



Opinion of the European Economic and Social Committee

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

Advanced materials for industrial leadership

(COM(2024) 98 final)

(C/2024/6028)

Rapporteur: **Anastasis YIAPANIS**

Co-rapporteur: **Gerardo Lu s ARROYO HERRANZ**

Advisors	Mihai IVAȘCU (for the Gr. III rapporteur) Francisco FERNÁNDEZ MARTÍNEZ (for the Cat.1 co-rapporteur)
Referral	European Commission, 27.3.2024
Legal basis	Article 304 of the Treaty on the Functioning of the European Union
Section responsible	Consultative Commission on Industrial Change
Adopted in section	6.6.2024
Adopted at plenary session	11.7.2024
Plenary session No	589
Outcome of vote (for/against/abstentions)	172/0/3

1. Conclusions and recommendations

1.1. The EESC appreciates the Commission Communication as an initial step towards enhancing the EU's capacity for advanced materials, but considers it cannot be viewed as a strategy per se, as it lacks quantifiable targets, deadlines and specific key performance indicators (KPIs). Building a complex advanced materials ecosystem demands a comprehensive strategy, substantial funding, incentives and, more importantly, high-level political backing.

1.2. The Committee welcomes the EU-Japan enhanced dialogue ⁽¹⁾ on advanced materials and the plan to create a platform for sharing policy advancements and exploring joint research opportunities, and believes that such initiatives should be extended to other leading countries, such as South Korea and the USA.

1.3. The EU needs a holistic approach to decrease material consumption, promote circularity and facilitate the transition to sustainable business models and consumption behaviours. Social and civic dialogue must be fostered to facilitate information exchange, knowledge sharing and innovation toward enhanced efficiency and sustainability.

1.4. Close collaboration among experts from product conception to end-of-life recycling is essential. The EESC finds it crucial to foster competitiveness in R&D&I by engaging industrial players, public authorities, social partners and academia, and by creating an integrated network of cross-border research infrastructures, connected via blockchain technology and accessible through a single-entry point.

⁽¹⁾ EU and Japan launch Enhanced Dialogue on advanced materials.

1.5. Integrating digital technologies and innovations into materials development processes, while establishing a unified framework for measuring the sustainability of new materials, is crucial to fully leverage the capabilities of advanced materials. The EESC supports the introduction of digital product passports, which include information standards and details from production to recycling, but cautions against introducing additional bureaucracy or costs for businesses or consumers.

1.6. The Committee highlights the EU challenge of translating laboratory innovations into commercially viable products and emphasises the need for additional measures and incentives in the final stages of product commercialisation. It also calls for expediting the permitting procedures for advanced materials plant authorisation.

1.7. The EU should strengthen domestic capacity through industrial policy measures and remove barriers to the extraction, refining and processing of essential strategic raw materials. Diversifying sources of critical raw materials by establishing long-term contracts with smaller countries is vital to mitigate potential supply disruptions from major suppliers like China.

1.8. The Committee stresses the importance of addressing both current and future skills needs, particularly in light of the digital and technological revolution. This entails implementing up-skilling and re-skilling programs for the current workforce, along with vocational education and training initiatives in the materials and manufacturing sectors. Additionally, effective career guidance is essential for attracting talent to STEM (Science, Technology, Engineering and Mathematics) careers and guiding individuals toward employment opportunities based on accurate labour market insights.

1.9. The proposed allocation of EUR 250 million under a co-programmed Horizon Europe partnership for the 2025-2027 period fails to significantly advance crucial advanced materials, falling short of EU ambitions. The EESC calls for concrete support for SME participation and incentives for their involvement in future partnerships.

1.10. Tax-based incentives can boost investment, innovation and production in advanced materials, fostering economic growth and technological progress, but vigilant monitoring is essential in order to prevent market distortions or unintended repercussions. Furthermore, simplified bureaucratic processes are vital for fostering innovation and collaboration, allowing innovative companies to concentrate on their core goals.

1.11. The EESC notes the escalating global competition for resource access and is worried that technological progress may lead to economic conflicts, price rises and a more complex political landscape. It recommends establishing transparent sustainability criteria and indicators for advanced materials production processes and introducing mandatory social conditionalities for accessing EU funds, incentives and public procurement processes.

