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Sammanfattning

Denna rapport undersöker hur Europeiska unionen hanterar additiv tillverkning givet en omvärldskontext av intensifierad strategisk konkurrens. Additiv tillverkning beskrivs av Europeiska kommissionen som en kritisk teknik för EU:s ekonomiska säkerhet, men unionens politiska svar är fortfarande ojämnt.

Proaktiva EU-initiativ som syftar till att främja konkurrenskraften har inte sett någon större ökning av sin finansiering eller sina ambitioner. Forskning och Utvecklingsstödet till additiv tillverkning har legat stabilt under det senaste decenniet, med en blygsam förskjutning mot försvarsinriktade projekt på senare tid. De politiska rekommendationerna från den utsedda arbetsgruppen för avancerad tillverkning har fått begränsad uppföljning, vilket tyder på bristande politiskt momentum.

Däremot har EU vidtagit mer beslutsamma åtgärder för att skydda sin tekniska bas. Åtgärderna omfattar granskning av utländska direktinvesteringar, strängare exportkontroller, selektiv uteslutning av aktörer från tredjeland inom känsliga forskningsprojekt och standardiseringsinsatser relaterade till additiv tillverkning. Internationella partnerskap har spelat en mindre roll. Medan Handels- och teknikrådet mellan EU och USA kortvarigt främjade samarbetet om standarder för additiv tillverkning, har detta momentum avtagit med den nya amerikanska administrationen.

Sammantaget visar EU på framsteg när det gäller defensiva åtgärder för att skydda unionens additiva tillverkning, men på betydligt färre proaktiva åtgärder för att stärka konkurrenskraften. Denna klyfta belyser en skillnad mellan strategisk retorik och konkret politisk implementering.

Nyckelord: Strategisk konkurrens, additiv tillverkning, ekonomisk säkerhet.

Summary

This report examines how the European Union addresses additive manufacturing within the broader context of intensifying strategic competition. Although additive manufacturing is identified by the European Commission as a critical technology for the EU's economic security, the Union's policy response remains uneven.

Proactive EU initiatives to promote competitiveness have seen little increase in neither funding or ambition. Funding levels for additive manufacturing have remained stable over the past decade, with a modest recent shift toward defence-oriented projects. Policy recommendations from the appointed task force on advanced manufacturing have seen limited follow-up, indicating a lack of political momentum.

In contrast, the EU has taken more decisive steps to protect its technological base. Measures include foreign direct investment screening, tighter export controls, selective exclusion of third-country entities from sensitive research and innovation (R&I) projects, and additive manufacturing-related standardization efforts. International partnerships have played a smaller role. While the EU-US Trade and Technology Council briefly advanced cooperation on additive manufacturing standards, this momentum has waned with the new US administration.

Overall, the EU's recent actions show progress in defensive measures to protect additive manufacturing, but far fewer proactive policies to enhance competitiveness. This gap highlights a divergence between strategic rhetoric and concrete policy implementation.

Keywords: Strategic competition, additive manufacturing, economic security.

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1 Introduction

Since the late 2010s, the concept of strategic competition has become increasingly central for international relations scholars trying to describe the current global security context. The term, which implies a rivalry across the spectrum of statecraft including the use of diplomatic, economic and military tools to exert influence, is primarily used to describe the growing rivalry between the People's Republic of China and the United States.¹

But the US and China are not the only actors affected by the new security environment. As the old rules-based international order weakens, all international actors need to adapt their behaviour to protect their interests. Hence the EU is also changing its priorities based on this new reality. A clear illustration is the 2024 report “The Future of European Competitiveness”, often referred to as the Draghi report, which discusses how the EU is facing a more uncertain geopolitical situation threatening European stability and freedom. The report stresses the importance for Europe to “close the innovation gap” with the US and China, particularly in the area of advanced technologies, and to reduce the EU's external dependence on energy, raw materials and technology.² EU Commission President Ursula von der Leyen recently emphasized that EU policy always has had a security dimension, since the creation of the Coal and Steel Community up until today, and that the EU once again must consider security in a broader range of policy areas.³ On a similar note, the EU Commission's Competitiveness Compass from 2025 highlights how a fiercer global competition for technological supremacy is challenging the core values of the Union: “Europe's competitiveness and what Europe stands for are inseparable.”⁴

These reports and speeches suggest that we are entering an era where technology and security are becoming more entwined. EU policy concerning research, economic and industrial growth is increasingly embedded in the security policy of the union. But what does this imply for the policy work conducted in the EU, and in the member states? After all, both security and defence policy fall primarily under the competence of the member states, and research policy as well as industrial policy is a shared competency.⁵ Thus, the opportunities for the EU to play a decisive role in the great power game of strategic competition may be smaller than the speeches from the Commission implies. In addition, even with this new discourse, the EU still has many other political goals to balance. Can the EU live up to its rhetoric? How does the emerging discourse on strategic competition translate into increased political efforts when many other goals also require attention?

1.1 Research questions

To explore this topic, this report looks at additive manufacturing as a case study. Additive manufacturing or “3D printing” is as the process of joining materials to make parts from a 3-dimensional model data one layer at a time,⁶ (see section 4.1 for more details). The Draghi report describes additive manufacturing as an advanced technology, and highlights the importance of these technologies for EU competitiveness. By having the ability to rapidly produce a large variety of things, additive manufacturing technology has the feature of potentially reducing external dependencies by enabling domestic production of specialized

¹ Stephanie Christine Winkler. “Strategic Competition and US-China Relations: A Conceptual Analysis,” *The Chinese Journal of International Politics*, 2023, 16, 333–356

² Mario Draghi. The future of European Competitiveness – Part A, A competitiveness Strategy for Europe. September 2024. p 6.

