

Science, research and innovation performance of the EU 2026



Securing Europe's growth

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EXECUTIVE SUMMARY

The EU faces a fundamental economic challenge. In a world of intensifying geopolitical competition, rapid technological change and slowing productivity growth, sustaining prosperity, competitiveness and strategic autonomy increasingly depend on the ability to generate, deploy and diffuse new knowledge. Science, research and innovation are among the most important drivers of productivity growth and, consequently, of the EU's long-term economic performance.

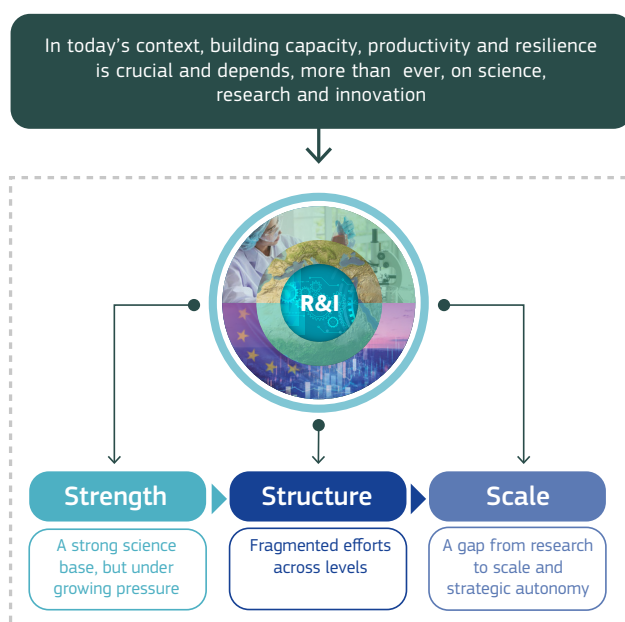
The 2026 edition of the Science, Research and Innovation Performance of the EU report builds on a wide range of new analyses and data sources to offer a comprehensive and detailed overview of how the EU is performing today in terms of science, research and innovation. Each chapter can be read independently, catering to readers with various backgrounds and interests.

The introductory chapter 'Securing Europe's growth' sets out an overarching perspective: for the European economy to grow and keep pace with the economies of the other major global

powers, productivity should be the focus. The need for faster productivity growth, in turn, puts science, research and innovation at the very core of European policymaking. Economic growth, competitiveness, resilience and strategic autonomy are all objectives that can be achieved only if the EU is able to translate its strengths in terms of scientific capacity and talent into innovation and productivity.

Three critical messages emerge from the report (Figure 1): (i) **strength** – the EU retains significant strengths in science, although these are increasingly contested in a rapidly evolving global environment; (ii) **structure** – the EU's research and innovation (R&I) system remains fragmented across countries, regions and institutions, limiting its ability to fully exploit its collective capabilities; (iii) **scale** – the EU continues to face difficulties in scaling innovation and transforming research excellence into market leadership, industrial deployment and productivity growth. Together, these challenges define the strategic agenda for European science and R&I policy.

Figure 1 From strength to scale



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Source: DG Research and Innovation, Common R&I Strategy and Foresight Service, Chief Economist Unit.

PART I

Part I starts with a selection of key figures on recent trends in chapter 1. It then presents key analytical insights across six dimensions: R&I investment (chapter 2), the European science system (chapter 3), technologies and global challenges (chapter 4), financing and scaling innovation (chapter 5), the geography of EU R&I (chapter 6), and artificial intelligence (AI) (chapter 7).

Investing in R&I

While the EU has increased its investment in research and development (R&D) over the past two decades, R&D intensity remains below that of several major competitors, and the gap in absolute spending continues to widen. The EU's R&D intensity rose from 1.81% to 2.24% of gross domestic product (GDP) between 2000 and 2024, yet it remains well below the EU's 3% target and far below the levels of Japan (3.44%), South Korea (4.96%) and the US (3.45%) reported in 2023, with the gap in absolute spending continuing to widen (chapter 2.1). This gap can be explained by the structure of European R&D, where public R&D is mainly channelled to universities and basic research, while private funding remains concentrated in mid-tech manufacturing, with a comparatively small share in the fast-growing high-tech and knowledge-intensive services sectors.

The EU's challenge is not only to invest more but also to ensure that different sources of investment are better aligned across different layers of government. The report highlights the importance of viewing R&I as an integrated system rather than as a collection of individual activities. The evidence presented in the report suggests that EU R&I funds do not crowd out national funds; instead, they reinforce each other: an increase in national investment in R&D is associated with an increase in Horizon Europe funding two years later, and the R&I

component of Cohesion Policy funding has a significant crowding-in effect on the capacity of a country to attract funding under Horizon Europe (chapter 2.2).

The European science system

The EU remains one of the world's leading scientific powers, producing a large share of global scientific publications and maintaining a highly collaborative research system.

