially contributes to operations)
Data source	ESFRI, the European Strategy Forum on Research Infrastructures
Report	ESFRI – Strategy Report on Research Infrastructures roadmap 2021 https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/publications/all-publications/science-research-and-innovation-performance-eu-2022-report_en

| Source | Part 3 Project & Landmarks, the catalogue (https://roadmap2021.esfri.eu/projects-and-landmarks/browse-the-catalogue/)

The ESFRI Landmarks are RIs that were implemented, or reached an advanced Implementation Phase under the Roadmap, and that represent major elements of competitiveness of the ERA. The Landmarks can be already delivering science services and granting user access, or can be in advanced stage of construction with a clear schedule for the start of the Operation Phase. The Landmarks need continuous support and advice for successful completion, operation and – if necessary – upgrade to achieve optimal management and maximum return on investment |
|---|---|
| Time frequency | Annual |
| Time coverage | 2021 |
| Unit of measure | n |
| Countries | EU, 27 Member States, Iceland, Israel, Norway, Serbia, Türkiye |
| No data | Armenia, Georgia, Montenegro |

Indicator #10	Share of higher education institutions or public/private research institutions with a Gender Equality Plan
Data source	NA
	Among the requirements to apply to Horizon Europe´s funds, the organisation imposed the necessity of counting with at least one Gender Equality Plan per High Education Institution.

Looking to the data available, it is impossible to settle the share as there is not information clarifying the number of Gender Equality Plans each HEI has. In addition, there is not data available about HEIs with those gender plans that have not applied to the Horizon funds.

Therefore, the lack of information on this indicator has led to not developing a study on it. |

Indicator #11	Share of women in grade A positions in higher education institutes
Dataset	She Figures 2021 https://quantos-stat.shinyapps.io/GUI_SF/
Data source	Women in Science database
Option 1	Proportion (%) of women among Academic staff
Grade	A
Field of R&D	Total
Position	Academic staff
Time frequency	Annual
Time coverage	2010 - 2019

Countries	Bulgaria (9), Croatia (3), France (3), Greece (5), Germany (9), Ireland (6), Italy (9), Latvia (7), Lithuania (3), Luxembourg (1), Malta (3), Netherlands (9), Poland (7), Romania (9), Slovakia (4), Slovenia (4), Spain (9), Sweden (5), Iceland (3), Israel (5), Switzerland (9), Türkiye (3) (Number of years for which data are available)
Option 2	Proportion (%) of women among Academic staff
Grade	A
Field of R&D	Total
Position	<u>Researchers</u>
Time frequency	Annual
Time coverage	2010 - 2019
Countries	Austria (4), Belgium (8), Croatia (3), Cyprus (8), Denmark (9), Finland (8), France (3), Germany (2), Hungary (9), Latvia (9), Luxembourg (2), Malta (4), Poland (7), Portugal (9), Romania (5), Spain (9), Norway (8), Switzerland (9), Türkiye (3) (Number of years for which data are available)
Calculation rule #1	If available, results for Option 1 are used, otherwise, results for Option 2 are used
Calculation rule #2	The results for the EU are calculated as the unweighted average of the %-shares of all Member States for which data are available after imputing for missing data
No data	Czechia, Estonia, Armenia, Georgia, Montenegro, Serbia

Indicator #12	Proportion of papers with mixed gender authorship, 2000-2020
Data source	Scopus database (Elsevier) and NamSor
Calculations by	Science-metrix
Time frequency	Annual
Time coverage	2000 - 2020
Unit of measure	Percentage
Countries	EU, 27 Member States, Norway, Türkiye, Serbia, Montenegro and Iceland

Indicator #13	Proportion of women in authorships of the top 10% most cited publications
Data source	Scopus database (Elsevier) and NamSor
Dataset	Science-metrix
Time frequency	Annual
Time coverage	2010 - 2018
Unit of measure	Percentage
Countries	EU, 27 Member States, Norway, Türkiye, Serbia, Montenegro and Iceland

Indicator #14	Women in Digital Index
Data source	Digital Economy and Society Index (DESI)
Dataset	https://digital-strategy.ec.europa.eu/en/policies/desi
Last update	19 September 2023
Time frequency	Annual
Time coverage	2022
Age class	Women in Digital Index is composed by other 13 indicators among which the age class changes. Overall, the indicators involve information from 16 to 74 years.
Unit of measure	Percentage of individuals
Countries	EU, 27 Member States
No data	Armenia, Georgia, Israel, Iceland, Montenegro, Norway, Serbia, and Türkiye