1.12. A value-chain approach is necessary to foster a fair and competitive environment for EU industry, addressing unfair trading practices, production overcapacity and third-country subsidies, while also advocating for ongoing WTO reforms. The EESC salutes the future set-up of an EU Technology Council, and demands that the EESC be included in its activities.

1.13. The Committee proposes including healthcare as an additional initial strategic area, as it represents one of Europe's largest industries, with high emissions intensity and with healthcare-related advanced materials often intersecting with sectors like electronics and energy.

1.14. In order to be able to compete in the international arena with firms from other regions who receive substantial government backing, the Committee deems it necessary to strengthen European production, streamline market access and improve market surveillance to verify the compliance of imported goods, including their recycling content.

2. Introduction and general comments

2.1. The COVID-19 pandemic and Russia's invasion of Ukraine have underscored the fundamental vulnerabilities in global supply chains, as well as the EU's significant reliance on third countries for specific raw materials.

2.2. Despite critical raw materials typically comprising a small fraction of a product's overall material balance, their current supply/demand trajectories suggest that their availability will not meet demand. The EESC considers it wise to extend supply sources promptly, via long-term contracts with smaller countries in order to mitigate disruptions from major suppliers of critical raw materials like China.

2.3. The introductory part of the European Commission communication states: 'With this Communication, the Commission sets out a European strategy to ensure industrial leadership in advanced materials'. However, this cannot be considered a strategy per se; rather, it serves as a starting point for discussions on establishing an EU strategy for advanced materials. Furthermore, no quantifiable targets have been set in this communication, nor have any deadlines to achieve these targets or specific KPIs been provided.

2.4. The EESC welcomes the recently announced EU-Japan enhanced dialogue on advanced materials and the intention to establish a platform for exchanging information on policy advancements and investigating opportunities for joint research into advanced materials. This initiative, given the global importance of and investment in advanced materials, should be replicated with other countries such as South Korea and the USA.

2.5. Securing access to both public and private finance is crucial for upholding the Union's open strategic autonomy and for establishing a robust and competitive manufacturing foundation. The completion of the Capital Markets Union and the Banking Union will enhance access to finance.

3. Research and Innovation on Advanced Materials in Europe

3.1. Promoting research into and innovation in advanced materials necessitates comprehensive consideration of safety and sustainability throughout a product's entire life cycle, as well as educating all stakeholders about the impact of substances and materials on humans, the environment and sustainability. A holistic approach is necessary to reduce material consumption and to facilitate the transition to sustainable business models and shifts in consumption behaviour. Social and civic dialogue at sectoral, regional, national and European level is vital for information and knowledge exchange and to guide innovation towards enhanced efficiency and sustainability.

3.2. Enhancing inclusive cooperation throughout the entire value chain is crucial for addressing the fragmentation of Europe's R&D&I environment and the growing complexity entailed in developing new materials and processes. Close collaboration among experts is essential. The EU should create an integrated network of cross-border research infrastructures, interconnected via blockchain technologies and accessible through a single entry point, available to all stakeholders and including SMEs in the development and testing of new materials.

3.3. To fully leverage the capabilities of advanced materials, it is imperative to integrate digital innovations into materials development processes and to establish a unified framework for measuring, quantifying and benchmarking the sustainability of new materials. Emphasis must be placed on digital technologies like AI, high-performance computing and big data management, and on their impact on future R&D results.

3.4. The EESC considers that greater attention must be placed on the adoption of blockchain-based data management technology, including intelligent sensing systems to collect and interpret the large amounts of data available, in order to ensure real-time access and verification between different stakeholders involved in R&D projects.

3.5. Digital product passports must be developed, incorporating suitable information standards and details, along with information concerning existing valuable substances. Such passports can enhance transparency in waste treatment of advanced materials, but should not add new red tape or extra costs for businesses or consumers.

3.6. R&D efforts should prioritise sustainability and efficiency, with incentives aligned accordingly, and should refrain from utilising large quantities of raw materials or relying on unsustainably extracted raw materials. The EESC advocates the establishment of clear sustainability criteria and indicators to ensure transparency in the production processes of advanced materials, along with applying the precautionary principle to anticipate and mitigate associated risks.

