Council of the European Union

Brussels, 24 October 2024
(OR. en)

14908/24

RECH 470
COMPET 1042
IND 489
EDUC 398

COVER NOTE

From:	Secretary-General of the European Commission, signed by Ms Martine DEPREZ, Director
date of receipt:	23 October 2024
To:	Ms Thérèse BLANCHET, Secretary-General of the Council of the European Union
No. Cion doc.:	COM(2024) 490 final
Subject:	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Implementation of the European Research Area (ERA) Strengthening Europe's Research and Innovation: The ERA's Journey and Future Directions

Delegations will find attached document COM(2024) 490 final.

Encl.: COM(2024) 490 final

EUROPEAN
COMMISSION

Strasbourg, 22.10.2024
COM(2024) 490 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Implementation of the European Research Area (ERA)

Strengthening Europe's Research and Innovation: The ERA's Journey and Future Directions

1. INTRODUCTION

The ambition of creating a European Research Area (ERA) as a single market for research, innovation and technology across the European Union (EU) was conceived in 2000 in the context of the Lisbon strategy. In 2009, the Lisbon Treaty formally recognised the ERA as an EU objective, under Article 179 of the Treaty on the Functioning of the European Union (TFEU). The ERA should be achieved mainly by: (i) reforming national research policies, systems and regulations; (ii) increasing investment in research and innovation (R&I); and (iii) agreeing on common priorities for R&I investment across the EU.

Enhancing Europe's scientific and technological base through cross-border cooperation, building critical mass and fostering continent-wide competition strengthens the quality and impact of science and the attractiveness of Europe as a place to be a scientist or an innovator. As Mario Draghi highlighted in the Report on the Future of European Competitiveness ([1]), R&I are essential for productivity growth, economic development and competitiveness, for creating more and better jobs, and for Europe's capacity to find more efficiently solutions to challenges such as for the green and digital transitions. The Political Guidelines for the next European Commission 2025-2029 also emphasise the core role of R&I for competitiveness ([2]).

In a fully effective European Research Area, researchers, knowledge and data would move freely. Europe's 2 million researchers would benefit from excellent working conditions wherever they were located and have access to top-tier research infrastructures. And innovators would find a supportive environment in which to scale up their innovations.

Significant strides have been made over the past two decades, including the development of European research infrastructures and access to them; the creation of joint research programmes and European flagship programmes supporting research excellence and increasing Europe's attractiveness to the most promising global talent; the provision of better conditions for researcher mobility; the increased attractiveness of research careers; and more open access to scientific results.

However, as the Draghi report notes, Europe's R&I system is still marked by considerable disparities and fragmentation between Member States and regions. Over the last years, the best performing EU regions have been eight times more innovative than the least performing ones ([3]). This is particularly evident in the uneven framework conditions for R&I activities, with public and private investment in research and development (R&D) remaining well below the target of 3% of gross domestic product (GDP). The regulatory and business environments for the deployment of innovation and the growth of innovative companies also vary significantly across Europe.

In its 2020 Communication *A new ERA for Research and Innovation* ([4]), the European Commission proposed renewed efforts to overcome the slowdown in ERA development, adapt to the rapidly changing global R&I landscape, and better support Europe's green and digital transitions. The Pact for Research and Innovation ([5]) introduced a new policy framework, along with the ERA Policy Agenda, a new governance structure and a monitoring system.

Four years later, increased geopolitical tensions, economic competition and the sharp rise in breakthrough technologies, such as artificial intelligence, call for a sound assessment of

([1]) EU competitiveness: Looking ahead - European Commission (europa.eu)
([2]) https://commission.europa.eu/document/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en
([3]) Regional Innovation Scoreboard 2023
([4]) COM(2020) 628 final
([5]) OJ L 431, 2.12.2021, p. 1–9.

the ERA's progress. This 2024 Communication takes stock of advances since 2020, identifying successes, shortcomings and areas in which further action is required to achieve the ERA's objectives.

2. THE ERA PRIORITIES: FOUR YEARS ON

The 2020 Communication *A new ERA for Research and Innovation* outlined four strategic objectives, which were endorsed by the Council in the **Pact for Research and Innovation**:

(i) prioritising investment and reforms;
(ii) improving access to excellence;
(iii) translating R&I results into the economy; and
(iv) deepening the ERA.

Based on these objectives, **the ERA roadmap** detailed 20 specific actions for the 2020-2024 period ([6]).

To address these objectives effectively and improve coordination among Member States and the European Commission, a new governance structure was established. This new governance structure has three components. The first component is the **European Research Area and Innovation Committee** (ERAC), which was reaffirmed as the high-level strategic policy joint advisory committee. The second component is the **ERA Forum**, composed of EU Member States, countries associated with Horizon Europe, stakeholders and the Commission. The ERA Forum coordinates priority setting and draw ups plans for joint actions in a co-creation process (**ERA Policy Agenda**[7]). It also facilitates the implementation of these actions via dedicated working groups, initiatives and the exchange of best practice. The third component of the new governance structure is a **new monitoring system** ([8]), which was put in place to track progress and assess the impact of ERA actions.

To preserve openness in international research and innovation cooperation, while promoting a level playing field and reciprocity underpinned by fundamental values, the Communication introduced a **geopolitical dimension.** These principles were strengthened in the 2021 Commission *Communication on a Global Approach to Research and Innovation* ([9]) and the 2024 *Council Recommendation on enhancing research security* ([10]).

To increase trust in science and help to achieve greater societal impact through the uptake of new ideas and innovations, since 2020 **citizen engagement** in R&I has also been at the heart of the 'new ERA'.

The sections below explore the issues addressed by the four objectives, review the progress made since 2020 and identify areas for further action ([11]).

2.1. Prioritising investment and reforms

Objective

The European Research Area is about achieving, through collaboration, the necessary scale and efficiency to address Europe's research and innovation needs effectively. At a time when Europe must concentrate its efforts on areas crucial to its future competitiveness,

([6]) More information on the 20 actions and the implementation of the 'new ERA' can be found in Annex 1.
([7]) Council doc. 14308/21.
([8]) Home | European Research Area Platform (europa.eu)
([9]) COM(2021)252 final.
([10]) OJ C, C/2024/3510, 30.5.2024.
([11]) More information on the implementation of the 'new ERA' can be found in Annex 1 as well as on the ERA policy platform, which provides detailed reports on the implementation of ERA actions, both at EU level and at the level of individual Member States: https://european-research-area.ec.europa.eu/

sustainability and wellbeing, the duplication, substitution and fragmentation of R&I investments and initiatives would be counterproductive. Cross-border cooperation, on the other hand, generates efficiency gains by achieving critical mass through pooled resources.

However, success requires strong political commitment across the Union to identify joint priorities, coordinate policy or regulatory actions, and pool investments. Without a sustained prioritisation of R&I investment at the national level, alongside the establishment of supportive regulations and policies, the ERA cannot be fully effective. This calls for each country to undertake a thorough assessment of its needs, particularly regarding the organisation of its research or university (support) systems, working conditions for researchers, Intellectual Property Rights (IPR) management or the overarching business and operating environment for innovative companies, identifying where structural reforms are necessary.

The Pact for Research and Innovation in 2021 called for ambitious yet realistic goals to drive the necessary reforms at national and regional level, with the ultimate target of **investing 3% of EU GDP in R&D**, with two thirds coming from the private sector. In April 2024, the European Council recognised this target as a key driver for boosting Europe's long-term competitiveness ([12]).

Progress

Since 2020, the European Commission has worked closely with Member States to strengthen and better align R&I efforts across the EU. This has been achieved through targeted policy; financial and technical support for structural reforms; and 'soft' measures like exchanges of experience and policy dialogues ([13]).