Indicator #15	Proportion of women among doctoral graduates by narrow fields of STEM
Calculation rule	$$I_{15} = \frac{n_{women\ graduated}}{N_{tot\ graduated}} * 100$$
Numerator	
Data source	Eurostat
Dataset	Graduates by education level, programme orientation, sex and field of education [EDUC_UOE_GRAD02__custom_5107514] https://ec.europa.eu/eurostat/databrowser/view/EDUC_UOE_GRAD02__custom_899437/bookmark/table?lang=en&bookmarkId=17583d8a-c64c-4a71-96d8-b50ab93b370a
Last update	09 August 2022
Time frequency	Annual
Time coverage	2010 - 2022
Unit of measure	Percentage of total graduates
Countries	EU, 27 Member States, Norway, Türkiye, and Serbia
Denominator	
Data source	Eurostat
Dataset	Graduates by education level, programme orientation, sex and field of education [EDUC_UOE_GRAD02__custom_5107514] https://ec.europa.eu/eurostat/databrowser/view/EDUC_UOE_GRAD02__custom_899437/bookmark/table?lang=en&bookmarkId=17583d8a-c64c-4a71-96d8-b50ab93b370a
Last update	09 August 2022
Time frequency	Annual
Time coverage	2010 - 2022
Unit of measure	Percentage of total graduates
Countries	EU, 27 Member States, Norway, Türkiye, and Serbia

	Both the numerator (number of women graduated) and the denominator (total number of graduates) come from the same database, and are used for the formula to obtain the indicator.
No data	Georgia, Armenia, Montenegro, Iceland and Israel

Indicator #16	Share of foreign doctorate students as a percentage of all doctorate students
Data source	Eurostat
Dataset	Share of mobile students from abroad enrolled by education level, sex and country of origin [EDUC_UOE_MOBS03]
	https://ec.europa.eu/eurostat/databrowser/view/educ_uoe_mobs03/default/table?lang=en
Last update	16 March 2023
Time frequency	Annual
Time coverage	2013 - 2020
ISCED 2021[3]	Doctoral or equivalent level
Unit of measure	Percentage
Countries	EU, 27 Member States, Norway, Türkiye, Serbia, Iceland
No data	Israel, Montenegro, Georgia and Armenia

Indicator #17	New doctorate graduates per 1,000 inhabitants aged 25-34
Data source	Eurostat
Dataset	Graduates at doctoral level, in science, math., computing, engineering, manufacturing, construction, by sex - per 1000 of population aged 25-34 [EDUC_UOE_GRAD07$DEFAULTVIEW]
	https://ec.europa.eu/eurostat/databrowser/view/educ_uoe_grad07__custom_8357208/default/table?lang=en
Last update	12 May 2023
Time frequency	Annual
Time coverage	2013 - 2021
Unit of measure	Per thousand inhabitants
Countries	EU, 27 Member States, Iceland, Montenegro, Norway, Serbia, Türkiye, Ireland, Armenia, Georgia and Israel

---

[3] International Standard Classification of Education (ISCED 2011)

Indicator #18	Job-to-job mobility of Human Resources in Science & Technology
Data source	Eurostat
Dataset	Job-to-job mobility of HRST by sex [HRST_FL_MOBSEX] https://ec.europa.eu/eurostat/databrowser/product/view/hrst_fl_mobsex?lang=en
Last update	4 February 2023
Time frequency	Annual
Time coverage	2010 - 2020
Age class	From 25 to 64 years
Unit of measure	Percentage
Countries	EU, 27 Member States, Iceland, Montenegro, Norway, Serbia, Türkiye
No data	Ireland, Armenia, Georgia, Israel

Indicator #19	Share of public-private co-publications per 1 mio inhabitants
Calculation rule	1,000,000 * (Numerator / Denominator)
Numerator	
Data source	Bibliometrics
Dataset	Science-Metrix
Time frequency	Annual
Time coverage	2010 - 2021
Unit of measure	Number of co-publications
Countries	EU, 27 Member States
Denominator	
Data source	Eurostat
Dataset	Population on 1 January by age and sex [DEMO_PJAN] https://ec.europa.eu/eurostat/databrowser/product/view/demo_pjan?lang=en
Last update	3 July 2023
Time frequency	Annual
Time coverage	2011 - 2021
Unit of measure	Number
Countries	EU, 27 Member States
No data	Armenia, Georgia, Iceland, Israel, Montenegro, Norway, Serbia, and Turkey

Indicator #20	Best practice examples and methodologies for knowledge valorisation
Data source	NA
	In the end it was not considered a quantitative indicator, as it represents qualitative information. Thus, it is added narratively in the report.