³ Ursula von der Leyen keynote speech at the EDA Annual Conference 2023: Powering up European Defence. November 30, 2023. https://ec.europa.eu/commission/presscorner/detail/en/speech_23_6207

⁴ European Commission. *A Competitiveness Compass for the EU*. COM(2025) 30 https://commission.europa.eu/document/download/10017eb1-4722-4333-add2-e0ed18105a34_en

⁵ European Union Website. “FAQ EU competences and Commission powers.” European Union. Accessed October 9, 2025 https://citizens-initiative.europa.eu/faq-eu-competences-and-commission-powers_en

⁶ John Ryan C. Dizon, et.al. “Mechanical characterization of 3D-printed polymers” *Additive Manufacturing*, Volume 20, 2018, Pages 44-67, <https://www.sciencedirect.com/science/article/pii/S2214860417302749>

components. A flourishing European additive manufacturing industry could replace imports from other parts of the world, increasing the EU's independence in an increasingly uncertain geopolitical situation. Additive manufacturing is also explored in a defence context in order to allow for the production of military components close to the front line, thus lowering the reliance on the supply chain. Currently, the EU is spearheading the additive manufacturing sector, together with the US and China.

In addition, the EU Economic Security Strategy of 2023 puts forth “advanced materials, manufacturing and recycling technologies,” as one of ten technology areas of critical importance for the economic security of the Union.⁷ Within that technology area additive manufacturing is the most prominent technology, as measured by business and innovation patent activities.⁸ Given that the Commission has designated additive manufacturing as a critical technology from an economic security perspective, it should be a suitable object of study on how the EU's new discourse on strategic competition translate into policies on the European level. To explore this, the report has two research questions:

- What is the EU doing to improve its competitiveness in the technological field of additive manufacturing?
- Has the EU's increased focus on strategic competition from the early 2020s led to new or increased efforts from the EU to strengthen additive manufacturing in the Union?

1.2 What is strategic competition?

The term strategic competition is widely used by politicians and experts in capitals around the globe, but there is no consensus on its definition. While the term goes back to the détente period of the Cold War, its current popularity was launched with the release of the US National Security Strategy in 2017, which identified China as the United States' main strategic competitor.⁹

Since then, the literature on the subject has grown dramatically. Certain features recur among scholars discussing the term. The word competition is often juxtaposed with the term cooperation, for example. In this interpretation, the world has moved from a more cooperative order built on plus-sum thinking of mutual gains, towards a more competitive order built on zero-sum thinking. In turn, this emerging rationale connects back to realist international relations-theory, in which states' goals centre around power, which by definition is a zero-sum game.¹⁰ The competition being strategic indicates that planning and an analysis of means and ends motivates the actions of the actors, and that they employ all available tools of statecraft to achieve their objectives.¹¹ Importantly, strategic competition consists of actions that remain below the threshold of outright war, underscoring the need for states to rely on tools beyond the purely military domain.¹²

Some scholars argue that strategic competition is not so much a description of the current time period as it is a description of how the international system has always operated. Seen in this light, the lack of strategic competition during the 90s and 00s were an exception to the rule, caused by the historical dominance of the United States during that period. With

⁷ European Commission. *Annex to the Commission Recommendation on critical technology areas for the EU's economic security for further risk assessment with Member States*. C(2023) 6689. October 3, 2023.

⁸ Joint Research Centre online tool, “European Advanced Manufacturing Monitor”, Last updated September 24, 2024. https://web.jrc.ec.europa.eu/dashboard/DGTES_ADMAN/index.html

⁹ Winkler. Strategic Competition and US–China Relations...

¹⁰ Mirosław Banasik and Lech Chojnowski. "Strategic Competition and its implications for international security". *Journal of Modern Science* 60 no. 6 (2024): 24–45. doi:10.13166/jms/196758.

¹¹ Winkler. Strategic Competition and US–China Relations...

¹² James van de Velde. “What is “Strategic Competition” and are we still in it?” *The SAIS Review* February 2, 2024. Accessed October 9, 2025. <https://saisreview.sais.jhu.edu/what-is-strategic-competition-and-are-we-still-in-it/>

the world shifting back to a more equal power balance across the globe, the international system is returning to its previous state.¹³

However, other scholars emphasize that our current era of strategic competition is historically unique. Michael Raska argues that today's competition is more complex than the competition during the Cold War, since it involves more actors and stretches across new domains. Raska also points to new technologies as central to strategic competition. This has always been the case to some extent, but two factors distinguish the current era of strategic competition from earlier periods. First, China's technological catch-up has renewed the strategic competition. Second, militarily relevant technologies have become harder to identify and classify, as their development is driven by commercial actors operating in dual-use technology domains.¹⁴ The growing importance of technology as an area of competition is also underlined by other researchers.¹⁵

This report looks at how the EU is currently managing strategic competition in policy areas related to additive manufacturing. That means that we are interested in the current ongoing strategic competition that started in the mid-2010s, rather than strategic competition as a historical phenomenon that can be identified in different shapes during a range of periods. Applying this context, we aim to place the EU's work on additive manufacturing into a broader context of strategic competition.

1.3 EU strategic competition policy development

As mentioned above, strategic competition has become more established in the global discourse on security policy since the late 2010s. The first identifiable use of the term "strategic competition", referring to an ongoing strategic competition of which the EU is a part, is from 2019.¹⁶ This is when the Commission published a report referring to China as a strategic competitor to the EU.¹⁷ In the beginning of 2020, the Commission also mentions the term when discussing the importance of economic resilience.¹⁸ During this period, the term became established in EU discourse but had not yet taken centre stage. However, this changed shortly thereafter. In March 2022 the EU Council publishes its Strategic Compass for Security and Defence. Here the term strategic competition features prominently, and is described as defining the EU's geostrategic situation together with Russia's invasion of the Ukraine.¹⁹ Thus, in the period 2019-2021 the term strategic competition became established in EU discourse, with the term being firmly established by the time of publication of the Strategic Compass of 2022.