The Cohesion Policy Funds and the Recovery and Resilience Facility (RRF) have been key instruments enabling the **identification of targeted reform needs and action on the framework conditions for R&I**. In the period of 2021-2027, EUR 36.5 billion of Cohesion Policy support is allocated to investments for R&I and innovation-related skills through national and regional programmes, each underpinned by place-based smart specialisation strategies ([14]). The RRF has mobilised EUR 55.6 billion for R&I since 2021 in conjunction with key structural reforms to improve the functioning and performance of Member States' R&I systems. Of this total, 35.5% is facilitating the green transition, while 9.3% is being directed to R&I in digital technologies. The accompanying structural reforms and complementary investments in the RRF are also expected to contribute significantly to the ERA by strengthening knowledge exploitation, fostering stronger science-business linkages (e.g. in France and Greece), supporting stronger R&I ecosystems through improved services to SMEs and startups (e.g. in Lithuania) or increasing the number of businesses investing in R&I activities (e.g. in Croatia). The R&I investment and reform momentum generated by the RRF has already led to tangible outcomes. For example, Slovakia is bolstering its scientific excellence by consolidating its universities and reforming their governance to ensure that they are better attuned to the economy and societal needs, while Spain amended its Science, Technology and Innovation Law to introduce a target to spend 1.25% of GDP target on public R&D investment by 2030. Horizontal R&I investments account for a significant share of the total R&I investments under the RRF. They include a variety of cross-cutting measures such as strengthening of innovation ecosystems (including through innovation clusters), upgrade of research infrastructures, grants for researchers, support for business innovation including start-ups

([12]) https://www.consilium.europa.eu/media/m5jlwe0p/euco-conclusions-20240417-18-en.pdf.
([13]) COM(2024)231 final, p. 9.
([14]) Cohesion policy is driving the reforms through the enabling conditions that need to be met in order to allow these investments to happen. Smart specialisation strategies provide a strategic framework for Cohesion policy's R&I targeted investments to strengthen regional innovation ecosystems and build institutional capacities, addressing also challenges such as industrial transition and fostering interregional cooperation.

and SMEs, facilitation of public-private R&I cooperation, and the support of existing or new regional clusters.

To provide **hands-on expert support** to Member States, both the Horizon Policy Support Facility ([15]) and the Technical Support Instrument ([16]) have been mobilised. These two tools have helped to inform the design and implementation of R&I reforms in areas such as: (i) improving public R&D spending on key priorities; (ii) setting up multiannual financial frameworks for the long-term public funding of science; and (iii) strengthening the linkages between science and business. Furthermore, 'enhanced dialogues' were initiated in 2022 between interested Member States and the European Commission to improve the articulation of EU and national R&I policies and increase coordination between different departments in charge of R&I ('whole of government' approach). The Commission has already organised 14 dialogues with 12 Members States.

Remaining scope for action

Despite this progress, more can still be done to reinforce European collective scientific and technological capacity through: (i) **greater policy coordination on joint priorities** between ERA countries; (ii) the **sustained prioritisation of R&I investment at national level**; (iii) **supportive regulations and policies** for R&I; and (iv) **stronger monitoring** of the effectiveness of the actions.

As highlighted in the last European Semester Spring Package ([17]), **several Member States still need to implement structural reforms** to improve conditions for science and innovation. Concerning the RRF, whilst implementation and disbursements have been accelerating, progress varies across Member States. All Member States need to continue their efforts to implement their respective RRP in full before the end of 2026, when the Facility is due to expire ([18]).

In 2022, R&D intensity in the EU stood at 2.3%, well below the 3% ambition, and that of our main international competitors such as the US at 3.6%, Japan at 3.4%, South Korea at 5.2% or China at 2.6%. R&I support and investments vary considerably across Member States ranging from 3.47% to 0.46% of GDP **([2])**, with **only five countries** reaching the **3% target.** The reason for this gap comes mostly from **low private investments in R&D** in Europe and insufficient specialisation in high-tech sectors ("the so-called European medium-technology trap").

Regulatory barriers impeding business innovation and the financing, scale-up and deployment of innovations remain to be tackled. There is notably scope to strengthen the syndication of European investors for breakthrough innovation, for instance through trusted investor networks, and bolster the European markets for innovations through public procurement or standardisation policies.

Actions to further promote **knowledge and technology transfer** from academia to the private sector, including through IPR policy, are also needed in many Member States. This could take the form of organisational changes or the adoption of dedicated incentive schemes, e.g. to encourage mobility between sectors.

([15]) The Horizon Policy Support Facility aims to support countries in improving their R&I systems through access to relevant expertise and experience from peers on R&I policy reforms across the ERA. The budget is set for each year in the Horizon Europe Work Programme.

([16]) The Technical Support Instrument is the EU programme that provides tailor-made technical expertise to EU Member States to design and implement reforms.

([17]) https://commission.europa.eu/publications/2024-european-semester-spring-package_en.

([18]) European Commission (COM(2024) 474 final, Report from the Commission to the European Parliament and the Council on the implementation of the Recovery and Resilience Facility, 10 October 2024

([2] Eurostat, Gross domestic expenditure on R&D, 2022 (R&D expenditure - Statistics Explained (europa.eu)

In addition to private investment, **public R&D investment remains low and insufficiently coordinated at EU level**, as 90% of all public R&D is focused on national priorities and the European R&I Framework Programme (Horizon Europe) represents only about 10% of public R&D spending in the EU. In many Member states, **Cohesion policy investments in R&I constitute a substantial part of their total R&I investment**. In Lithuania, Poland and Latvia – above 30%; in Estonia, Slovakia, Hungary, Bulgaria, Croatia – above 20%, in Portugal, Cyprus, Czech Republic, Romania, Malta and Slovenia – above 10%. ([19]) **No progress has been made towards achieving the ERA target of directing at least 5%** of national public R&D funding towards joint cross-border research programmes or European partnerships. More could also be done to **reinforce public research systems** by adopting stable and predictable funding schemes, tackling institutional fragmentation and improving the attractiveness of careers in research.

2.2. Improving access to excellence

Objective

A strong European Research Area relies on a robust scientific base throughout the territory able to secure its long-term capacity to compete globally, but also to keep and attract talent. Research excellence exists everywhere in Europe, produced by researchers of all ages, in all disciplines and in all sectors, but its full potential remains untapped. There are still considerable disparities in the opportunities available to researchers and innovators across the ERA. Some of these disparities are caused by administrative and regulatory barriers that make it difficult for researchers in some regions and countries to access R&I funding, research and technology infrastructures, support structures or collaboration networks.

In a world of increasingly complex technologies, discoveries and innovations are fostered by interactions across sectors, disciplines and geographies. But despite the importance of these interactions, both industry-academia collaboration and cross-border R&I collaboration remain underdeveloped in the EU. Only nine EU Member States feature in the global top 20 for industry-university collaborations ([20]). Cooperation networks for R&I activities rarely extend across national – or even regional – borders. About 70% of all co-owned patents are the result of collaboration within the same region. Only 13% involve organisations located in two different countries.

The ERA's objective is to tap into the EU's full R&I potential and nurture talent wherever it is found, thereby ensuring that all Member States can both contribute to and benefit from the scientific knowledge and technologies created in the EU. Doing so requires (i) sustained investment in R&I capacities throughout the Union including by leveraging available instruments such as the widening scheme under Horizon Europe, the RRF and the Cohesion Policy funds; (ii) mobilising different levels of policy action at EU, national and regional level; and (iii) developing expertise in facilitating access to and the management of research projects.

([19]) Ex post evaluation of Cohesion policy programmes 2014-2020 financed by the ERDF, Final report
([20]) Science, Research and Innovation Performance (SRIP) Report 2024, Chapter 5, p. 353-355.