Indicator #22	Number of PCT patent application divided by GDP in million euros
Calculation rule	$$I_{22} = \frac{n_{patent\ applications}}{GDP}$$
Numerator	
Data source	OECD
Dataset	Regional Innovation: PCT Patent Applications, count (fractional count; by inventor place of residence and priority year) https://stats.oecd.org/index.aspx?queryid=67138
Last update	23 March 2023
Time frequency	Annual
Time coverage	2010 - 2015
Unit of measure	N
Countries	EU, 27 Member States, Norway, Turkey, Israel and Iceland
Denominator	
Data source	Eurostat
Dataset	GDP and main components (output, expenditure and income) [NAMA_10_GDP] https://ec.europa.eu/eurostat/databrowser/view/nama_10_gdp/default/table?lang=en
Last update	21 February 2023
Time frequency	Annual
Time coverage	2010 - 2022
Unit of measure	Million euro (current prices)
Countries	EU, 27 Member States, Norway, Turkey, Serbia, Iceland and Montenegro
No data	Georgia, Armenia, Serbia, Montenegro

Indicator #23	Share of innovating enterprises collaborating with Higher education institutes (HEI)I and/or Public Research organisations (PRO) out of all innovative enterprises
Data source	Eurostat
Dataset	Community Innovation Survey (CIS)
Survey round	CIS 2010
Time coverage	2010
Statistical classification	Innovation core activities (Com.Reg. 1450/2004)
Size class	Total
Numerator	
Dataset	Types of co-operation partner for product and process innovation [INN_CIS7_COOP]

Type of innovator	Product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or on-going innovation activities)
Variable 1	Enterprises co-operating with government, public or private research institutes
Variable 2	Enterprises co-operating with universities or other higher education institutions
Denominator	
Dataset	Enterprises by type of innovation [INN_CIS7_TYPE]
Type of innovator	Innovative enterprises (including enterprises with abandoned/suspended or on-going innovation activities)
Survey round	CIS 2012
Time coverage	2012
Statistical classification	Innovation core activities (Com.Reg. 1450/2004)
Size class	Total
Numerator	
Dataset	Types of co-operation of the enterprises by NACE Rev. 2 activity and size class [INN_CIS8_COOP]
Type of innovator	Product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or on-going innovation activities)
Variable 1	Enterprises co-operating with clients or customers from the public sector
Variable 2	Enterprises co-operating with universities or other higher education institutions
Denominator	
Dataset	Basic economic information on the enterprises by NACE Rev. 2 activity and size class [INN_CIS8_BAS]
Type of innovator	Innovative enterprises (including enterprises with abandoned/suspended or on-going innovation activities)
Survey round	CIS 2014
Time coverage	2014
Statistical classification	Innovation core activities (Com.Reg. 995/2012)
Size class	Total
Numerator	
Dataset	Types of co-operation of the enterprises by NACE Rev. 2 activity and size class [INN_CIS9_COOP]
Type of innovator	Product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or on-going innovation activities)
Variable 1	Enterprises co-operating with clients or customers from the public sector
Variable 2	Enterprises co-operating with universities or other higher education institutions

