

*Reclaiming Europe's Edge:
Competitiveness through STEM Talent*

Recommendations

Introduction

In a rapidly evolving global economy driven by technological breakthroughs, Europe faces increasing pressure to sustain its leadership in innovation and industrial strength. Addressing complex issues like climate change and geopolitical tensions necessitates coordinated, STEM-driven solutions to ensure sustainable energy sources and reinforce European defence. Europe's Green Deal and digital transformation agendas demand skilled professionals in STEM disciplines to innovate and deploy sustainable technologies, modernise infrastructure, and ensure Europe's technological sovereignty. Without a robust talent pipeline in STEM, Europe will struggle to meet these goals. In response to these challenges, Europe needs a comprehensive STEM strategy. Although education and skills development are mainly national competencies, addressing STEM skills shortages requires broader and cross-sector policy initiatives. It is important that the strategy is not limited to being a STEM strategic education plan, but that it has a broader focus on enabling framework conditions promoting STEM professions. An EU STEM strategy should be developed through inclusive consultations at both the EU and national levels, involving social partners and other key stakeholders. It should include clear KPIs to monitor progress and integrate STEM into European reporting processes. The strategic framework proposed is crucial for restoring Europe's global competitiveness and a precondition to long-term socio-economic resilience.

These recommendations are based on the findings described in detail in the report, which can be downloaded here:

[Reclaiming Europe's Edge: Competitiveness through STEM Talent](#)

The recommendations were produced jointly with HANNE SHAPIRO futures and the ANE EU Task Force.

1.

Recommendations in support of the STEM professions

Elevate STEM competencies on the EU political agenda

- Include STEM Competencies as a distinct and recurring item on the agenda of the European Council meetings alongside other strategic topics, especially when discussing industry, prosperity, competition and tech sovereignty topics.
- Incorporate STEM competencies as a specific topic in European Semester reporting processes on education, training, lifelong learning, and employment. To measure the progress over time and to ensure consistency of those measurements, STEM skills should remain a recurring topic.
- Ensure that new EU labour and social policies, such as the new Action Plan on the implementation of the European Social Pillars right and the Quality Jobs Roadmap include results from the STEM labour market analysis.
- Establish an EU skills observatory with the participation of experts and relevant stakeholders – including the social partners.
- Create a dedicated European STEM labour market digital dashboard drawing on real-time data to provide an informed basis for STEM policy actions at both the EU and national levels.

Background

The shortage of STEM skills is a critical barrier to the EU's competitiveness and innovation capabilities.

Europe faces slow productivity growth, insufficient investment in research and breakthrough innovations, and persistent skills shortages across different sectors. These barriers are well recognised, and they substantially hinder innovation and technology adoption.

Ursula Von der Leyen has stated a commitment to doing "whatever it takes" to safeguard Europe's competitive edge and foster the growth of the European clean tech industry within its borders.

To realise these ambitions, there is an immediate demand for STEM skills to be elevated on the EU political agenda. While education and skills are primarily national responsibilities, STEM skills shortages should not be viewed solely as an educational issue. STEM skills are deeply connected to future competitiveness as they equip individuals with the technical knowledge, problem-solving abilities, and innovation mindset necessary to develop and advance emerging technologies, such as AI, biotechnology, and renewable energy. An increased political commitment is essential to maximise synergy between Member State policy measures and EU policy actions.

This requires measures that go beyond soft forms of coordination. Therefore, addressing STEM skills shortages should be a distinct and recurring agenda item at the meetings of the EU Heads of State. There is a need to regularly benchmark and report to the European Council on the implementation of STEM initiatives and skills provisions proposed by and/or funded through the European Commission programmes. This should be complemented by concurrent reviews of the implementation of national STEM action plans and targets as part of the European Semester. Currently, STEM competencies are not included as a separate topic in the reporting obligations on education and lifelong learning. The new EU initiatives under the social pillar and labour policies lack crucial data on the STEM labour markets, a precondition to identifying STEM labour skills mismatches and STEM skills shortages at the occupational level within STEM fields. This is needed to assess unemployment in STEM occupations, to assess labour demands in STEM-intensive fields, and to fully understand STEM employment and mobility patterns. A dedicated European STEM labour market digital dashboard drawing on real-time data could provide an informed basis for STEM policy actions at both the EU and national levels.



2.