It ranks second globally in scientific output, with output increasing again in 2024 after several years of decline. Furthermore, scientific collaborations account for 57% of all EU publications, reflecting the growing role of the European Research Area (ERA) in building a single, borderless market for knowledge (chapter 3.1). However, the EU's position is less strong in fields related to strategic technologies, where China is advancing rapidly and the US continues to lead. Strengthening excellence in these fields and retaining senior researchers, particularly women in science, technology, engineering and mathematics (STEM), will be essential to remain competitive.

The EU is actively working to become the destination of choice for global research talent through the *Choose Europe for Science* initiative, though researchers continue to face challenges linked to precarious contracts and a 'publish or perish' culture. These challenges call for responsible research assessment frameworks that better reflect the true value of scientific work (chapter 3.2). The EU benefits from a dense network of universities and research organisations and leads globally on Open Science and academic and scientific freedom. However, emerging geopolitical tensions and the rise of AI necessitate careful reflection on how research outputs are shared and how data quality and security are ensured (chapter 3.3).

Technologies and global challenges

The global technological landscape is becoming more competitive. While the EU continues to hold strong positions in several fields, other major economies have expanded rapidly. Between 2000 and 2022, the EU's share of patent applications under the Patent Cooperation Treaty (PCT) fell from approximately 30% to around 16%, while China's rose from 3% to nearly 33%, signalling a profound redistribution of global innovation capacity. The EU performs well in advanced materials, manufacturing and several green transition technologies but lags in digital technologies including AI, advanced semiconductors and cloud computing, where weaker technological positions frequently coincide with supply chain dependencies (chapter 4.1).

Part of the explanation lies in how the EU converts its research into economic value. The report identifies knowledge valorisation and technology deployment as central areas where it can improve. Innovation is not only about generating new knowledge but also about ensuring that knowledge is translated into products, services and productivity gains. Yet, while the EU's innovation output has increased by almost 10% over the past decade, knowledge valorisation remains uneven across countries, institutions and sectors. Cross-border industry-science collaborations are limited, and bottlenecks at the transition from research to scale-up continue to delay the broader economic impact of R&I investment (chapter 4.2).

Looking at specific sectors reveals where this gap is most tangible. Across life sciences, clean technologies and digital, the EU retains upstream R&I strengths. However, these strengths often weaken further downstream, where commercialisation, deployment and industrial scale become increasingly important (chapter 4.3). These deployment challenges take on added urgency in the context of defence and space,

where rising NATO targets could require at least EUR 383 billion in additional annual expenditure by 2035. Yet EU defence investment remains skewed towards equipment procurement rather than R&D, and the EU's share of global space investment is limited and declining. This raises important questions about how public resources can be used most effectively to strengthen long-term technological sovereignty (chapter 4.4). The proposed European Competitiveness Fund signals a growing recognition that closing the EU's innovation gap will entail accompanying strategic technologies along the entire pathway from research to market.

Financing and scaling innovation

The EU's difficulties in scaling innovation are closely linked to broader structural conditions. EU productivity growth over the past 25 years has been roughly half that of the US, and while a post-COVID-19 rebound was encouraging, this momentum has since slowed (chapter 5.1). Weakened business dynamism, market fragmentation, regulatory complexity and barriers to growth continue to limit the expansion of innovative firms. These factors contribute to a widening gap between frontier firms and the rest of the economy, slowing the diffusion of new technologies and reducing aggregate productivity growth.

Finance plays a crucial role in this process. The EU has made considerable progress in developing its startup ecosystem and venture capital (VC) markets. However, it continues to trail the US in scaleup performance, with a persistent late-stage funding gap (chapter 5.2). Furthermore, EU institutional investors hold approximately USD 12 trillion in assets but allocate relatively little to VC. As a result, many of the EU's most promising companies continue to depend on external sources of finance at critical stages of development: around 50% of deep-tech growth-stage funding still

originates from outside Europe. Nonetheless, EU support has been proven to be highly catalytic, with Horizon Europe-backed startups having raised EUR 70 billion in VC since 2010 and the European Innovation Council (EIC) having mobilised over EUR 4 billion in additional private investment.

Capital alone is not enough. Technological change is rapidly shifting labour demand towards high-skill, non-routine tasks. Yet the EU faces persistent talent shortages in precisely these occupations. The report highlights the importance of skills, lifelong learning and workforce adaptability in supporting technology adoption and productivity growth. Regulatory frameworks also matter. While the EU leads globally on better regulation practices, innovation considerations remain underrepresented in impact assessments, and regulatory fragmentation across Member States continues to raise compliance costs for innovative companies. A growing number of Member States are responding by actively using regulatory sandboxes to test innovative solutions and reduce uncertainty, though these should be seen as one tool among many rather than a default solution (chapter 5.3).