Denominator	
Dataset	Basic economic information on the enterprises by NACE Rev. 2 activity and size class [INN_CIS9_BAS]
Type of innovator	Innovative enterprises (including enterprises with abandoned/suspended or on-going innovation activities)
Survey round	CIS 2016
Time coverage	2016
Statistical classification	Innovation core activities (Com.Reg. 995/2012)
Size class	Total
Numerator	
Dataset	Product and/or process innovative enterprises engaged in co-operation by co-operation partner, NACE Rev. 2 activity and size class [INN_CIS10_COOP]
Type of innovator	Product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or on-going innovation activities)
Variable 1	Government or public research institutes
Variable 2	Universities or other higher education institutions
Denominator	
Dataset	Basic economic information on the enterprises by NACE Rev. 2 activity and size class [INN_CIS10_BAS]
Type of innovator	Innovative enterprises
Survey round	CIS 2018
Time coverage	2018
Statistical classification	Innovation core activities (Com.Reg. 995/2012)
Size class	Total
Numerator	
Dataset	Enterprises that co-operated on R&D and other innovation activities with other enterprises or organisations, by kind and location of co-operation partner, NACE Rev. 2 activity and size class [INN_CIS11_COOP]
Type of innovator	Innovative enterprises
Variable 1	Government, public or private research institutes
Variable 2	Universities or other higher education institutions
Denominator	
Dataset	Enterprises, employed persons and turnover by type of enterprise, NACE Rev. 2 activity and size class [INN_CIS11_BAS]
Type of innovator	Innovative enterprises

Survey round	CIS 2020
Time coverage	2020
Statistical classification	Innovation core activities (Com.Reg. 995/2012)
Size class	Total
Numerator	
Dataset	Innovative enterprises that co-operated on R&D and other innovation activities with other enterprises or organisations, by kind and location of co-operation partner, NACE Rev. 2 activity and size class [INN_CIS12_COOP]
Type of innovator	Innovative enterprises
Variable 1	Government, public or private research institutes
Variable 2	Universities or other higher education institutions
Denominator	
Dataset	Enterprises, employed persons and turnover by type of enterprise, NACE Rev. 2 activity and size class [INN_CIS12_BAS]
Type of innovator	Innovative enterprises
Calculation rule #1	Indicator value = the highest score of the %-shares of variable 1 and variable 2 plus half of the lowest score of the %-shares of variable 1 and variable 2
Calculation rule #2	Aggregate for the EU is the sum of the numerator values divided by the sum of the denominator values for all Member States for which data are available
Countries	All years: EU, 27 MS, Iceland, Norway, Serbia, Türkiye Missing years: 2010 Greece 2012 Netherlands, Poland, Romania, Iceland 2014 Sweden 2016 Iceland 2018 Serbia 2020 Iceland, Serbia
No data	Armenia, Georgia, Israel

Indicator #25	Business enterprise researchers as % of national researchers
Data source	OECD
Dataset	Main Science and Technology Indicators https://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=MSTI_PUB&ShowOnWeb=true&Lang=en
Time frequency	Annual

Time coverage	2010-2020
Unit of measure	$I_{25} = \dfrac{n_{enterprise\ researchers}}{N_{tot\ researchers}}$ Percentage
Countries	EU, 24 MS, Iceland, Norway and Turkey
No data	Croatia, Cyprus, Malta, Romania, Georgia, Armenia, Israel, Serbia and Montenegro

Indicator #26	Business enterprise researchers in full-time equivalent per thousand employees in industry
Data source	OECD
Dataset	Main Science and Technology Indicators https://stats.oecd.org/viewhtml.aspx?datasetcode=MSTI_PUB&lang=en
Time frequency	Annual
Time coverage	2010-2020
Unit of measure	$I_{26} = \dfrac{n_{b.e.researchers}\,(full\ time\ equivalent)}{N_{employed\ in\ industry}\,(in\ thousands)}$ Per thousand
Countries	EU, 24 MS, Iceland, Norway and Turkey
No data	Bulgaria, Croatia, Malta, Romania, Georgia, Armenia, Israel, Serbia, Montenegro

Indicator #27	Number of scientific publications among the top-10% most cited publications worldwide as a percentage of all publications
Data source	Scopus
Calculations by	Science-Metrix
Report	European Innovation Scoreboard 2023 https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en
Time frequency	Annual
Time coverage	2010-2020
Unit of measure	Percentage share
Countries	EU, 27 MS, Iceland, Israel, Montenegro, Norway, Serbia, Türkiye
No data	Armenia, Georgia

Indicator #28	Academic Freedom Index
Data source	Vdem
URL	https://www.vdem.net/vdemds.html
Time frequency	Annual
Time coverage	2010-2022
Unit of measure	Score/ interval from low to high (0-1)
Countries	EU, 27 MS, Iceland, Israel, Montenegro, Norway, Serbia, Türkiye, Georgia, Armenia

Indicator #29	ERC grants by total R&D expenditure
Data source	NA
	Although the DG RTD and the ERC provided data on this indicator, it was impossible to extract the financial information. Therefore, it was impossible to comment on it.