Recommendations in support of the STEM professions

Increase funding for research and development to drive technological advancements

- Increase public spending on R&D and focus on breakthrough technologies. The investments should be prioritised for the key technological development areas.
- Provide targeted EU economic support to develop strategic technologies and materials.
- Modernise science and technology infrastructure to support a vibrant research environment.
- Simplify regulations (IPR and taxes) and fund strains to support innovation in small high-tech firms and promote value creation through commercial innovations.

Background

To enhance strategic prioritisation and risk-taking in funding allocation within the Horizon programme and other EU research efforts, a shift towards transformative policies is essential. This will stimulate opportunities from disruptive technological innovation and prioritise ambitious projects that

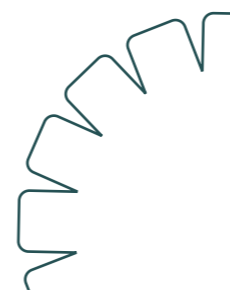
create synergies beyond what individual countries can accomplish. Policy measures should also support industrial involvement and focus on generating commercial outcomes from research and development (R&D) investments.

Europe must embrace new technologies with global impact, requiring a dynamic and innovative industrial ecosystem supported by comprehensive R&D and innovation policies. The current science, technology and innovation (STI) infrastructure is outdated, needing next-gen digital and data-enabled systems. Adequate funding and resources for researchers are crucial. Europe should also leverage R&D benefits in defence and dual-use technologies, adapting to the changing security landscape and addressing cyber warfare risks. Reports by Letta and Draghi highlight the need for a competitiveness strategy that supports innovation and technological advancement. Europe needs speed, scale, and reduced complexity in the governance of R&D and innovation investments to achieve its competitiveness goals. Current EU funding frameworks should be

independently assessed to reduce complexity and overlapping purposes. The Single Market faces challenges like a complex regulatory environment, long permitting times, and a fragmented market with diverse legal and tax systems, deterring investment in European tech start-ups. Emerging technologies need a flexible intellectual and property rights (IPR) framework to protect innovators and foster collaboration. Simplifying IPRs rights can support small high-tech firms and promote innovation. A renewed IPR policy should adapt to rapid tech changes and encourage data sharing in publicly funded research to support the STEM ecosystem. A sustainable competitiveness model should incentivise private investment and innovation by creating a favourable environment for venture capital, private equity, and foreign direct investment in Europe.



Reports by Letta and Draghi highlight the need for a competitiveness strategy that supports innovation and technological advancement.



3.

Recommendations in support of the STEM professions

Support the scale-up of EU technological innovations

- Develop and promote funding programs specifically aimed at supporting scale-up financing for deep-tech startups. Assess the role of the EU in driving deep tech innovation through public procurement.
- Review national innovation systems and cross-border collaborations to identify barriers and enablers for a connected European deep-tech ecosystem. Assess whether supporting structures have the necessary skills and connections to aid deep-tech start-ups through development and scaling, including board professionalisation, investment preparation, and effective liaison with European venture funds.
- Explore and facilitate the involvement of large pension funds in venture capital, creating models for their participation in funding technological innovations. Encourage the formation of consortia of investors to share the risks and rewards of investing in deep-tech startups
- Implement the “Fifth Freedom” to anchor research, innovation, and education in the Single Market and to boost technological development for the EU strategic autonomy.

Background

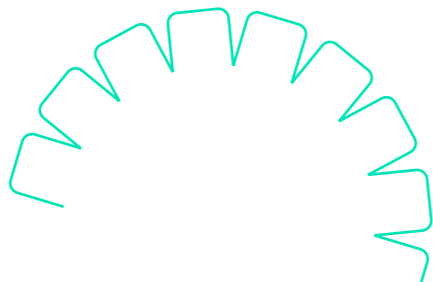
While Europe excels in the creation of startups, surpassing even the US with a stable share of repeat founders, challenges remain in scaling up these ventures as a precondition to future competitiveness. Breakthrough technological innovation is a lengthy and complex process that necessitates “patient” capital throughout the entire innovation cycle. Europe has a limited pool of deep-tech investors, comprising a select group of funds that strategically prioritise investments in deep technology and a few others that occasionally venture into advanced tech sectors. Moreover, 97% of dedicated European Deep Tech investors have fund sizes below €300M. The dedicated deep-tech funds are typically small, which restricts their capacity to fully support startups as they progress through successive funding rounds. This scarcity, both in the number and scale of investors, poses a significant barrier when startups reach the industrialization stage and require considerable capital for expansion and large-scale expenditures.