1.3.1 The Strategic Compass (2022)

The Strategic Compass was a broad initiative to strengthen EU defence and security policy in light of the worsening security situation. It proposed a wide range of policy measures, from an EU deployment capacity to strengthened intelligence capabilities, among others. The Strategic Compass also focused on strengthening EU access to emerging and disruptive technologies. One key initiative was the creation of the Roadmap on Critical Technologies

¹³ Elbridge Colby. "The Return of Strategic Competition: How to Execute and Sustain the National Security Strategy." Reaganfoundation.org March 24, 2020. Accessed June 8, 2025.
<https://www.reaganfoundation.org/reagan-institute/publications/the-return-of-strategic-competition-how-to-execute-and-sustain-the-national-security-strategy>

¹⁴ Michael Raska. Strategic Competition for Emerging Military Technologies. PRISM, Vol. 8, No. 3 (2019), pp. 64–81

¹⁵ Timothy R. Heath. US Strategic Competition with China – A RAND Research Primer. RAND, June 2021.

David C. Gompert. Winning the US-China Technology Race, *Survival*, 66:4, 77-84, (2024), DOI: 10.1080/00396338.2024.2380198

¹⁶ By searching for the term "strategic competition" on <https://eur-lex.europa.eu/advanced-search-form.html> some earlier uses of the term can be found, but they usually talk about other historical periods like the cold war, or other parts of the world where the EU acts as a mediator rather than a competitor.

¹⁷ European Commission. *EU-China – A Strategic Outlook*. JOIN(2019) 5.

¹⁸ European Commission. *2020 Strategic Foresight Report – Charting the Course Towards a More Resilient Europe*. COM(2020) 493.

¹⁹ Council of the European Union. *A Strategic Compass for Security and Defence*. March 24, 2022.

for Security and Defence. The roadmap emphasized, in line with the emerging discourse on strategic competition, that staying at the forefront of technological development is critical to safeguarding Europe's prosperity and way of life. The roadmap also presented its own policy proposals, including identifying critical technologies for EU security and defence, boosting the research, development and innovation capital provided to these technologies through EU programs, and promoting an EU-wide, strategic and coordinated approach to critical technologies.²⁰ The Commission also publishes annual progress reports for the Strategic Compass. The 2025 progress report discusses EU's work on disruptive technologies, including references to the Economic Security Strategy (discussed further below) and support given to small and medium sized enterprises to boost innovation.²¹

1.3.2 The Economic Security Strategy (2023)

The Strategic Compass was the first major EU document trying to describe EU policy in light of a global environment of strategic competition. Since then, several EU documents have addressed the topic from different angles. One central document is the Economic Security Strategy. Although it does not use the term strategic competition, it mentions related concepts such as "geopolitical tensions" and "new technological and geopolitical realities". The strategy aims to reduce the EU's economic vulnerabilities and increase its resilience in order to manage a new geopolitical reality in which the Union must contend with a wide range of threats from hostile foreign powers. The document lists a few dozen different policy measures, many of them aiming at strengthening the EU's technological edge. The measures include both defensive policies aimed at protecting the EU from threats and risks, as well as offensive measures designed to enhance the Union's competitiveness and thereby its power and resilience.²²

As part of the Economic Security Strategy, the EU also published a list of critical technology areas. Although this list concerns critical technology areas for the EU's economic security rather than critical technologies for security and defence, there is an obvious link between the identification of critical technologies requested in the Roadmap on Critical Technologies and the list of critical technologies published in the Economic Security Strategy. No separate list for critical technologies related to security and defence has been produced, and the Observatory of Critical Technologies, which monitors the critical technologies on the Economic Security Strategy list, features prominently in the roadmap.²³ Thus, while there is no explicitly stated connection between the Strategic Compass and the Economic Security Strategy, the two policy areas often overlap.

1.3.3 The Draghi Report (2024)

In 2024, the so-called Draghi report was published. The report came to define how the EU talked about managing strategic competition. The Draghi report is based on the observation that growth in Europe has been slower compared to the US and Asia. Draghi concludes that Europe has largely missed out on the internet-driven digital revolution and the associated productivity gains, and that the productivity gap between the EU and the US is largely attributable to the tech sector. Draghi argues that the EU is weak in the emerging technologies that will drive future growth, and he underlines that only four of the world's top 50 tech companies are European. Also, there is no EU company with a market capitalisation

²⁰ European Commission, "Roadmap on critical technologies for security and defence" February 15, 2022. COM(2022) 61. https://commission.europa.eu/document/download/c5f8e8fa-94f6-427a-8724-e57cba97a25a_en?filename=com_2022_61_1_en_act_roadmap_security_and_defence.pdf

²¹ European External Action Service. *Annual Progress Report on the Implementation of the Strategic Compass for Security and Defence*. HR(2025)73.

²² European Commission. *European Economic Security Strategy*. June 20, 2023. JOIN/2023/20 <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=JOIN:2023:20:FIN>

²³ European Commission website, "The EU Observatory of Critical Technologies", Accessed October 15, 2025. https://defence-industry-space.ec.europa.eu/eu-space/eu-observatory-critical-technologies_en

over EUR 100 billion that has been founded in the last 50 years, while all six US companies with a value above EUR 1 trillion were established during the same period.²⁴

Draghi's view is that Europe is stuck in a static industrial structure with few new companies emerging to disrupt existing industries, or develop new growth engines. EU companies are specialised in mature technologies where the potential for breakthroughs is limited, and, as a consequence, the companies spend less on research and innovation than their US counterparts. Europe consistently fails to translate innovation into commercialisation, and innovative companies seeking to scale up in Europe are hindered at every stage by inconsistent and restrictive regulations.²⁵

To Draghi, Europe's current inability to close the gap poses an existential threat to the Union:

If Europe cannot become more productive, we will be forced to choose. We will not be able to become, at once, a leader in new technologies, a beacon of climate responsibility and an independent player on the world stage. We will not be able to finance our social model. We will have to scale back some, if not all, of our ambitions. This is an existential challenge.