Indicator #30	International co-publications with non-EU partners per 1,000 researchers in the public sector
Calculations by	Science-Metrix
Report	European Innovation Scoreboard 2023 https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Percentage share
Countries	EU, no data for any individual Member State or Horizon associated country
Alternative	International co-publications with foreign partners per million population
Calculations by	Science-Metrix
Report	European Innovation Scoreboard 2023 https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Percentage share
Countries	(EU), 27 MS, Iceland, Israel, Montenegro, Norway, Serbia, Türkiye, Armenia, Georgia

Indicator #31	European and international co-patenting in EPO applications at national and EU level
Data source	Eurostat

Dataset	Co-patenting at the EPO according to applicants'/inventors' country of residence - number [PAT_EP_CP]
	Https://ec.europa.eu/eurostat/databrowser/product/page/PAT_EP_CP
Time frequency	Annual
Time coverage	2010-2013
Unit of measure	Number
Countries	EU, 27 MS, Iceland, Israel, Norway, Türkiye,
No data	Georgia, Armenia, Serbia, Montenegro

Indicator #32	EU co-patenting at the EPO according to applicants´/inventors´ country of residence by international patent classification (IPC) sections-number
Data source	NA
	Eurostat only presents data at EU level. Hence, due to the lack of information at the national level in the countries covered by the dashboard, the indicator is not part of the analysis.

Indicator #33	Government budget allocations for R&D (GBARD) according to NABS as share of total GBARD
Data source	Eurostat
	GBARD Environment
Dataset	GBARD by socioeconomic objectives (NABS 2007) [GBA_NABSFIN07__custom_8275162]
	https://ec.europa.eu/eurostat/databrowser/view/GBA_NABSFIN07__custom_8275162/default/table?lang=en
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Million Euro
Countries	EU, 27 MS, Iceland, Norway, Türkiye, Switzerland, Serbia
No data	Albania
	GBARD Energy
Dataset	GBARD by socioeconomic objectives (NABS 2007) [GBA_NABSFIN07__custom_8275321]
	https://ec.europa.eu/eurostat/databrowser/view/GBA_NABSFIN07__custom_8275321/default/table?lang=en
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Million Euro
Countries	EU, 27 MS, Iceland, Norway, Türkiye, Switzerland, Serbia
No data	Albania
	GBARD Transport, telecommunication and other infrastructures
Dataset	GBARD by socioeconomic objectives (NABS 2007) [GBA_NABSFIN07__custom_8275414]

	https://ec.europa.eu/eurostat/databrowser/view/GBA_NABSFIN07__custom_8275414/default/table?lang=en
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Million Euro
Countries	EU, 27 MS, Iceland, Norway, Türkiye, Switzerland, Serbia
No data	Albania

Indicator #34	R&I investments (transnational cooperation): GBARD (EUR) allocated to Europewide transnational, bilateral or multilateral, public R&D programmes per FTE researcher in the public sector
Data source	Eurostat
Time frequency	Annual
Time coverage	2010-2020
Unit of measure	Share
Countries	EU, 26 MS, Norway, Serbia,
No data	France, Georgia, Armenia, Israel, Iceland, Türkiye, Montenegro
Calculations	Ratio between 2 variables: - Investment in public R&D programmes - Public researchers
Variable 1	Investment in public R&D programmes Denominator million euros https://ec.europa.eu/eurostat/databrowser/view/GBA_TNCOOR__custom_6210260/default/table?lang=en
Variable 2	Public researchers Numerator Full time equivalent https://ec.europa.eu/eurostat/databrowser/view/RD_P_PERSOCC/default/table?lang=en

Indicator #35	Environmentally related government R&D budget as percentage of total government R&D
Data source	OECD Green Growth Indicators Database
URL	https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH
Last update	N/A
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Percentage
Countries	23 MS, Israel, Norway, Türkiye
No data	EU, Bulgaria, Croatia, Cyprus, Malta, Armenia, Georgia, Iceland, Montenegro, Serbia