4. Fast Track from Lab to Fab

4.1. Europe has for a long time led the way in advanced materials development. However, a significant challenge persists in efficiently translating laboratory innovations into commercially viable products. The EESC considers that more measures and incentives are necessary in the final phases of bringing new products onto the market and stresses that policy action without a strong industrial base will not achieve the expected results.

4.2. The EU needs to bolster domestic capacity through industrial policy measures and to eliminate obstacles to the extraction, refining and processing of essential strategic raw materials. Furthermore, the Union should advocate sustainable and responsible sourcing of non-primary, non-fossil-based feedstock for the design of advanced materials and should only import feedstock materials from countries with high environmental and social standards.

4.3. In alignment with the 2020 Council Conclusions, the EESC acknowledges that regulatory sandboxes offer valuable learning opportunities for businesses, especially SMEs, micro-enterprises and start-ups. The EESC advocates the establishment of sandboxes across industries as they foster experimentation and innovation without early compliance costs or regulatory limitations.

4.4. To guarantee widespread public acceptance and rapid implementation of advanced technologies, there is a need to enhance public understanding and awareness of enabling technologies, taking into consideration ethical and environmental considerations in a proactive way. Moreover, investing in maintenance practices and technologies enhances capabilities for innovation, research and production in the field of advanced materials, supporting reliability, performance, quality, safety, and efficiency.

4.5. The shortage of skilled workers in advanced materials persists and is expected to worsen due to people retiring and demographic changes. Highly skilled talent and educational capacities are essential for the twin transitions in specialised and research-intensive supply chains, as well as for the transition to a low-carbon economy and for R&D&I activities aimed at reducing material use and substitution. The Committee emphasises the need not only to address current skills demand, but also to anticipate future skills needs.

4.6. The European Commission and Member States must put in place adequate awareness-raising campaigns to attract workforce, in particular young people and women, to STEM education. Effective career guidance is essential for increasing people's interest in STEM careers and disciplines and guiding them to employment opportunities. EU and national policy-makers should also invest in awareness-raising campaigns about the importance of life-long learning.

4.7. To strengthen European strategic autonomy, it is paramount to enhance the attractiveness and accessibility of employment opportunities in advanced materials projects. This includes attracting talent and highly qualified personnel who, in collaboration with specialised universities and with the necessary financial support, will promote leadership and drive research and development in the strategic sectors. The EESC emphasises the need for up-skilling and re-skilling programmes for the current workforce, as well as vocational education and training programmes in the materials and manufacturing sectors. Furthermore, companies, particularly SMEs, should receive support to develop right-skilling initiatives.

5. Increasing capital investment and access to finance

5.1. The European Commission plans to allocate €250 million for 2025-2027 to leverage at least the equivalent amount from industry under a co-programmed Horizon Europe partnership. The EESC acknowledges this initiative, but deems the amount insufficient to substantially accelerate the development of advanced materials vital for the EU's industrial leadership in the green and digital transitions. Currently, the funding allocation falls short of EU ambitions.

5.2. The EESC calls for national and EU policies to be devised immediately to strengthen the start-up ecosystem in advanced materials across the Member States, including steps to ensure much-needed financing. Furthermore, all EU Member States need to ensure significant progress towards meeting the Lisbon Strategy target (3 % of GDP spending on R&D). This is particularly crucial given that in 2022, EU R&D expenditure relative to GDP stood at 2,24 %, compared to 3,34 % in Japan, 3,46 % in the US and nearly 5 % of GDP in South Korea ^(?),

5.3. Funding institutions must possess the technical expertise necessary to assess funding proposals for material innovations, ensuring prompt consideration of safety and sustainability aspects. Public investment should be targeted at essential infrastructure investment and should support R&D and the scaling-up of breakthrough technologies. The Committee calls for the creation of a European sovereignty fund to support an industrial policy of 'Made in Europe' and efforts to explore all possible tools to finance it.

5.4. Tax-based incentives (like R&D tax credits, tax exemptions, training credits, etc.) can help stimulate investment, innovation and production in the advanced materials industry, driving economic growth and technological advancement. Careful monitoring must be in place to ensure that they do not distort the market or have unintended consequences.

5.5. European funding programmes for the development of innovative materials involve excessive bureaucracy, necessitating additional personnel for application and reporting, thereby impeding project participation. Streamlining bureaucratic procedures is crucial to enhancing innovation and collaboration, enabling innovative companies to focus on their primary objectives.