Progress

The European Union supports **building cross-border and cross-sectoral R&I cooperation networks** through its collaborative projects funded by Horizon Europe, representing close to three quarters of the budget awarded. Horizon Europe also supports the **development of stronger R&I capacities** in specific Member States ([21]) through its widening actions ([22]). With an investment of over EUR 1 billion, the widening actions have: (i) supported the creation or modernisation of centres of excellence in collaboration with leading institutions from different countries (Teaming); (ii) established excellent scientists and their teams in a widening institution (ERA-Chairs); and (iii) strengthened regional innovation ecosystems, by creating linkages between academia, businesses, governments and civil society (Excellence Hubs). The so-called widening countries received 14% of the Horizon Europe budget compared to 8% under the predecessor programme (2024 data), demonstrating an increase in their capacity to access the programme and compete successfully for funding. Horizon Europe also supports the **training, career and skills development**, **mobility and networking of researchers** through the COST actions and the Marie Skłodowska-Curie Actions. Moreover, Cohesion policy is one of the main sources of innovation support for building R&I capacities and strengthening the ecosystems, in particular in regions classified by Regional Innovation Scoreboard as moderate and emerging innovators (mostly corresponding to the Cohesion policy's transition and less developed regions). The establishment as of 2024 of Regional Innovation Valleys ([23]) under Horizon Europe and Interregional Innovation Investment (I3) Instrument under Cohesion Policy aims to harness the full innovation potential across Europe, **connecting less and more innovative regions** and addressing social challenges through cutting edge technologies.

Individual country plans under the RRF also contribute to cross-border projects and multi-country outcomes, with for instance investments in the Lithuanian plan aiming to strengthen genetic research in order to facilitate participation in the EU cross-border health project "1+ Million Genomes". Similarly, the Finnish RRP features investments to promote research on the production and storage of clean hydrogen and projects linked to European cooperation networks.

In order to **strengthen synergies between different levels of policy action at EU, national and regional level** for reinforced access to excellence from the whole of Europe, a forum has been created for exchanging practices and setting joint policy priorities between R&I ministries and managing authorities in charge of regional development funds / initiatives. In addition, practical guidelines ([24]) for the implementation of synergies between key policy instruments, notably Horizon Europe and the European Regional Development Fund (ERDF), were published in 2022. This has yielded some promising results. Managing Authorities under Cohesion Policy in several Member States have established schemes that enable single beneficiary projects awarded the Seals of Excellence under Horizon Europe - projects evaluated as excellent but unable to secure funding due to budget constraints - to access alternative funding through ERDF programme support. Malta and Lithuania have started in 2024 pioneering the transfer of resources from ERDF towards Horizon Europe to fund high-quality proposals awarded a Seal of

([21]) Widening countries under Horizon Europe are: Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia; Outermost Regions (under the terms of Article 349 TFEU); and associated countries with equivalent characteristics in terms of R&I performance (Albania, Bosnia & Herzegovina, Kosovo* (This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence), Montenegro, North Macedonia, Serbia, Turkey, Armenia, Georgia, Moldova, Tunisia, Ukraine, Faroe Islands).

([22]) Widening participation and spreading excellence - European Commission (europa.eu)

([23]) Inforegio - Commission funds Regional Innovation Valleys with €116 million to strengthen competitiveness and promote innovation (europa.eu)

Excellence. Member States such as Italy are also mobilising funding from ERDF to support the participation of their entities to Horizon Europe partnerships.

In addition to Horizon Europe, the ERA Forum gathering Member States representatives and key stakeholders also allows to identify actions to reinforce **research management** capabilities.

Remaining scope for action

Despite the progress made since 2020, barriers remain to fully exploiting Europe's R&I potential, with the latest edition of the European Innovation Scoreboard ([25]) reflecting sizeable disparities between countries. There is **scope to further strengthen and better connect the R&I ecosystems** of all European countries and regions to enable greater access to excellence by all European talents and make Europe an attractive place to perform research and be an innovator.

In particular, there is scope to (i) provide **better information** on available support at EU, national and regional level through efficient structures; (ii) **greater visibility** of the diversity of available talent throughout Europe; (iii) **more openness in R&I cooperation networks** in terms of disciplines, sectors and geographies; and (iv) **further simplification of administrative processes** for accessing financial or technical support for newcomers or for cross-border or cross-sector mobility.

2.3. Translating research and innovation results into the economy

Objective

For the ERA to support competitiveness, improve the quality of EU citizens' life and address societal challenges such as the green and digital transitions, investments made in R&I should lead to concrete results deployed and taken up by the market. According to data from the European Patent Office, only one third of patented inventions by European universities or research and technology organisations are used commercially. Making better use of the results of R&I investments and translating them into products and services of economic and societal value is essential to drive future European growth.

The objective is to reinforce the deployment and uptake of European innovation on the markets by acting on all aspects of the innovation system at EU, national and regional level: policy coordination, regulatory environment, financing, IPR management, standardisation, infrastructure, human capital, and public and private demand for innovation. Many of these aspects depend on the completion of the single market and the capital markets union ([26]), where progress is being made.

Progress

In 2022 the Commission adopted its Communication on a New European Innovation Agenda ([27]). The Communication contained plans for a set of flagship initiatives together with a roadmap to position Europe at the forefront of the new wave of deep tech innovation and start-ups. A report on the state of play of implementation of the 25 actions contained in the Agenda was published in March 2024 ([28]).

To establish a unified approach across EU countries to maximising translation of R&I results into solutions that benefit society, a **Council Recommendation on guiding**

([25]) https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en
([26]) https://european-union.europa.eu/priorities-and-actions/actions-topic/single-market_en
([27]) https://research-and-innovation.ec.europa.eu/strategy/support-policy-making/shaping-eu-research-and-innovation-policy/new-european-innovation-agenda_en
([28])https://op.europa.eu/en/publication-detail/-/publication/a879719c-e4ec-11ee-8b2b-01aa75ed71a1/language-en

principles for knowledge valorisation ([29]) was adopted in 2022. The guiding principles target national, regional and local policymakers and cover all elements of the R&I systems that can be mobilised to reinforce innovation deployment. These elements include support structures, funding schemes, provision of training and skills, intellectual asset management, etc. Detailed guidance for practitioners and stakeholders is set out in the Codes of Practice on **intellectual asset management**, **standardisation**, **industry-academia co-creation** and **citizen engagement** ([30]). A repository provides stakeholders with best practice examples from the implementation of this guidance to reinforce the framework conditions for the economic exploitation of R&I results ([31]).

At the policy coordination level, in order to support the alignment of R&I investment agendas at EU and national levels for **the development and uptake of innovative technologies for the green and digital transformation of industries**, the Commission, together with ERA Member States, industry representatives and R&I stakeholders, developed joint roadmaps providing guidance on the development and uptake of industrial technologies from basic research to deployment. The roadmaps give a comprehensive view on the most relevant technologies, together with an overview of current schemes and financial instruments to help bring these technologies to market. The roadmaps can be used to inform decisions taken by industry, research organisations or public authorities. ERA Industrial Technology Roadmaps were developed for low-carbon technologies in energy-intensive industries, on circular industrial technologies, and human-centric R&I approaches in industrial technologies. The results of the industrial technology roadmaps fed into relevant transition pathways for European industrial ecosystems (chemicals, construction, and textile). A set of technology demonstration projects, for example in the field of clean technologies, followed these roadmaps with a view to leveraging follow-up investment to bring these technologies to market ([32]). Furthermore, the Strategic Energy Technology Plan ([33]) has enabled the Commission and Member States to develop joint R&I agendas in areas such as solar energy. The implementation ([34]) of these joint R&I agendas is supported by the Clean Energy Transition Partnership, ([35]) which enables 30 national, regional and international funding agencies to align priorities, pool budgets and implement joint calls.