The geography of EU science, research and innovation

These financing and scaling dynamics do not play out evenly across the EU. The report further shows that Europe's R&I challenges have a strong geographical dimension. The R&I divide is evident both at the regional level and between urban and rural areas. This divide is widened by self-reinforcing dynamics of agglomeration that favour the most urbanised and historically innovative areas, and it could lead to sub-optimal use of the EU's R&I potential (chapter 6.1). Such concentration can support excellence and efficiency, but it may leave valuable capabilities elsewhere underutilised. This remains an important question for cohesion, as well as for competitiveness and resilience. The EU can strengthen its overall

innovation performance by making better use of capabilities distributed across its territories and by improving connections between regions, institutions and innovation ecosystems.

The same logic applies to collaboration. Collaborative R&I activities cluster in the most innovative Member States, and the EU's collaboration system is more fragmented than that of the US, particularly in co-patenting, with this gap growing in the most advanced technology fields where integrated effort matters most (chapter 6.2). The ERA and Horizon Europe, the participation base of which is broader than that of its predecessor, are central instruments for bridging these gaps and building a more integrated internal market for knowledge.

This drive towards greater openness and connectivity extends beyond the EU's borders. International cooperation continues to be a major strength of the European R&I system. EU Member States are increasingly active in global research partnerships: third countries bring complementary expertise, while reciprocity provisions expand opportunities for EU participation in global programmes (chapter 6.3). At the same time, international patenting activity remains heavily concentrated among a small number of partners, and diversification of such linkages will be important to reduce vulnerability to potential disruptions in cooperation.

The role of AI

AI illustrates many of the broader themes identified throughout the report.

AI is rapidly transforming how research is conducted, how firms innovate and how economies grow. AI adoption can deliver firm-level productivity gains and is accelerating scientific discovery across fields. However, the global AI landscape is largely dominated by other major competitors, leaving the EU dependent on foreign infrastructure. This has serious implications

for economic security (chapter 7). The EU's share of global AI patent applications has declined from around 20% in 2000 to 12% in 2022, though major EU cities retain solid positions in AI-related scientific output, on a par with their Asian and US peers. The EU is moving in the

right direction now that its AI policy framework has entered a more operational phase. However, turning frameworks into competitive advantage will require sustained investment in compute capacity, data infrastructure and skills at a speed commensurate with the challenge.

PART II

Part II brings together contributions from academics, the Joint Research Centre (JRC), the Organisation for Economic Co-operation and Development (OECD) and the European Investment Bank (EIB) on the following topics.

Chapter 8 argues that the impact of innovation policy naturally hinges on the scale of R&D investment but that investment composition also plays an important role. Evidence from the US suggests that government-funded but privately owned innovation has a disproportionate impact on basic research, productivity and GDP growth. The EU appears to have a narrower pipeline of science-intensive innovation from public institutions. The challenge is, therefore, to strategically increase R&D spending by strengthening institutional channels, connecting public research to private innovation and improving the measurement and tracking of publicly funded innovation.

Chapter 9 makes the case that place-based strategies are indispensable to tackling societal challenges effectively. In contrast to place-blind policies applied uniformly across heterogeneous territories, place-based policies are tailored to exploit region-specific opportunities and address region-specific bottlenecks. The chapter discusses the critical importance of regions for competitiveness, technological sovereignty, the green transition, cohesion and addressing societal discontent.

Chapter 10 examines the EU's technological position in advanced materials through the lens of

economic complexity, distinguishing between absolute and relative capabilities and showing that the EU's position differs markedly across sub-fields such as composites, nanomaterials and biomaterials. The chapter argues that combining these two types of indicator can support the design of more targeted R&I policies, allowing the EU to build on existing strengths and better prioritise technological development across Member States and regions.

Chapter 11 explores how the digital and net-zero technological transitions, and the interactions between them, are likely to shape productivity outcomes. Drawing on firm- and sector-level evidence, it highlights the implications of uneven technology diffusion and heterogeneous adjustment pressures, outlining policy directions to support diffusion and capability building for broad-based productivity gains consistent with the EU's twin transition objectives.

Chapter 12 examines how access to finance shapes the EU's ability to turn innovation into competitiveness. It highlights the need to mobilise more institutional capital for VC and growth equity and reduce fragmentation and home bias in European capital markets, providing evidence that well-designed public instruments can crowd in private investment and strengthen exit opportunities. Closing the EU's innovation finance gap requires a lifecycle approach combining targeted public support, deeper capital markets and stronger cross-border investment.

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The ‘Science, Research and Innovation Performance of the EU, 2026’ (SRIP) report offers a comprehensive and detailed overview of how Europe is performing today in terms of science, research and innovation and analyses the key determinants of this performance. The report builds on a wide range of data sources and provides an extensive coverage of topics, which illustrates the horizontal nature of research and innovation activities in the EU landscape. Each chapter of the report can be read independently, catering to readers with various backgrounds and interests.

This is a flagship biennial publication by the European Commission’s Directorate-General for Research and Innovation that draws on a long tradition of indicators and economic analyses.

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