A robust startup and scale ecosystem fosters creativity, experimentation and seamless connectivity, which is essential for maintaining Europe’s competitiveness in the global market, especially against major non-EU tech companies. This aligns with the recommendations in Enrico Letta’s report “Much More than a Market,” which emphasizes the importance of

empowering research infrastructures and creating a strong European technological infrastructure. A well-structured startup ecosystem can attract both domestic and international investment. Investors are more likely to fund startups in environments where there is a coherent regulatory framework and standards enabling Europe to function as an integrated market.

To further support the scaling up of ventures, the EU should explore how public procurement can stimulate deep-tech scale-up. Moreover, the funding mechanisms made available through European Innovation Council (EIC) should be reviewed in terms of ease, speediness and support in the funding process.

It is critical for European deep-tech start-ups that the deeply specialised innovation hubs and technology parks within deep tech function as effectively connected ecosystems across EU borders and regions of Europe. Additionally, the EU could take steps to assess whether the existing innovation infrastructures offer optimal support when it comes to effectively liaising deep tech companies with venture cap and can assist them in professionalising the board and preparing a comprehensive strategy for venture cap. Also implementing programs to attract international talent and simplifying the relocation process for skilled workers will ensure that the EU has access to the necessary workforce to sustain innovation and growth.



4.

Concrete recommendations in support of an EU STEM Strategy

Develop a Resilient, cross-sectoral EU STEM Strategy

- Develop a comprehensive EU STEM strategy. It is important that the strategy is not limited to being a STEM Strategic Education Plan, but that it has a broader focus on enabling framework conditions promoting STEM professions
- Create a dedicated body to oversee the strategy, ensuring coordination among various stakeholders including government, industry, and educational institutions.
- Engage a wide range of stakeholders including social partners to gather insights, build consensus, and ensure that the strategy addresses diverse needs.
- Continuously monitor the strategy's implementation and adjustments just as a necessary response to political decisions and emerging challenges and opportunities.



It is important that the strategy is not limited to being a STEM Strategic Education Plan, but that it has a broader focus on enabling framework conditions promoting STEM professions.

The strategy should include the following key areas:

Early interest: Enhance primary education in literacy and numeracy to support future learning and spark an early interest in STEM through innovative curricula and teaching methods.

Vocational excellence: Enhance STEM in vocational education by promoting student and staff mobility, integrating entrepreneurial practices, and offering pathways between vocational and higher education.

Higher education: Attract more students, especially women, to STEM fields, reduce dropout rates, and encourage diversity in enrolment.

Lifelong learning: Increase participation in lifelong learning, leveraging micro-credentials to create coherent learning pathways and to retain senior workforce (55+) in the job market.

Work practices: Promote work practices that enhance job quality, better working conditions and skills utilisation and development and support mobility and retention in STEM occupations.

Skills monitoring: Implement a granular methodology to conduct STEM labour market analyses and monitor STEM skills demand and supply, ensuring this data informs the development of the EU Jobs Quality Roadmap.

Global mobility: Develop models to support the mobility of STEM professionals and researchers from outside the EU, e.g. through attractive working conditions and by including robust skills recognition.

Talent retention: Promote scientific excellence to attract and retain top-tier talents worldwide, helping to address STEM skills shortages and also capitalising on the seniors' (55+) expertise.

Integrated skills anticipation: Integrate the EU's technology policies to evaluate the future demand for STEM professionals in Skills Monitoring, considering detailed insights from both the value chain and sector perspectives.

The Association of Nordic Engineers, ANE, consists of engineering trade union associations from the Nordic countries:

The Swedish Association of Graduate Engineers (Sveriges Ingenjörer)
The Danish Society of Engineers (IDA)
The Norwegian Society of Engineers and Technologists (NITO)
The Association of Chartered Engineers in Iceland (VFI)
Engineers Finland representing the Finnish organisations:
the Academic Engineers and Architects in Finland (TEK), the Technical Association in Finland (TFiF),
the Union of Professional Engineers in Finland (ILRY) and the Engineers in Finland (DIFF)

For more information, please visit www.nordicengineers.org



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