In addition to this support for reinforced policies for innovation deployment across Member States, action was also taken through Horizon Europe to provide **better support to innovative companies**. The industrial partnerships under Horizon Europe continued to support key sectors such as electronics, transport, health or hydrogen by bringing together industry and academia to accelerate and coordinate investment and deployment ([36]). These partnerships complement wider efforts to develop supply chains through industrial alliances ([37]) and incentivise investment through Important Projects of Common European Interest (IPCEI). Another key initiative of Horizon Europe is the European Innovation Council (EIC), which helps to translate excellent deep tech research into breakthrough innovations through its Transition scheme. The EIC has also succeeded in 'crowding in'

([29]) OJ L 317, 9.12.2022, p. 141–148.
([30]) OJ L 69, 7.3.2023, p. 75–84 and OJ L 69, 7.3.2023, p. 63–74, OJ L, 2024/774, 5.3.2024 and OJ L, 2024/736, 5.3.2024.
([31]) Repository of Best Practices | Research and Innovation (europa.eu)
([32])https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/2f1ec1d2-1173-11ee-b12e-01aa75ed71a1
([33]) EUR-Lex - 52023DC0634 - EN - EUR-Lex (europa.eu)
([34]) Implementing the actions - European Commission (europa.eu)
([35]) https://cetpartnership.eu/
([36]) Including for instance the Chips Joint Undertaking, Innovative Health Initiative Joint Undertaking, Clean Hydrogen Joint Undertaking, and co-programmed partnerships such as Processes 4 Planet (processing industries), Clean Steel, Batt4EU (industrial batter value chain), 2ZERO (zero emissions road transport), Made in Europe (advanced manufacturing) or co-funded partnership with Member States such as European Clean Energy Transition Partnership, as well as the Knowledge and Innovation Communities of the European Institute of Innovation and Technology (EIT).
([37]) Industrial alliances - European Commission (europa.eu)

over EUR 3.50 of additional investment into deep tech start-ups and SMEs for every euro invested through the EIC Fund under its Accelerator scheme. The development of the EIC Fund has made the EIC the biggest investor in deep tech in Europe. With 200 investment decisions so far under Horizon Europe worth over EUR 1.5 billion in total, and through co-investments with the EIC Fund, an ecosystem of deep tech investors is emerging across Europe. The EIC now has strong portfolios in critical technologies for Europe, including artificial intelligence, quantum and semiconductors, and biotech.

In January 2024, the Commission launched the AI innovation package to boost startups and innovation in trustworthy AI ([38]). So called AI Factories will bolster access to Europe's EuroHPC supercomputers ([39]), data storage facilities, and AI talent. Over 150 European Digital Innovation Hubs help mid-caps, SMEs and public organisations in their digitalisation process and the integration of AI into business processes. Four Testing and Experimentation Facilities are so far operational to enable innovators to test and validate their AI solutions in Manufacturing, Health, Smart Cities and Agrifood. The EU's Strategic Technologies for Europe Platform (STEP) ([40]) supports European industry and investment in critical technologies in Europe. STEP raises and steers funding across 11 EU programmes to three target investment areas: digital technologies and deep-tech innovation; clean and resource-efficient technologies; and biotechnologies. STEP also supports projects growing the skills necessary to develop those critical technologies.

Remaining scope for action

Despite these efforts, the ERA still faces challenges in translating R&I results into societal impact and economic value and in retaining the latter within the EU.

As pointed out in the Draghi report on the Future of European Competitiveness (2024), the innovation capacity of the EU continues to lag behind that of the US, while other major economies are rapidly catching up. The EU shows weaknesses throughout the entire cycle of innovation, as well as in its patterns of sectoral specialisation, with activities concentrated in sectors with medium-to-low R&D intensity. Further **actions are needed to improve the environment for innovative companies** to grow in Europe and to increase the deployment and take-up of breakthrough digital and green technologies throughout the economy. This can be facilitated through: (i) greater coordination and better targeting of support across Europe, (ii) leveraging and de-risking private investment, creating a critical mass of capital for investments and (iii) effective measures to support the translation of research ideas from the lab into viable commercial propositions.

Although Europe is now creating a significant number of start-ups, they often fail to successfully pass into the initial, rapid-growth stage and from there into the subsequent scale-up phase. In particular, there is still a significant shortfall in the availability of **venture capital** in Europe, which hinders European innovation and the **scale-up in Europe** of innovative companies, most pronounced at the scale-up phase ([41]). The EU continues to lag behind the US and China in the numbers of patent applications it makes, in high-tech exports, and in the number of companies achieving unicorn valuations (above USD 1 billion). As of November 2023, the number of companies with the status of unicorns in the US and China exceeded that in the EU by a factor of 8 and 3, respectively ([42]).

([38]) eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52024DC0028
([39]) EuroHPC Joint Undertaking. Homepage - EuroHPC JU (europa.eu)
([40]) https://strategic-technologies.europa.eu/get-funding_en
([41]) Science, Research and Innovation Performance (SRIP) Report 2024, Chapter 5, p. 328.
([42]) Science, Research and Innovation Performance (SRIP) Report 2024, Chapter 5, p. 331

Overall, more can be done to reap economic benefits from European R&I investments by lowering the remaining regulatory, legal or administrative barriers that make Europe less attractive for many investors and innovators. These barriers include: (i) the various **national rules related to startups and scale-ups**; (ii) **regulatory environments** that are not conducive to innovation including the insufficient use of regulatory sandboxes; (iii) fragmented **IPR and standardisation** policies; (iv) **limited use of innovation procurement** amongst public procurers; (v) difficulties in **attracting and retaining talent;** and (vi) the **significant disparities in innovation performance** between the EU's regions. Addressing these aspects goes beyond the scope of the ERA and touches on the completion of the single market and the capital markets union ([43]), in particular to ensure a fully functioning investment flow for innovative companies for all stages from creation to scale-up.

2.4. Deepening the ERA

Objective

According to the latest Eurostat data, Europe has over two million researchers, i.e. approximately a quarter of the number globally, including 670 000 doctoral candidates. This marks a 45% increase since 2012 and corresponds to 1% of the total labour force in the EU. The free circulation of researchers, knowledge and data is key to creating a more efficient and inclusive European R&I system without overlaps in R&I efforts but with the necessary critical mass. It requires both common framework conditions at EU level and a stronger alignment of national policies applicable to research activities, researchers and research organisations. Deepening the single market in R&I in this way would have positive implications for: (i) the way researchers develop their careers and collaborate; (ii) the way research is conducted and evaluated; (iii) the overall quality and impact of the research. This requires action on several aspects:

- researchers should be able to freely move so they can live and work around Europe, seek employment and enjoy similar working conditions based on EU values and principles such as gender equality and research freedom;
- researchers and research organisations should be able to easily collaborate, access research infrastructure, compete for funding, and access, share and reuse research results;
- research, researchers and research organisations should be assessed in the same effective and responsible manner based on a diversity of outputs, practices and activities.

Progress

In 2023 the Council adopted a Recommendation on a European framework to attract and retain research, innovation and entrepreneurial talents in Europe ([44]) , including a new European Charter for Researchers ([45]). The Recommendation is the basis for a **common understanding of research careers among Member States and the needs** for the free and balanced movement of researchers and innovators across Europe. In particular, the Recommendation highlights the need to offer attractive working conditions, access to world-class infrastructure and to recognise the diverse contributions of researchers through improved assessment practices, for instance by rewarding multi-track careers. A Mutual

([43]) https://european-union.europa.eu/priorities-and-actions/actions-topic/single-market_en
([44]) OJ C, C/2023/1640, 29.12.2023.
(45) Updating the 2005 Charter and Code for researchers.