Calculation rule for EU	1) Extract R&D spending by the government sector in million Euros from Eurostat GERD by sector of performance [RD_E_GERDTOT] Time frequency — Annual Sector of performance — Government sector Unit of measure — Million euro
	2) Calculate for each Member State Environmentally related government R&D in Euros by multiplying the percentage share from the OECD with total government R&D spending from Eurostat
	3) Aggregate for all Member States spending in Step 2 and spending in Step 3 and calculate the percentage share for the EU by dividing both aggregates and multiply by 100

Indicator #37	National public and private investments as suggested in the SET Plan progress report 2021 (in EUR, million)
Data source	SETIS research and innovation data
URL	https://setis.ec.europa.eu/publications/setis-research-and-innovation-data_en
Last update	2020
Time frequency	Annual
Time coverage	2010 - 2020
Unit of measure	$I_{37} = X_{private} + X_{public}$ Where X: investment In EUR (million)
Countries	EU, 27 Member States
No data	Norway, Georgia, Armenia, Israel, Turkey, Iceland and Montenegro

Indicator #38	OECD Patents on environment technologies
Data source	OECD
Dataset	Patents on environment technologies https://data.oecd.org/envpolicy/patents-on-environment-technologies.htm
Time frequency	Annual
Time coverage	2010-2019
Unit of measure	Percentage
Countries	EU, 27 Member States, Iceland, Norway, Georgia, Armenia, Israel, Serbia, Montenegro and Turkey

Indicator #39	Share of researchers receiving transferable skills training
Data source	MORE Survey
URL	https://www.more-4.eu/online-indicator-tool
Last update	2019
Time frequency	Every 3 years

Time coverage	2016, 2019
Variable	Share of R1 (Doctoral or equivalent) researchers enrolled in a PhD programme or R2 (Post-Doctoral or equivalent) researchers with a PhD that indicate they received training in transferable skills OR developed transferable skills through work experience, in % and by country of PhD
Unit of measure	Percentage share
Countries	26 Member States, Iceland, Norway
No data	Cyprus, Armenia, Georgia, Israel, Montenegro, Serbia, Türkiye

Indicator #40	Innovative enterprises that co-operated on R&D and other innovation activities with universities and higher education institutions
Data source	Eurostat
Dataset	Innovative enterprises that co-operated on R&D and other innovation activities with other enterprises or organisations, by kind and location of co-operation partner, NACE Rev. 2 activity and size class [INN_CIS12_COOP__custom_5206298] https://ec.europa.eu/eurostat/databrowser/view/inn_cis12_coop/default/table?lang=en
Last update	17 November 2022
Time frequency	Annual
Time coverage	2020
Unit of measure	Number
Countries	EU, 27 Member States, Norway, and Türkiye
No data	Georgia, Armenia, Montenegro, Serbia, Iceland and Israel

Indicator #41	Direct government support and Indirect government support through R&D tax incentives as a percentage of GDP
Data source	OECD R&D Tax Incentives Database (http://oe.cd/rdtax)
Last update	April 2023
Time frequency	Annual
Time coverage	2010-2020
Unit of measure	Percentage share
Countries	EU, 27 Member States, Iceland, Israel, Norway, Türkiye
Calculation rule	Sum of the 2 variables: • GTARD as percentage of GDP • Direct funding of BERD as percentage of GDP
No data	Armenia, Georgia, Montenegro, Serbia
Alternative	Data on Direct funding of BERD as percentage of GDP only
Countries	Montenegro, Serbia
Source	Eurostat

Time frequency	Annual
Time coverage	2010-2020
Variable 1	R&D spending by Business enterprise sector as percentage of GDP Dataset: GERD by sector of performance [RD_E_GERDTOT]
Variable 2	R&D spending by Business enterprise sector in Million Euros Dataset: GERD by sector of performance [RD_E_GERDTOT]
Variable 3	R&D spending by Business enterprise sector funded by Government sector in Million Euros Dataset: GERD by sector of performance and source of funds [RD_E_GERDFUND]
Calculation rule	Variable 1 * Variable 3 / Variable 2
All data extracted from	European Innovation Scoreboard 2023 https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en

Indicator #46	Share of investments in Citizen Science as a percentage of total pubblic R&D and/or per 1,000 researchers
Data source	NA
	The data is not available in EOSC Observatory and there are no other sources providing a good proxy for the indicator.