The thoughts on the EU and strategic competition expressed in documents such as the Draghi report or the Strategic compass was also confirmed in the Budapest Declaration on the new European competitiveness deal in November 2024. The declaration was adopted by the European Council, indicating that the Commission's approach to strategic competition is shared by the member states.²⁶

1.3.4 The Competitiveness Compass (2025)

In January 2025, the Commission published a communication document called the Competitiveness Compass, stressing the importance of Europe's competitiveness. The "contestants" are clearly defined: "The EU has fallen behind the US in advanced technologies, while China has caught up in many sectors, and is winning the race for leadership in certain new growth areas." The Commission reiterated Draghi's claim that the root cause is a lack of innovation, and an inability to translate ideas into new, marketable technologies, as well as failing to integrate those technologies into the EU's industrial base. Moreover, the Compass emphasizes that domestic constraints hamper the ability of European businesses to fight back. Companies are squeezed by high energy prices and a high regulatory burden, and face an increasingly uneven global playing field, characterised by the large-scale use of industrial subsidies abroad. Europe is also increasingly dependent on strategic inputs and highly concentrated supply chains.²⁷

The Competitiveness Compass expresses concern about the consequences:

*What is at stake for Europe is not just economic growth, but the future of its model. If Europe does not increase its productivity, it risks to be stuck on a low-growth path, with less income for the employed, less welfare for the disadvantaged and less opportunities for all. Europe faces a world of great power rivalry, competition for technological supremacy, and a scramble for control over resources. In this world, Europe's competitiveness and what Europe stands for are inseparable. Our freedom, security and autonomy will depend more than ever on our ability to innovate, compete and grow.*²⁸

To sum up, the EU has long compared its economic, political, military technological position with that of other actors. However, in recent few years there has been a more explicit focus on strategic competitiveness, in which the opponents are clearly identified. The EU expresses serious concerns over the Union's declining technological advantages. Furthermore, the "competition" concerns more than industrial capacity or employment. What is at

²⁴ Draghi. *The future of European competitiveness*.

²⁵ Draghi. *The future of European competitiveness*.

²⁶ Council of the European Union. "Budapest Declaration on the New European Competitiveness Deal" November 8, 2024. <https://www.consilium.europa.eu/en/press/press-releases/2024/11/08/the-budapest-declaration/>

²⁷ European Commission. *A Competitiveness Compass for the EU*, p. 1.

²⁸ European Commission. *A Competitiveness Compass for the EU*, p. 1.

stake, according to the EU, is the continent's freedom, security and autonomy, as economic power and security are closely linked within the strategic competition discourse.

1.4 Additive manufacturing technology

Before turning to the EU's handling of additive manufacturing in a global competition perspective, some notes on the technology itself are required. The term additive manufacturing stems from the practice of manufacturing goods by adding instead of removing material. Pottery is probably the most far-reaching historical example of how products have been manufactured by adding material. However, most people probably associate the concept with the technology that broke through during the 2010s.

As the more popularized term "3D printing" suggests, contemporary additive manufacturing is carried out by computer-controlled machines that produces artefacts by adding material in three dimensions. The process typically involves an array of hardening plastic materials, but metals and concrete are also used. Current uses for additive manufacturing include the printing of personalized medical implants, the production of specialized parts and prototypes in industries like the automotive and space industry, and the production of wearable technologies and sensors in the electronics industry.²⁹

Additive manufacturing is not a new technology. Nevertheless, additive manufacturing is rightly perceived as a disruptive, even revolutionary, technology. Some of the key benefits of additive manufacturing concern the decentralisation of production. Many believe that 3D printing could spur an industrial revolution in which the basis of production shifts from high volume, long manufacturing lines toward smaller volumes and end-user customisation.³⁰ This shift towards a decentralized production has several implications for defence and security. The ability to produce a wide variety of specialized parts leads to an increased resilience in the supply chain for the countries with access to the additive manufacturing machines. Within a military context, additive manufacturing can lead to reduced costs and increased reliability. Additive manufacturing machines close to the front line can quickly produce specialized spare parts, bypassing slow and complex supply lines.³¹

By the early 2000s, additive manufacturing even became associated with an emancipatory discourse. According to this discourse, the combination of open-source code and accessible 3D printing hardware could enable people to manufacture what they need at home. Some commentators pinpointed additive manufacturing as "the next great technological disruption".³² The emancipatory interpretation was likely an important booster for the dispersion of additive manufacturing within wider circles of society by the 2010s. The scientific domain is one indicative example. As figure 1 shows, academic publishing on additive manufacturing grew rapidly.

²⁹ Sarah Rudge, "7 Key Uses of Additive Manufacturing Driving Innovation in the Next Decade", *manufacturing-today.com* September 30, 2024.
<https://manufacturing-today.com/news/7-key-uses-of-additive-manufacturing-driving-innovation-in-the-next-decade/>

³⁰ Eg. Irene J. Petrick & Timothy W. Simpson, "3D printing disrupts manufacturing: How economies of one create new roles of competition", *Research-Technology Management* 56, no. 6 (2013): 12-16.

³¹ Chris Kremidas-Courtney. *Additive Manufacturing and the Future of European Defence*, European Policy Centre, 2025. p 4-5.

³² See e.g. Michael Weinberg, *It will be awesome if they don't screw it up: 3D printing, intellectual property, and the fight over the next great disruptive technology*, Public Knowledge, November 2010.