Learning Exercise, supported by the Horizon Europe Policy Support Facility to foster the exchange of good practices among Member States ([46]), shows that several Member States have already started implementing reforms in line with the Recommendation.

The Commission has supported the conclusion of the Agreement and Coalition for Advancing Research Assessment (CoARA) ([47]) as a key milestone for **reforming the way research projects, researchers and research institutions are assessed.** This reform is expected to raise the quality and impact of research and the attractiveness of research careers by creating strong incentives and rewards for the creation of a more inclusive, open and effective research environment. The reform will make it easier to better recognise the diversity of research practices, activities and outputs beyond traditional metrics based on authoring articles that are published in scientific journals.

To support the implementation of this new European framework, the Commission launched the ERA Talent Platform ([48]) as the **new single information gateway for researchers and research organisations in Europe.** In parallel, to **facilitate mobility and career development**, the Commission strengthened EURAXESS ([49]), a platform for research job offers and funding, which registers more than 14 000 organisations, 110 000 researchers and an average of over 63 000 job opportunities every year. To support **researchers' skills and intersectoral mobility**, the Commission also drew up the European Competence Framework for Researchers ([50]), taken as a reference tool by an increasing number of institutions and researchers ([51]). In parallel, in addition to the existing Horizon Europe support provided to up to 65 000 researchers (including 25 000 PhD candidates under the Marie Skłodowska-Curie Actions for their training, skills and career development, mobility across borders, disciplines and sectors), a new smaller Horizon Europe funding scheme has been launched to support intersectoral mobility (ERA Talents). Temporary cross-sectoral mobility is also encouraged by the Next Generation Innovation Talents Scheme.

Protecting European values and principles in the performance of R&I, such as open science, research integrity and ethics, transparency, diversity and gender equality – as laid out in the Pact for Research and Innovation - makes Europe a more attractive place for researchers and businesses from around the world. Since 2020 the Commission has continued to lead the way **in promoting the free flow of knowledge and data through its open science policy**, with a focus on supporting open access to publications, open data and FAIR ([52]) data management, public engagement, and the development of skills and training for open science. As of 2024 a total of 21 Member States have put in place a national policy for open access to scientific publications, compared to 14 in 2020, and 13 Member States have a policy on research data management, double the number in 2020.

The European Open Science Cloud is a notable initiative that aims to support collaboration across borders and disciplines. It offers **seamless access to quality data and digital services** based on the federation of data repositories and services of research infrastructure. It also provides an environment in which researchers and innovators can publish, find and re-use each other's data and tools. The European Open Science Cloud EU Node, providing a full spectrum of scientific tools for researchers across Europe, became operational in

([46]) https://projects.research-and-innovation.ec.europa.eu/en/statistics/policy-support-facility/mutual-learning-exercise-research-careers
([47]) https://coara.eu/about/
([48]) https://ec.europa.eu/era-talent-platform/
([49]) https://euraxess.ec.europa.eu/
([50])https://research-and-innovation.ec.europa.eu/jobs-research/researchcomp-european-competence-framework-researchers_en
([51]) Data from the Research and Innovation Careers Observatory (ReICO) will indicate the progress in terms of researchers' skills and intersectoral mobility.
([52]) Findable, Accessible, Interoperable and Reusable.

2024 as the first node of the cloud and will help to address the crucial need for improved data sharing. It will be supported by the Open Research Europe ([53]) open access publishing service launched by the Commission in 2021 as an optional and cost-free service allowing beneficiaries of EU programmes to comply with their obligation to make their peer-reviewed scholarly research freely available online. To support a **responsible use of Artificial Intelligence in science** in line with EU values and principles, the ERA Forum developed and published in 2024 living guidelines ([54]) for researchers, research organisations and funders.

To **strengthen gender equality and inclusiveness in R&I policy**, the development of a gender equality plan has been introduced as an eligibility criterion for all public bodies, higher education institutions and research organisations applying to Horizon Europe. Another eligibility criterion for Horizon Europe is a requirement to take into account the gender dimension in the content of R&I activities. In addition, thanks to the work done under the ERA Policy Agenda, the Commission has drawn up an EU Baseline on a Strategy for a Zero-Tolerance Code of Conduct to counteract gender-based violence, including sexual harassment. According to data from 2023, there are signs of progress on gender equality in R&I ([55]). Gender balance has almost been achieved at the level of PhD graduates in Europe (at present slightly more men than women graduate with PhDs). There has also been a slight increase in the proportion of women holding senior academic positions and contributing to scientific publications. Nevertheless, significant gender gaps remain in R&I, particularly in the fields of science, technology, engineering and mathematics (STEM) ([56]).

The Commission continuously invests in research and education projects on **ethics and research integrity**, to assist in the strengthening of the relevant frameworks. To support the research community in promoting research integrity and excellence, various toolboxes and educational materials have been developed. Additionally, the Commission facilitates the operations of several European and global networks on ethics, research integrity and research quality.

As global tensions rise and the strategic importance of R&I grows, ensuring the security of European research is paramount. To address this challenge, the EU must balance openness and collaboration with the protection of critical knowledge and technology. In line with the **Council Recommendation on Enhancing Research Security ([57])**, the ERA will strengthen support for researchers and institutions using a coordinated approach, including by setting up a **European Centre of Expertise on Research Security**. This Centre will serve as a hub for knowledge exchange, risk assessment and capacity building, ensuring that European research remains open, collaborative and secure.

Following calls from the European Parliament, which has adopted a resolution on the 'Promotion of the freedom of scientific research in the EU' ([58]), the Commission has also committed to preparing a possible legal initiative on **freedom of scientific research in the EU** ([59]).

For the ERA to be fully effective and support excellent R&I, it also needs **world-class research and technology infrastructure to be accessible to European researchers and**

([53]) https://open-research-europe.ec.europa.eu/
([54]) https://research-and-innovation.ec.europa.eu/document/2b6cf7e5-36ac-41cb-aab5-0d32050143dc_en
([55]) For recent figures on progress:https://op.europa.eu/en/publication-detail/-/publication/1d49ca62-ec09-11ee-8e14-01aa75ed71a1/language-en
([56]) She Figures 2021 https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/67d5a207-4da1-11ec-91ac-01aa75ed71a1
([57])OJ C, C/2024/3510, 30.5.2024.
([58]) https://www.europarl.europa.eu/doceo/document/TA-9-2024-0022_EN.html
([59]) Based on an external study for the European Commission to be completed by May 2025 and aiming to provide a solid de jure and de facto assessment of the protection and promotion of the freedom of scientific research in the EU.

innovators. Most individual Member States do not have the necessary financial or organisational resources to build, operate and upgrade such infrastructure, whether it is single site, distributed across Europe, or virtual. In order to best support the **further integration and strengthening of world-class European research infrastructure**, the Commission regularly carries out an assessment of the needs and performance of existing structures. The Roadmap of the European Strategy Forum on Research Infrastructures (ESFRI) is updated on the basis of such analysis, prioritising the facilities and services that reinforce European scientific and technological competitiveness. The landscape analysis issued by ESFRI in 2024 ([60]) provides a comprehensive picture of a dynamic research infrastructure ecosystem in Europe, ranging from pan-European ESFRI Landmarks and ERICs ([61]) to EIROforum ([62]) members and national research infrastructure. The ESFRI Roadmap alone reflects a total of more than EUR 25 billion of investment and more than EUR 2 billion in operating costs every year, with most funding mobilised at national level. Horizon Europe allocates in its work programme EUR 2.4 billion to research infrastructures, alongside the Cohesion Policy Funds and RRF contributions. Horizon Europe also supports transnational access to European research infrastructure for more than 6 000 researchers every year. The European Commission, via its Joint Research Centre (JRC), also provides access to its unique research infrastructures for research ([63]) and training and capacity building ([64]). In recent years, 17 JRC research infrastructures have opened access to more than 560 users from over 130 institutions across 33 countries.