Indicator #48	Trust in Science
Data source	Eurobarometer
Dataset	Special Eurobarometer 516: European citizens' knowledge and attitudes towards science and technology https://data.europa.eu/data/datasets/s2237_95_2_516_eng?locale=en
Time coverage	2021
Calculation rule	All individuals that replied (at least once) to any the following: - very positive to QA6 - strongly agree to QA9.7 - strongly agree to QA10.3 - strongly agree to QA10.5 Results weighted on w1 - weight results from target. For EU weighted separately, based on w87 - weight EU27B (no UK)
Denominator	Amount of responses
Numerator	Calculated in STATA or SPSS using the following or a similar rule: IF (QA6 = 1 or QA9_7 = 1 or QA10_3 = 1 or QA10_5 =1) TRUST = 1 Indicator calculated as the weighted aggregate of TRUST over all respondents divided by the weighted number of all respondents.

Indicator #49	Increase in total R&D expenditure in widening countries, expressed as a percentage of GDP
	For aggregate of Widening countries
Numerator	
Data source	Eurostat
Dataset	GERD by sector of performance [RD_E_GERDTOT]
Last update	9 December 2022
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Million Euro
Calculation rule for aggregate	Calculate aggregate for Widening countries as the sum of GERD in Million Euro for Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia
Denominator	
Data source	Eurostat
Dataset	GERD by sector of performance [RD_E_GERDTOT]
Last update	9 December 2022
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Percentage of gross domestic product (GDP)
Calculation rule for GDP	Calculate GDP for each country as follows: GERD in Million Euro / (GERD in Percentage of GDP / 100) / 1000
Calculation rule for aggregate	Calculate aggregate for Widening countries as the sum of GDP in Million Euro for Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia
Calculation rule for indicator	Step 1. Calculate GERD as a Percentage of GDP by dividing GERD in Million Euros for Widening countries by GDP in Million Euros for Widening countries and multiply by 100 Step 2. Calculate the indicator by taking the difference between GERD as a percentage of GDP in each year and that in the previous year
	For individual countries
Data source	Eurostat
Dataset	GERD by sector of performance [RD_E_GERDTOT]
Last update	9 December 2022
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Percentage of gross domestic product (GDP)
Calculation rule for indicator	Calculate the indicator by taking the difference between GERD as a percentage of GDP in each year and that in the previous year
Countries	27 Member States, Iceland, Montenegro, Norway, Serbia, Türkiye

Data source	OECD (https://stats.oecd.org/)
Dataset	Main Science and Technology Indicators
Last update	March 2023 edition
Time frequency	Annual
Time coverage	2010 - 2021
Unit of measure	Percentage of gross domestic product (GDP)
Calculation rule for indicator	Calculate the indicator by taking the difference between GERD as a percentage of GDP in each year and that in the previous year
Countries	Israel
Data source	UNESCO Institute for Statistics (http://data.uis.unesco.org/)
Dataset	Science, technology and innovation
Last update	February 2023 edition
Time frequency	Annual
Time coverage	2015 - 2021
Unit of measure	Percentage of gross domestic product (GDP)
Calculation rule for indicator	Calculate the indicator by taking the difference between GERD as a percentage of GDP in each year and that in the previous year
Countries	Armenia, Georgia
Comment	For individual countries, also the data used for indicator #1 - Gross Domestic Expenditure on R&D (GERD) as a percentage of GDP - could be used.

Indicator #50	Share of higher education institutions or public/private research institutions with a Gender Equality Plan
Data source	NA
	Among the requirements to apply to Horizon Europe´s funds, the organisation imposed the necessity of counting with at least one Gender Equality Plan per High Education Institution.
	Looking to the data available, it is impossible to settle the share as there is not information clarifying the number of Gender Equality Plans each HEI has. In addition, there is not data available about HEIs with those gender plans that have not applied to the Horizon funds.
	Therefore, the lack of information on this indicator has led to not developing a study on it.

Indicator #51	Share of Seal of Excellence rewards that received funding from other sources
Data source	NA
	The data is only available for the number of SoE projects in Horizon Dashboard, but no further financial information is accessible. Therefore, as there are no alternative data sources, the indicator is not included in the analysis.

Indicator #52	Number of early career research managers participating in training programmes, staff exchanges, networks as share of total number of researchers
Data source	NA
	The data information was not available in EARMA. Therefore, as there are no alternative data sources, the indicator is not included in the analysis.