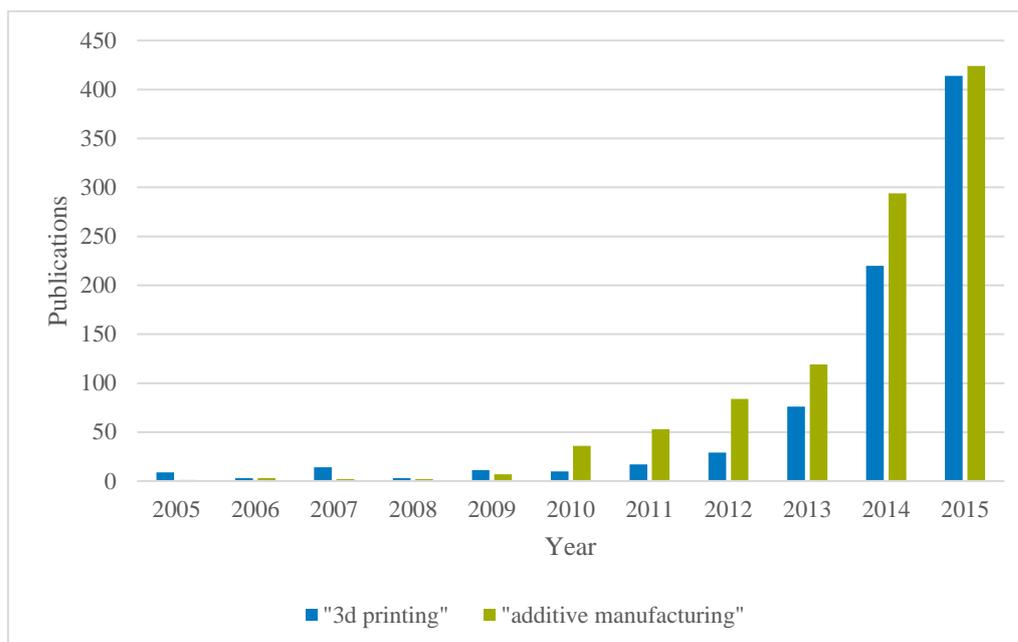


Figure 1. Number of scientific publications with “3d printing” and “additive manufacturing” in the title, 2005–2025. Source: Web of Science

Moreover, additive manufacturing attracted commercial interest at a larger scale through the 2010s. This shows clearly in the frequency of patenting on additive manufacturing technology. In 2006, 20 patents with “additive manufacturing” in the title were published worldwide. In 2020 the number was 4705. This was not because the term itself became popular. “3D printing” shows a similar trend with 4 patents in 2010 and 4519 in 2020.³³ The data illustrates a significant business trend emerging in the 2010s. The diffusion of additive manufacturing technology has given rise to a value chain of production and services, including software design, hardware manufacturing, data management, intellectual-property management, and design services.³⁴

1.5 Competitiveness of the EU additive manufacturing industry

Describing the international landscape of the additive manufacturing sector is complex, since it is a rapidly growing technology. Currently the growth of the international additive manufacturing industry exhibits a compound annual growth rate of over 20 percent which makes capturing international diffusion and adoption difficult.³⁵ A rough picture can still be given.

The additive manufacturing industry is highly concentrated, to the US, the EU and China. The US and the EU have been, and in some ways still are, leading in additive manufacturing innovation and commercialisation. However, in recent years China has become a formidable competitor. Although the US and the EU industries remain robust and competitive, Chinese industries are growing rapidly and make up an increasingly large share of the international market.

Almost 12,000 firms worldwide engage in advanced 3D printing and additive manufacturing technology. In this perspective, China is leading by hosting 44 percent of the firms, followed

³³ The Lens, data retrieved via custom search, accessed December 2025. <https://www.lens.org/>

³⁴ See e.g. J. Jacob Heinen, Kai Hoberg & Tim Schlaich, “Creating value from additive manufacturing: An analysis of entrepreneurial firms along the value chain”, *International Journal of Production Economics* 269 (2024).

³⁵ Lei Wang, Bingheng Lu. Development of Additive Manufacturing Technology and Industry in China. *Strategic Study of CAE*, 24(4) (2022): 202-211 DOI:10.15302/J-SSCAE-2022.04.018

by the US (18 percent) and the EU (15 percent).³⁶ Another way to describe the additive manufacturing sector is to use the Comparative Advantage Index (RCA). RCA is a measure used for comparing a geographical region's share of activities in a specific technology area against the global average. Using RCA for 3D Printing shows that US has the greatest relative advantage, followed by the EU:

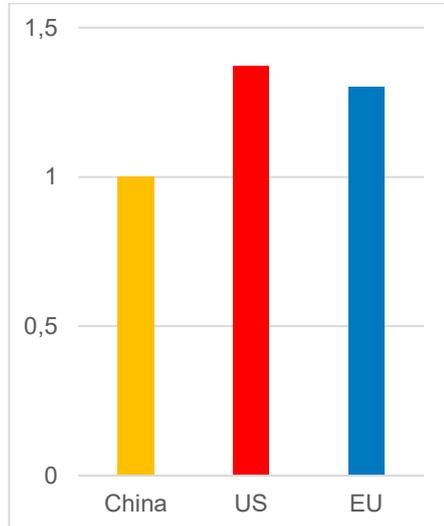


Figure 2. Relative Comparative Advantage for 3D Printing Technology. Source: Calza et al, *Advanced Manufacturing Study*, (2024).

In 2024, an EU report examined the relative position between the EU, the US, China and the rest of the world. It concluded that the US is the stronger actor in business, while China holds a stronger position in innovation across the additive manufacturing ecosystems studied.³⁷ An OECD report states that the US is the leading exporter in aircraft parts and orthopaedic appliances, while Germany leads in 3D printable machine parts, and medications/pharmaceuticals. China appeared to have taken the lead in exports of lower-tech 3D printable goods.³⁸

Another report from Digitaleurope argues that the EU still holds a competitive lead over the US and China in additive manufacturing, although the pillars of this position is rapidly eroding. According to the report, the EU performs well compared to the US and China when looking at global exports. However, the EU is struggling compared to the US and China with funding for start-ups and scale-ups, and is being surpassed when it comes to industry adoption of additive manufacturing.³⁹

When it comes to innovations measured by patents, the image is fragmented. A report from 2023 pointed out that 40 percent of all international patent families (IPFs) related to additive manufacturing filed between 2001 and 2020 originated from applicants based in the US. The EU followed with 33 percent, whereas applicants based in China accounted for 4 percent.⁴⁰ Another report from 2024 showed that between 2009 and 2023 there were over 10,000 additive manufacturing-related patent applications. Chinese firms filled the large majority of them (60 percent), followed by the EU (11 percent) and the US (10 percent).⁴¹ Usually though, since IPFs group similar patents filed in different countries together, IPFs are preferred as an innovation indicator as it avoids double counting, and as applying for an IPF is a stronger indication that the owner of the patent actually think that the patent is

³⁶ Elisa Calza et al. *Advanced Manufacturing Study. Preliminary findings on EU's Advanced Manufacturing industry in the global landscape*, EU Joint Research Centre (2024), p. 7.