In parallel, **technology infrastructure also plays an important role in supporting the innovation capacity and competitiveness of the industrial sector**, in the form of pilot lines, testing facilities, clean rooms, demonstration sites and living labs. They can be sector-specific or technology-focused and are usually hosted and operated by research and technology organisations and technical universities. In line with the ERA Policy Agenda, a comprehensive analysis of the policy and funding landscape for technology infrastructure was developed, identifying the main weaknesses and deficiencies. A European approach to technology infrastructure was also tested in two specific areas: (1) setting-up open innovation test beds to develop advanced materials, and (ii) establishing a roadmap for investment in relevant infrastructure for the European aviation sector. Cross-sectoral collaborative work on **a comprehensive European strategy to improve the quality, availability and accessibility of technology infrastructure** is also ongoing, in particular for SMEs and start-ups.

Universities, in their position at the crossroads of education, research, innovation, and serving society and the economy, are uniquely placed to support the ERA. With the aim of **facilitating the adaptation of universities to changing needs and conditions**, the Commission adopted a Communication on a European Strategy for universities in 2021 ([65]). An ERA Forum subgroup has developed recommendations on supporting excellence in R&I in the university sector, and on the institutional change needed.

In order to **track all policy developments and their impact on R&I careers**, including on skills training and intersectoral mobility, in 2024 the Commission launched a new **Research and Innovation Careers Observatory** ([66]) in partnership with the OECD. This will help to identify areas in which further action is needed.

([60]) https://landscape2024.esfri.eu/media/coqdoq0q/20240604_la2024.pdf
([61]) European Research Infrastructure Consortia
([62]) European Intergovernmental Research Organisation forum
([63]) https://joint-research-centre.ec.europa.eu/tools-and-laboratories/open-access-jrc-research-infrastructures_en
([64]) https://joint-research-centre.ec.europa.eu/tools-and-laboratories/training-programmes/open-access-jrc-research-infrastructures-training-and-capacity-building_en
([65]) COM (2022) 16 final
([66]) ERA Talent Platform - Research and Innovation Careers Observatory (ReICO) (europa.eu) .

Remaining scope for action

Overall, knowledge circulation within the EU has improved, due to the combined impact of past and recent initiatives. Nevertheless, despite the progress made, several important challenges remain.

Administrative and legal obstacles such as disparities in **career development opportunities** and the lack of a level playing field across sectors and countries remain. These obstacles make research careers less attractive and hamper the mobility of R&I talent across Member States and between business and academia. There is also still scope for stronger action to develop inclusive **gender equality** plans and policies that address intersecting inequalities and discrimination on the grounds of gender, gender orientation, ethnicity, age, sexual orientation and other aspects. Moreover, there remain persistent and growing **skills shortages** in certain areas such as clean energy and artificial intelligence that need to be addressed if Europe is to remain competitive in emerging technologies and harness the full potential of the green and digital transformation.

To ensure that Europe continues to lead the way in addressing the ethical challenges raised by new technologies and ensure the **protection of EU values and fundamental rights** in research, the ERA should ensure that researchers, research and innovation processes and the R&I system, independent of their source of funding, comply with the highest ethics and integrity standards. This implies ensuring that the respect of EU values is not globally context-dependent so as to notably ensure an Ethics by Design approach throughout the ERA.

Despite making progress in accepting and practising **open science**, Europe still lacks the necessary federated and interoperable digital infrastructure to share research data and services across countries and scientific disciplines. It also lacks fit-for-purpose copyright, data and digital regulation to **unlock knowledge and data** currently behind paywalls or insufficiently exploited due to legal challenges. The EU has recently adopted the European Data Governance Act and the European Data Act, which are significant advances in fostering data sharing. ([67])

Budget constraints increasingly prevent funding bodies and countries from awarding matching costs for the construction, operation, and upgrading of **research infrastructures**. Alignment and coordination between EU, national and regional funding is needed to both: (i) reduce the risk of fragmentation and dilution of resources; and (ii) address new challenges linked to transnational access, new user communities, digitalisation, research security, economic competition and regulatory barriers. The **technology infrastructure** landscape remains fragmented, with a high concentration of facilities in the most industrially developed countries and regions of the EU, while only a few countries have dedicated national policies addressing technology infrastructure and facilitating the use of such infrastructure by companies.

2.5. Conclusion

The vision for the 'New European Research Area' outlined in the 2020 Communication responded to the pressing challenges facing the EU, in particular the need for resilience and recovery following the COVID-19 crisis, combined with the essential role of R&I in underpinning the green and digital transitions. The rationale remains equally valid now, namely to create an environment for research and innovation that: (i) maximises economies

([67]) Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act) (Text with EEA relevance)

of scale and cooperation across the whole of the EU and beyond;(ii) nurtures the full diversity of European talent; (iii) provides European researchers with the best possible working conditions; and (iv) ensures that the excellent results produced by European researchers benefit both the economy and society.

By establishing new governance structures and a policy agenda with concrete actions, the EU injected fresh momentum into the ERA completion, aligning policies, regulatory frameworks and funding programmes. Notable progress has been made through collaboration with Member States, particularly in addressing the fragmentation of R&I systems. Initiatives have focused on careers, infrastructure, open science, building trust through citizen engagement and mobilising resources for thematic cooperation. The joint priority-setting process, co-created between Member States, stakeholders and the Commission, has fostered a sense of ownership and increased commitment to implementation.

Despite this progress, the EU still cannot rely on a fully effective ERA capable of attracting, retaining and nurturing its talent under optimal conditions. As highlighted in the Draghi report, the quality of European research is high but numerous barriers remain. These barriers include: (i) inadequate prioritisation of R&I in public budgets (with only five countries meeting the 3% GDP target for public and private R&D investment); (ii) insufficient coordination of R&I policies across ERA countries; (iii) persistent fragmentation of R&I systems and regulations; (iv) performance disparities; and (v) administrative burden. These factors continue to hinder Europe's competitiveness. In addition, while the launch of the European Innovation Council under Horizon Europe was a significant step towards supporting deep tech innovators, barriers still exist that make it difficult to deploy and exploit R&I results, and scale up innovative companies in Europe. Completing the Single Market and the Capital Markets Union is key to tackling the innovation gap between the EU and other major economies.

The persistence of these challenges, weaknesses and disparities across and within Member States prevents the EU from leveraging its full scientific potential for the benefit of the economy and society. Enrico Letta's report on the single market ([68]) emphasised the crucial role of the ERA, as enshrined in the Treaty, in developing a '5th Freedom to enhance research, innovation and education in the Single Market' and bolstering Europe's innovation capacity. To build a stronger EU rooted in scientific excellence and technological leadership, continued political commitment and cooperation are key. This would allow the EU to secure its place at the forefront of global innovation, ensuring a future in which its talent thrives and delivers lasting benefits for all.