^(?) R&D expenditure - Statistics Explained.

6. Fostering the production and use of advanced materials

6.1. According to OECD estimates, global resource consumption is projected to increase by approximately 40 % by 2040 and nearly 90 % by 2060 ⁽³⁾, with all countries competing for the same reservoir of raw materials. Given that a significant portion of the essential raw materials required by European industry originates outside of Europe, the industry faces intensifying global competition in securing access to these resources. Furthermore, the EESC is concerned about the current ownership of mining facilities in third countries, with China establishing a dominant position ⁽⁴⁾ and making it more difficult for the EU to enter markets. Given the projected drastic increase in resource demand, the EESC is worried that technological progress may lead to economic conflicts, price rises and a more complex political landscape.

6.2. The Committee considers that the EU must advocate for European content in global value chain products by making social conditionalities obligatory for accessing EU funds, incentives and public procurement, thereby encouraging the production of goods from EU-sourced components. The EESC supports the idea of establishing an Advanced Materials Academy to analyse the present market situation and competitiveness, as well as future challenges.

6.3. The EESC advocates a value-chain approach at European, national and regional level. The Union's objective should be to foster a fair and competitive environment for its industry by addressing unfair trading practices, over-capacity in production and unfair subsidies from third countries, while continuing WTO reforms.

6.4. Data analysis plays a significant role in decision-makers' and authorities' actions; these require a comprehensive data basis and need to be based on FAIR principles ⁽⁵⁾ and advanced monitoring to identify current knowledge gaps, which should be available to all EU stakeholders.

6.5. In order to build an effective advanced materials ecosystem, as the EC is suggesting, it is necessary to bring together stakeholders from the entire value chain (R&D, development, recycling, waste, digital aspects, machinery building, etc.) and also from the education and training domains. Building such a complex ecosystem requires both a comprehensive strategy for advanced materials (with targets and deadlines), significant funding and incentives and, more importantly, high-level political support.

7. Overall governance framework

7.1. All Member States must work together to advance materials development, leveraging Europe's collective strengths for mutual benefit. Novel inclusive cooperation models throughout the entire value chain will be essential to address the existing fragmentation in Europe's R&D&I production landscape and the growing complexity of developing new materials and processes. The EESC salutes the future set-up of an EU Technology Council for advanced materials and demands that the EESC be included in its activities.

7.2. After consulting with Member States, the European Commission recommends four research and innovation priorities (energy, mobility, construction and electronics) as preliminary strategic priorities for collaborative efforts in the field of advanced materials. The EESC suggests adding healthcare as a further strategic area because it is one of Europe's largest industries and has high emissions intensity; moreover, the development of advanced materials for healthcare frequently overlaps with other sectors such as electronics and energy.

7.3. The EESC urges the European Commission and Member States to develop and implement early warning systems for identifying materials and applications of concern in advanced materials, including the development of monitoring capacities and risk assessment tools for strategic supply chains. The Committee also emphasises the importance of reducing bureaucracy at all levels while preserving regulations related to occupational safety and health (OSH), and expediting the permitting procedures for plant authorisation.

⁽³⁾ OECD, Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences.

⁽⁴⁾ In the Congo for example, 70 % of cobalt mines are owned by China.

⁽⁵⁾ Findability, Accessibility, Interoperability and Reusability of data.

7.4. As is the case with other industrial sectors, European companies in the advanced materials industry encounter a fiercely competitive global landscape, where firms from other regions receive substantial government backing. To maintain the EU's competitiveness in this global arena, it is crucial to strengthen European production, facilitate market access and enhance market surveillance to ensure compliance of imported goods, including their recycling content.

7.5. The EESC points to the importance of protecting intellectual property rights for companies willing to sell their products on international markets and calls for European efforts to harmonise legislation in OECD discussions and bilateral agreements.

7.6. Many new material developments originate in SMEs, which often encounter challenges ranging from technological innovation failures to difficulties in raising sufficient capital quickly in order to scale up their innovations and enter the market. The EESC calls for concrete support for SME participation, as well as incentives for their involvement in future partnerships.

Brussels, 11 July 2024.

The President
of the European Economic and Social Committee
Oliver RÖPKE