³⁷ Josefina Fabiani et al. *Strategic Insights into the EU's Advanced Manufacturing Industry: Trends and Comparative Analysis*, Publications Office of the European Union, (2024), JRC139092.

³⁸ OECD (2021). *3D Printing and international trade*, p. 23.

³⁹ Digitaleurope. *The EU's critical tech gap – rethinking Economic Security to put Europe back on the map*. 2024.

⁴⁰ European Patent Office. *Innovation Trends in additive manufacturing – Patents in 3D printing technologies*. (2023)

⁴¹ Calza, et al. *Advanced Manufacturing Study*. p. 7.

valuable.⁴² This would indicate that the US still has the lead in this regard, with the EU following.

Depending on the source, the EU may still be regarded as a leading actor in the field of additive manufacturing, or it may be viewed as having been overtaken by the US and China. However, there is broad agreement that these three actors dominate the field, and that the EU is under increasing competitive pressure.

1.6 Chinese and US additive manufacturing policy

1.6.1 Chinese additive manufacturing policy

China's additive manufacturing industry is growing fast and has benefitted from an active industrial policy going back over a decade. In 2015, China adopted the "Made in China 2025" plan for industrial policy, which identified additive manufacturing as a key technology. This focus from the political leadership contributed to significant investments.⁴³ Since 2018 the government has also supported its domestic additive manufacturing industry by prioritizing domestic purchases. In 2021, China adopted its 14th Five-Year Plan, which also declares additive manufacturing as a core technology for China to remain competitive. Moreover, China has released a project declaration guide that expanded on the Five-Year plan, pushing both for investments in additive manufacturing and in practical applications of the technology. The country has also issued an action plan on leading the development of additive manufacturing standards.⁴⁴ Additionally, China's additive manufacturing development has also benefitted considerably from tax rules that allow companies to deduct 200 percent of their research and development expenses from taxable income.⁴⁵ Altogether, this illustrates the high priority the Chinese state assigns to developing the technology.

1.6.2 US additive manufacturing policy

The US has adopted a proactive approach to maintain its leadership position in additive manufacturing. In 2022, the government adopted "AM Forward", a public-private partnership to promote additive manufacturing and make the technology more accessible. The initiative supports small and medium sized companies with education and by purchasing more additively produced parts from smaller suppliers.⁴⁶ That same year the US also adopted a National Strategy for Advanced Manufacturing, which supports the goals set out in AM Forward and outlines a number of additional government actions to advance additive manufacturing, including continued R&I investments.⁴⁷

In 2021, the US Department of Defense also adopted an additive manufacturing strategy aimed at expanding the use of additive manufacturing within the military services. The

⁴² OECD. *OECD Patent Statistics Manual*, 2009. pp. 71–72.

https://www.oecd.org/content/dam/oecd/en/publications/reports/2009/02/oecd-patent-statistics-manual_g1gh9fa4/9789264056442-en.pdf?

⁴³ Gil Lavi. "Beyond Low-Cost: China's Bold Strategy for AM Dominance", *3Dalliances.com*,. March 30, 2025. Accessed September 10, 2025.

<https://www.3dalliances.com/post/beyond-low-cost-china-s-bold-strategy-for-am-dominance>

⁴⁴ Xuesong Pan, "An inside perspective on China's thriving metal Additive Manufacturing industry", *metal-am.com*, April 5, 2023. Accessed September 10 2025.

<https://www.metal-am.com/articles/an-inside-perspective-on-chinas-thriving-metal-additive-manufacturing-industry/>

⁴⁵ Michael Molitch-Hou, "China's 3D Printing Sector Is One Of The World's Fastest Growing" *Forbes.com*, May 30, 2024. Accessed September 10, 2025.

<https://www.forbes.com/sites/michaelmolitch-hou/2024/05/30/chinas-3d-printing-sector-is-one-of-the-worlds-fastest-growing/>

⁴⁶ The White House, "Fact Sheet: Biden Administration Celebrates Launch of AM Forward and Calls on Congress to Pass Bipartisan Innovation Act" May 6, 2022.

<https://web.archive.org/web/20240223011106/https://www.whitehouse.gov/briefing-room/statements-releases/2022/05/06/fact-sheet-biden-administration-celebrates-launch-of-am-forward-and-calls-on-congress-to-pass-bipartisan-innovation-act/>

⁴⁷ National Science and Technology Council. *National Strategy for Advanced Manufacturing*. October 2022.

<https://www.energy.gov/sites/default/files/2024-03/National-Strategy-for-Advanced-Manufacturing-10072022.pdf>

means to achieve this include new business models for additive manufacturing in contracting and acquisition, supporting collaboration across military branches and with external partners, developing new certifications, and enabling secure network connection of additive manufacturing machines, among other measures.⁴⁸ While the strategy should be viewed as an initial step to mainstreaming additive manufacturing within the US armed forces, it is nevertheless more comprehensive and structured than any comparable publicly available document from other actors.

1.7 Methodology

1.7.1 Delimitations

EU policy is shaped by many different actors and influenced by a wide range of documents, making it difficult to determine what should be examined when studying EU additive manufacturing policy. This report therefore defines its scope by assessing the policies set out in the Economic Security Strategy (see more below for the rationale behind this choice) and analysing how they affect additive manufacturing. This approach allows the report to capture a broad picture of the EU's work on additive manufacturing while maintaining a clear delimitation in terms of which policies should be studied.

The Economic Security Strategy contains 34 different policy tools, many of which concern additive manufacturing. Examining a large number of policies is necessary to capture a comprehensive picture of additive manufacturing policy work, but it also means that each policy cannot be explored in full within the scope of this report. Because access to data and other material varies considerably across the different policies, different methodological approaches must be applied depending on what best suits each case. The details of the sources and methods used are described alongside each policy in order to improve readability. In general, we have reviewed the relevant EU documents for each policy and searched for the terms “additive manufacturing” and “critical technologies” to determine whether they directly relate to additive manufacturing.