([68]) https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf

ANNEX 1: IMPLEMENTATION OF THE 2020 ERA COMMUNICATION ROADMAP THROUGH THE ERA POLICY AGENDA 2022-24

STRATEGIC OBJECTIVE	ROADMAP ACTION (ERA COMMUNICATION 2020)	ERA POLICY AGENDA ACTIONS
Prioritising investment and reforms	(1) Re-affirm the 3% GDP EU R&D investment target and propose a new EU 1.25% GDP public effort target to be achieved by Member States by 2030	The Pact for Research and Innovation reaffirms the importance of prioritising investment and reforms (3rd chapter): '*Member States should contribute to the Union-level target of investing 3 % of Union GDP in R&D by setting, on a voluntary basis, national targets for their total expenditure on R&D'.* Action 20: Support research and innovation investments and reforms. While no specific ERA action was undertaken to support stronger R&I investment and reforms, in the context of the implementation of the Recovery and Resilience Facility, several Member States have used this funding to boost their R&I investments and, in some instances, start implementing important reforms to consolidate a fragmented R&I system, improve science-business linkages or boost innovation. Strengthening these efforts, especially at the end of the Recovery and Resilience Facility period in mid-2026, will be crucial to constructing a stronger ERA.
	(2) Launch of ERA Forum for Transition, to support Member States in the coordination and prioritisation of national R&I funding, and reforms	The ERA Forum for Transition was created in early 2022 and later replaced by the ERA Forum, which is responsible for implementing the ERA Policy Agenda. It consists of Member States, associated countries and stakeholders.
Improving access to excellence	(3) Support Member States who are below the EU average R&D investment as a share of GDP to increase their total investment in R&D by 50% in the next 5 years	Planned to be completed under Action 20 of the ERA Policy Agenda, however, Member States did not commit to pursuing this goal.
	(4) Set up a dedicated work stream in the ERA Forum for Transition for access to excellence and support lower-performing R&I Member States to increase their number of	Action 16: Improve EU-wide access to excellence: – The ERA Forum Subgroup on Access to Excellence - R&I and Cohesion Managing Authorities' Network (RIMA) was set up in June 2023. – RIMA brings together research and innovation policy actors and managing authorities to assess the innovation divide, increase excellence and capitalise on existing widening instruments.

STRATEGIC OBJECTIVE	ROADMAP ACTION (ERA COMMUNICATION 2020)	ERA POLICY AGENDA ACTIONS
	highly cited publications by one-third over 5 years	
Translating R&I results into economic results	(5) Develop common industrial technology roadmap	Action 10: Make EU R&I missions and partnerships key contributions to the ERA: – The Transnational Cooperation on the Missions Approach (TRAMI) project was launched to support the Missions. – The European Mission Network brought together key players from the private sector, academia, civil society organisations and governments. – European Partnerships (EP) played a central role in delivering the ERA, for example through the Sustainable Blue Economy Partnership (SBEP). The Partnership Knowledge Hub (PKH) was set up to support the Commission and Member States in implementing and coordinating the EPs. Action 11: An ERA for the green transition: – The ERA pilot on Green Hydrogen was set up, along with the Implementation Working Group on Hydrogen, which aim to implement the respective Strategic Research and Innovation Agenda (SRIA). – The SET Plan was revised, aligning it with current EU policies, complemented by an SET Plan Conference and a Communication. – The ERA sub-action 11.3 on the Future of Work was set up to inform policies and guide research and innovation funding for the future of work via a Strategic Research and Innovation Agenda (SRIA).The SRIA is the outcome of workshops and consultations and provides an overview of the current state of R&I on the future of work, highlighting existing efforts and identifying areas for further research. – Action 12: Accelerate the green/digital transition of Europe's key industrial ecosystems: – Three ERA industrial technology roadmaps were prepared. (on low-carbon technologies in energy intensive industries; on circular technologies; and on human-centric technology for Industry 5.0). – A policy agenda was developed the Industry 5.0 paradigm (human-centricity, sustainability and resilience) which focuses on the skills, organisational capacity and operational models that support the twin transition in European industry. – A Commission report on Scaling up innovative technologies for climate neutrality maps demonstrators in 184 EU-funded projects developing climate neutrality technologies in energy-intensive industries. – Two mutual learning exercises (MLEs): Whole-of-government approach in R&I (topic on ‘Green Transition’), and on Industrial Decarbonisation.

STRATEGIC OBJECTIVE	ROADMAP ACTION (ERA COMMUNICATION 2020)	ERA POLICY AGENDA ACTIONS
		– A report with comprehensive analysis of the policy and funding landscape for technology infrastructures identified the main weaknesses and deficiencies. – A roadmap for the update/construction of aviation research and technology infrastructures at EU level was published to support the clean transition of the EU aviation industry.
	(6) Develop and test a networking framework in support of Europe's R&I ecosystems, building on existing capacities, in order to strengthen excellence and maximise the value of knowledge creation, circulation and use	Action 15: Build up R&I ecosystems to improve excellence and competitiveness: – Under the widening component of Horizon Europe, 25 Excellence Hubs have been created that will strengthen regional innovation excellence through innovation ecosystems in widening countries and beyond, by teaming up with and creating robust linkages between academia, businesses, local governments and civil society. – The Regional Innovation Valleys (RIVs) initiative aims to reduce the fragmentation of R&I ecosystems. 148 regions have been selected to receive an RIV label and have committed to: (i) strengthening their R&I ecosystem; (ii) enhancing the coordination and directionality of their R&I policy and investment towards key EU priorities; and (iii) engaging in R&I collaboration between more and less advanced regions with complementary smart specialisations. – A pilot was launched in 2022 to test the concept of ERA Hubs as an opportunity to create a framework for both multi-level governance and a multi-stakeholder approach, the role of which in addressing societal challenges is increasingly recognised. – Through the open access to the Joint Research Centre (JRC) research infrastructures programme, the JRC facilitated access to researchers from institutions located in the Widening Participation and Spreading Excellence list of countries, by waiving access costs and supporting travel and subsistence to carry experimental research and receive training and capacity building at JRC research infrastructures.
	(7) Update and develop guiding principles for knowledge valorisation and a code of practice for the smart use of intellectual property	Action 7: Upgrade EU guidance for better knowledge valorisation: – Council Recommendation on guiding principles for knowledge valorisation for a unified approach to policy principles and measures for national, regional and local policymakers to optimise the translation of R&I outcomes into impactful solutions for society. – A Code of Practice on intellectual asset management and standardisation offers guidance for R&I actors on managing intellectual assets and standardisation. – Awareness-raising campaigns to support the implementation of the guiding principles, and the codes of practice started in spring 2023. – An MLE was also organised on knowledge valorisation involving 16 Member States and two associated countries.
Deepening the ERA	(8) New toolbox in support of researchers' career development	Action 4: Promote attractive research careers, talent circulation and mobility: – Adoption on 18 December 2023 of the Council Recommendation on a European framework to attract and retain research, innovation and entrepreneurial talent in Europe, with a new European Charter for Researchers.