Indicator #53	Number of more experienced research managers participating in training, in order to lead out on the research management teams as share of total number of researchers
Data source	NA
	The data information was not available in EARMA. Therefore, as there are no alternative data sources, the indicator is not included in the analysis.

Indicator #54	Number of collaboration networks of RPOs in Widening countries with other EU countries
Data source	NA
	The data information was not available in CORDIS. Therefore, as there are no alternative data sources, the indicator is not included in the analysis.

Indicator #55	Share of public R&D expenditures financed by the private sector
Calculation rule	100 * Numerator / Denominator
Numerator	
Calculation rule	Sum of R&D expenditures by GOVERD funded by the business sector and R&D expenditures by HERD funded by the business sector
Data source	Eurostat
Dataset	GERD by sector of performance and source of funds [RD_E_GERDFUND]
Last update	29 March 2023
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Million Euro
Variable 1	R&D expenditures by GOVERD funded by the business sector
Sector of performance	Government sector
Sector of funds	Business enterprise sector
Variable 2	R&D expenditures by HERD funded by the business sector
Sector of performance	Higher education sector
Sector of funds	Business enterprise sector
Countries	EU, 27 Member States, Iceland, Norway, Montenegro, Serbia, Türkiye
Denominator	

Calculation rule	Sum of R&D expenditures by GOVERD and R&D expenditures by HERD
Data source	Eurostat
Dataset	GERD by sector of performance and source of funds [RD_E_GERDFUND]
Last update	29 March 2023
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Million Euro
Variable 1	R&D expenditures by GOVERD
Sector of performance	Government sector
Sector of funds	All sectors
Variable 2	R&D expenditures by HERD
Sector of performance	Higher education sector
Sector of funds	All sectors
Countries	EU, 27 Member States, Iceland, Norway, Montenegro, Serbia, Türkiye
Dataset	OECD – Main Science and Technology Indicators
Last update	March 2023
Calculation rule	100 * Numerator / Denominator
Time frequency	Annual
Time coverage	2010-2020
Numerator	
Calculation rule	Sum of R&D expenditures by GOVERD funded by the business enterprise sector and R&D expenditures by HERD funded by the business enterprise sector
Variable 1	Percentage of GOVERD financed by the business enterprise sector
Variable 2	Percentage of HERD financed by the business enterprise sector
Calculation rule #1	GOVERD financed by the business enterprise sector in million national currency = [Percentage of GOVERD financed by the business enterprise sector / 100] * [GOVERD - million national currency (for euro area: pre-EMU euro or EUR)]
Calculation rule #2	HERD financed by the business enterprise sector in million national currency = [Percentage of HERD financed by the business enterprise sector / 100] * [HERD - million national currency (for euro area: pre-EMU euro or EUR)]
Denominator	
Calculation rule	Sum of R&D expenditures by GOVERD and R&D expenditures by HERD
Variable 1	GOVERD - million national currency (for euro area: pre-EMU euro or EUR)
Variable 2	HERD - million national currency (for euro area: pre-EMU euro or EUR)
Countries	Israel

No data	Armenia, Georgia

Indicator #56	Government budget allocations for R&D (GBARD) allocated to Europe-wide transnational, as well as bilateral or multilateral, public R&D programmes per FTE researcher
Calculation rule	1,000,000 * Numerator / Denominator
Numerator	
Data source	Eurostat
Dataset	National public funding to transnationally coordinated R&D [GBA_TNCOOR]
Last update	9 February 2023
Time frequency	Annual
Time coverage	2010-2021
Unit of measure	Million Euro
Type of contri-bution recipient	Total
Type of contr-ibution recipient	Transnational public R&D performers
Calculation rule	Difference between Total and Transnational public R&D performers
Denominator	
Data source	Eurostat
Dataset	R&D personnel by sector of performance, professional position and sex [RD_P_PERSOCC]
Last update	9 December 2022
Time frequency	Annual
Time coverage	2010-2021
Sector of performance	All sectors
Professional position	Researchers
Unit of measure	Full-time equivalent (FTE)
Countries	EU, 26 Member States, Iceland, Norway, Serbia
No data	France, Armenia, Georgia, Israel, Montenegro, Türkiye

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.

This report presents the methodology used in the
ERA Dashboard 2023.

Research and Innovation policy