The strength of this approach is that it quickly lets us scan a large number of documents. The weakness, however, is that it does not take into account policies that affect additive manufacturing without mentioning the technology. This might include initiatives such as the EU's regulatory-simplification work, which targets large sections of the economy and also happens to affect additive manufacturing. Or it could involve policies concerning specific machinery equipment, or critical raw materials used in the additive manufacturing process. These policies would be interesting to study as well, but they raise a difficult question of what should and should not be included within the scope of the study. In order to keep our methodology straightforward, we do not focus on these policies unless additive manufacturing or critical technologies is also mentioned. Instead, we focus on documents that explicitly mention additive manufacturing or critical technologies, both because it provides a clear scope and because it signals a political intent. If additive manufacturing is mentioned explicitly, we can infer that policymakers intend specifically to strengthen this technology, rather than it benefiting incidentally from measures pursued for other political objectives. A specific focus on additive manufacturing aligns with the EU's growing interest in critical technologies as part of its new emphasis on strategic competition, illustrating how the strategic competition discourse has been translated into policy.

⁴⁸ Office of the Under Secretary of Defense for Research and Engineering. *Department of Defense Additive Manufacturing Strategy*, January 2021. <https://www.cto.mil/wp-content/uploads/2021/01/dod-additive-manufacturing-strategy.pdf>

1.7.2 Identifying EU additive manufacturing policies related to strategic competition

Since there is no single document that describes EU policy on additive manufacturing, we identify relevant policies by studying more overarching documents. We have chosen to evaluate EU additive manufacturing policies related to strategic competition by studying the policies in the Economic Security Strategy. The list of critical technology areas was created as an annex to the Economic Security Strategy, implementing its language on the “new geopolitical and technological realities” that the EU must manage. The strategy takes a broad approach to economic security. It includes proactive measures to strengthen European competitiveness, particularly in critical sectors of the economy, as well as defensive measures to protect the EU economy and competitiveness, including critical technologies, from exploitation or coercion by foreign actors. This makes the Economic Security Strategy suitable to identify a wide variety of policy steps related to additive manufacturing. While the Strategic Compass is even more centred around strategic competition, it is less focused on policies relating to critical technologies compared to the Economic Security Strategy. It is also published earlier. The Competitiveness Compass meanwhile includes actions on a less detailed level compared to the Economic Security Strategy. Taken together, these considerations led us to select the policies in the Economic Security Strategy as the basis for identifying EU work on additive manufacturing in the context of strategic competition.

The Economic Security Strategy divides its policy work into three categories, promoting, protecting and partnering, each of which addresses EU competitiveness and economic security in different ways. They can be summarized as follows:

1. **Promoting competitiveness** focuses on strengthening EU competitiveness, and presents policies aimed at growing the economy and improving the Unions industrial and technological base.
2. **Protecting against economic security risks** aims at making the Union more resilient and strengthen its economic security and competitiveness by guarding it from risks and threats.
3. **Partnering on economic security** entails building cooperations other countries that share the Unions concerns and interests on competitiveness and economic security.⁴⁹

Under each of these three categories, the strategy outlines a number of policies that the Commission is pursuing to strengthen the union’s economic security. In total, we identified 34 policies in the Economic Security Strategy.⁵⁰ In this section, we summarise the policies identified as directly relating to additive manufacturing or critical technologies. We also discuss policies that may appear relevant based on their titles, in order to explain why they are not examined further. The evaluation of the policies is also summarized at the end of each paragraph in the form of a table, with the policies deemed as directly relating to additive manufacturing highlighted in green.

Part 1 – promoting competitiveness expresses an intention to redirect EU research funds towards critical technologies through different initiatives. A prominent example is the Strategic Technologies for Europe Platform (STEP). In order to get a sense of how EU investments into additive manufacturing have developed over time, we compiled a data set on EU funding of additive manufacturing projects using the EU Funding and Tenders Portal, the main website for EU funding programs provided by the European Commission.⁵¹ The Economic Security Strategy also refers to the EU Industrial Strategy and its work to

⁴⁹ European Commission. *European Economic Security Strategy*.

⁵⁰ The Economic Security Strategy itself does not provide a neat list of the policies; rather they are woven into the text and thus not very easy to count. A work to compile the policies into a list has however been done by the report below, and this report draws on their work. The complete list used for this report can be found in annex 1. See François Chimits, et.al. *European Economic Security: Current practices and further development*. European parliament, 2024.

⁵¹ EU Funding and Tenders Portal Website, “About”, European Commission, Accessed October 17, 2025. <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/about>

strengthen the EU single market. An Industrial Forum focusing on additive manufacturing was appointed under the Industrial Strategy. The data set and the work of the Industrial Forum is described further under section 2.1.

Some policies, like the Green Deal and the Net-Zero Industry Act, may appear relevant to additive manufacturing, especially since the technology has at times been grouped under the green transition in EU documents. However, neither the Green Deal Industrial Plan nor the Net-Zero Industry Act mentions additive manufacturing or critical technologies, indicating that these are not areas of focus.⁵² The Net-Zero Industry Act instead highlights several other technologies, showing that its technological priorities are directed elsewhere.⁵³

Promoting competitiveness	
Policies	Connection to additive manufacturing
NextGeneration EU	EU funding projects that may fund additive manufacturing projects. All such projects are proxied by looking at the EU Funding and Tenders portal, which displays approved funding and calls for a large number of EU research projects.
Horizon Europe	
Cohesion Funds	
Strategic Technologies for Europe Platform (STEP)	Coordinates and guides funding programs in a direction that supports additive manufacturing. Proxied via the EU Funding and Tenders Portal.
EU Industrial Strategy	Analysed by looking at the work done on additive manufacturing by the EU industrial Forum
Green Deal	Projects deemed irrelevant based on preliminary searches
Net-Zero Industry Act	
Repower EU	
Internal Market Emergency and Resilience Act	
Capital Market Union	
European Chips Act	