STRATEGIC OBJECTIVE	ROADMAP ACTION (ERA COMMUNICATION 2020)	ERA POLICY AGENDA ACTIONS
		– Launch of the ResearchComp (European Competence Framework for Researchers) website on 13 June 2023. – Launch on 10 June 2024 of the ERA Talent Platform and the revamped European EURAXESS Portal – Researchers in Motion to support researchers and innovators throughout their career. – Two MLEs under the Horizon Europe Policy Support Facility (Knowledge Valorisation and Inter-Sectoral Mobility; implementation of the Council Recommendation). – Launch of a Horizon Europe WIDERA pilot call on Talent Ecosystems for early-career researchers. – Launch of the Research and Innovation Careers Observatory, to be implemented together with the OECD. – RESAVER is supported for broader adoption, geographical expansion, and continuous improvement of its offerings in countries where it is already operational. – The revamped and updated HR Excellence in Research award Portal is now a full initiative under the ERA Talent Platform. Action 17: Enhance public research institutions' strategic capacity: – A set of recommendations for targeted actions at national and European level were developed to increase recognition of the profession and the range and accessibility of research managers' training activities. – Horizon Europe funds key projects on research management, with the aim of developing a dedicated competence framework.
	(9) Launch, via the Horizon Europe Programme, a platform of peer-reviewed open access publishing; analyse authors' rights to enable sharing of publicly funded peer-reviewed articles without restriction; Ensure a European Open Science Cloud that is offering findable, accessible, interoperable and reusable research data and services (Web of FAIR); and incentivise open science	This objective is addressed under three ERA Policy Agenda actions. Action 1: Enable open science, including through the European Open Science Cloud (EOSC): – Building up the EOSC as part of the co-programmed European Partnership. – New national strategies for Open Science policy for mainstreaming open science practices and FAIR principles across national research funding programmes. – EOSC Observatory serving as a one-stop-shop providing intelligence on Open Science implementation. – EOSC Catalogue of best practices with illustrative examples on practices targeting publications, data, software, infrastructure. Action 2: Propose an EU copyright and data legislative framework fit for research: – Studies on EU copyright and data legislation and its impact on access to resources for scientific research, reuse of scientific publications, and research data sharing and reuse. Study on: (i) improving access to and reuse of research results; (ii) identifying barriers and challenges; and (iii) presenting options for measures to strengthen the free circulation of knowledge (these measures include the introduction of an EU-wide secondary publication right and other measures to strengthen open-ended and flexible research exceptions). Action 3: Reform the assessment system for research, researchers and institutions:

STRATEGIC OBJECTIVE	ROADMAP ACTION (ERA COMMUNICATION 2020)	ERA POLICY AGENDA ACTIONS
	practices by improving the research assessment system.	– Agreement on reforming research assessment (July 2022), establishing a common direction for reforms, while respecting the signatory organisations' autonomy. As of August 2024, it had been signed by 768 organisations. – As of August 2024, 91 organisations have published an Action Plan to detail how they intend to implement the commitments contained in the Agreement. – The Coalition for Advancing Research Assessment (CoARA) was established in December 2022, bringing together a broad range of stakeholders. As of August 2024, 676 organisations had joined. – CoARA has established 13 Working Groups to identify good practices and recommendations on several aspects of research assessment. 16 groups, each bringing together the signatories from a given country (so-called 'National Chapters') will facilitate reforms at national level. – National dialogues have been initiated to identify potential legal and administrative barriers and solutions.
	(10) Implement the EFSRI White Paper and establish an updated governance structure for research and technological infrastructure.	Action 8: Strengthen research infrastructures: – Analysis of the European Research Infrastructure landscape, with a new methodology, issued in June 2024. – Revision of the European Charter of Access to Research Infrastructures, expected end-2024. – Update of the ESFRI Roadmap to be launched in October 2024. – Commission report on the application of the ERIC Regulation, issued in August 2023. – ESFRI-EOSC Task Force set up in June 2023.
	(11) Develop a roadmap of actions for creating synergies between higher education and research, notably building on the dual role of universities.	Action 13: Empower higher education institutions: – The ERA Forum Subgroup on 'Universities for ERA' has set out an action plan with recommendations for short- medium- and long-term actions for better coordination between Member States and the EU to foster excellence. A number of EU-level actions are being implemented under the WIDERA work programme of Horizon Europe. – The Communication on a European strategy for universities published in 2022, aiming to boost the European dimension in higher education and research. The European strategy for universities includes cross references to the ERA and relevant ERA actions promoting a transformation of universities in order to increase their excellence in R&I (e.g open science, academic careers). In recognition of the importance of the R&I dimension of higher education institutions, this is complemented under Horizon Europe by the European Excellence Initiative and other dedicated calls under the WIDERA work programme of Horizon Europe. Action 6: Protect academic freedom in Europe:

STRATEGIC OBJECTIVE	ROADMAP ACTION (ERA COMMUNICATION 2020)	ERA POLICY AGENDA ACTIONS
		– Staff working document on tackling foreign interference in research and innovation in 2022, providing a comprehensive strategy for higher education institutions and organisations performing research. – European strategy for universities, committing to ensuring academic freedom in higher education institutions. – European Parliament Forum for Academic Freedom initiated in November 2022, with the aim of creating the annual Academic Freedom Monitor. – MLE on Tackling Foreign Interference in R&I, with a strong emphasis on the protection of institutional autonomy and academic freedom. – Adoption of Council Recommendation on Enhancing Research Security that strikes a balance between being open and safe, while respecting and safeguarding crucial principles such as academic freedom, institutional autonomy and non-discrimination.
	(12) Develop inclusive gender equality plans with Member States and stakeholders to promote EU gender equality in R&I	Action 5: Promote gender equality and foster inclusiveness: – Gender equality in Horizon Europe is addressed by introducing: • gender equality plans (GEPs) as an eligibility criterion for certain categories of legal entities; • the default requirement for the integration of a gender dimension into R&I content; • a target of 50% women on Horizon Europe-related boards, in expert groups and on evaluation committees, and the introduction of a gender balance among research teams as a ranking criterion for proposals with the same score. – Report 'Approaches to inclusive gender equality in Research and Innovation' on emerging practices and policies at EU and national levels. – Drafted report on the impact of GEPs across the ERA. – The EU Award for Gender Equality Champions was established to recognise the outstanding results of institutions in implementing GEPs. – The ERA Forum Subgroup on Inclusive Gender Equality: • Task force on the gender dimension in R&I and Task Force on gender-based violence; • Zero-Tolerance Code of Conduct, counteracting gender-based violence, including sexual harassment in the EU R&I System.
Horizontal	(13) Organise with Member States and stakeholders Europe-wide participatory citizen science campaigns to raise	Action 14: Bring science closer to citizens: – MLE on citizen science initiatives – policy and practice was developed, with the aim of facilitating the exchange of citizen science information, experiences and lessons learned. – MLE on public engagement – policy and practice fostering public participation in R&I policies.

STRATEGIC OBJECTIVE	ROADMAP ACTION (ERA COMMUNICATION 2020)	ERA POLICY AGENDA ACTIONS
	awareness and encourage networking	– Initiatives completed/ongoing: European City of Science in Leyden (2022) and Katowice (2024), EU TalentOn, European Union Contest for Young Scientists (EUCYS), Plastic Pirates – Go Europe! citizen science initiative. – Eurobarometer survey on 'European citizens' knowledge and attitudes towards science and technology' (2021) showing that 9 in 10 EU citizens expect a range of technologies currently under development to have a positive effect on society.
	(14) Develop with Member States an approach to set and implement strategic priorities that deliver on the ERA agenda through the ERA Forum for Transition and by means of a Pact for R&I in Europe.	In the context of the ERA Forum, Member States, the European Commission and stakeholders collaborated to define strategic priorities for the ERA Policy Agenda and to coordinate joint efforts in implementing its actions. Many of the ERA Policy Agenda actions contribute to this roadmap action. Only actions not described above are included in this overview. Action 9: Promote a positive environment and level playing field for international cooperation based on reciprocity: – The ERA Forum Standing Subgroup on the Global Approach. – Multilateral Dialogue on Principles and Values for International Cooperation in R&I with key non-EU partners. – An international ministerial conference endorsed a Ministerial Statement on principles and values for international cooperation in R&I (the 'Brussels Statement' (16/02/2024)). – Ongoing development of a European Framework for Science Diplomacy, and a Team Europe Approach Initiative on cooperation with Africa. – Recommendation on a Team Europe approach towards China under preparation. Action 19: Establish an effective ERA monitoring system: – New ERA monitoring and evaluation framework, with key monitoring tools and mechanisms as part of the implementation of other actions. – The ERA Policy Platform was launched, and EU-level report, ERA Scoreboard and Dashboard 2023, ERA Country Reports were published. Action 18: Support the development of EU Member States' national processes for ERA implementation. This Action has not been implemented due to a lack of support by MS.