Part 2 – Protecting against economic security risks includes a number of different policy measures which concern additive manufacturing. This includes the Foreign Direct Investment Screening Regulation, which is an important tool to ensure that foreign actors do not gain undue access to critical technologies, industries or supply chains, as well as the closely related regulation on dual use export controls policy. It also mentions the ability to exclude third country entities from participating in research and innovation (R&I) projects funded by the union, and standardisation work, specifically through the EU standardization strategy as a tool to protect the EU’s technological advantage. Further, the strategy also mentions the critical raw materials act as a tool for reducing dependencies. We explore all these policies further under section 2.2.⁵⁴

A few policies in part 2 appear potentially relevant to our study based on their names but, on closer inspection, are not. The strategy mentions the EU Trade Defence Instrument as a tool to protect EU industries against unfair competition by external actors. Today a total of 199 trade defence measures are in place, none of which seems to directly concern additive manufacturing.⁵⁵ Similarly, the EU’s Foreign Subsidies Regulation, adopted in 2023,

⁵² European Commission, *A Green Deal Industrial Plan for the Net-Zero Age*, February 1, 2023. COM(2023) 62.

⁵³ Official Journal of the European Union. “Regulation on establishing a framework of measures for strengthening Europe’s net-zero technology manufacturing ecosystem”, 13 June 2024, 2024/1735

⁵⁴ In the Economic Security Strategy, the critical materials act is sorted under the Promoting section, however the section on additive manufacturing is clearly focused on risk mitigation and protection, which is why we have chosen to sort it under the Protecting section in this report.

⁵⁵ European Commission. *43rd Annual Report from the Commission to European Parliament and the Council on the EU’s Anti-Dumping, Anti-Subsidy and Safeguard activities and the Use of trade defence instruments by Third Countries targeting the EU in 2024*. August 28, 2025. COM(2025) 428.

investigates foreign subsidies in the internal market. Its focus is on strategic sectors, but only a handful of investigations have been launched so far, none of them related to additive manufacturing.⁵⁶

The EU Anti-Coercion Instrument is a legal framework that allows the Union to retaliate economically against other countries. It has not yet been used, meaning it currently has no relevance for this study.⁵⁷ The Commission has also produced a toolkit on how to tackle foreign R&I interference. The toolkit discusses research in general and contains no specific discussion related to critical technologies, and is therefore not explored further.⁵⁸ Finally, the Economic Security Strategy also mentions the risk assessment conducted by all member states in relation to four of the critical technology areas, in order to identify vulnerabilities that may threaten EU economic security. The technology areas first chosen to conduct a risk assessment on were advanced semiconductor technologies, AI technologies, quantum technologies and biotechnologies.⁵⁹ While the Commission has signalled openness to conducting risk assessments of other technology areas at a later stage, none has yet been carried out for additive manufacturing. This report will therefore not explore this policy action further.

⁵⁶ François-Charles Lapr v te et al. "The EU Foreign Subsidies Regulation: 2024 in Review and Predictions for 2025" Clearly Antitrust Watch. February 10, 2025. Accessed September 2, 2025.

<https://www.clearlyantitrustwatch.com/2025/02/the-eu-foreign-subsidies-regulation-2024-in-review-and-predictions-for-2025/>

⁵⁷ Erik Brattberg, Jacopo Pastorelli, and Benjamin Schwab. "The EU could respond to Trump's tariffs with a new 'anti-coercion instrument'", Atlantic Council blog, April 8, 2025.

<https://www.atlanticcouncil.org/blogs/new-atlanticist/the-eu-could-respond-to-trumps-tariffs-with-a-new-anti-coercion-instrument-heres-what-to-know/>

⁵⁸ European Commission: Directorate-General for Research and Innovation, *Tackling R&I foreign interference – Staff working document*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2777/513746>

⁵⁹ European Commission, *Commission recommendation on critical technology areas for the EU's economic security for further risk assessment with Member States*. October 3, 2023. C(2023) 6689

https://defence-industry-space.ec.europa.eu/document/download/31c246f2-f0ab-4cdf-a338-b00dc16abd36_en?filename=C_2023_6689_1_EN_ACT_part1_v8.pdf

Protecting against economic security risks	
Policies	Connection to additive manufacturing
Foreign Subsidies Regulation	Could in theory be applied in relation to additive manufacturing but haven't been so far
Trade Defence Instrument	
EU Anti-Coercion Instrument	
Toolkit on Tackling R&I Interference	Projects deemed irrelevant based on preliminary searches
Cyber Resilience Act	
EU Hybrid and Cyber Diplomacy Toolboxes	
Directive on the Resilience of critical entities	
Revised Directive on the security of network and information system (NIS2 Directive)	
5G Toolbox	
Cyber Solidarity Act	
EU's regulation on Dual Use Export controls	
Foreign Direct Investment (FDI) Screening Regulation	Analysed by looking at EU statistics on how the FDI screening regulation is applied to different sectors.
EU Standardization Strategy	Analysed by looking at the Commissions implementation request concerning additive manufacturing shared with the European Committee on Standardization.
Horizon Europe (exclusion of third countries)	Analysed by looking at how often third countries are being excluded from participating in research related to additive manufacturing, through data found via the EU funding and tenders portal.
Critical Raw Materials Act	Analysed by looking at relevant sections of the Critical Raw Materials Act

Part 3 – Partnering on economic security mentions the establishment of new trade agreements, as well as bi- and plurilateral agreements in general, as a way of strengthening relations and thus improving economic resilience. The EU currently has nine trade agreements under negotiation, which makes it possible to determine whether additive manufacturing has been included in recent free-trade discussions. This part of the strategy also refers to the Trade and Technology Councils that the EU have established with select countries. Work relating to additive manufacturing within these partnerships is described in section 2.3.

Under the partnership section, bi- and plurilateral agreements not related to trade are also mentioned. The bi- and plurilateral agreements most closely related to critical technologies seems to be the EU Digital Partnerships. These bilateral agreements, which the EU has with Japan, Singapore, South Korea and Canada, cover critical technologies such as semiconductors, quantum technologies and AI, but do not mention additive manufacturing.⁶⁰ At a summit in 2025, the EU and Japan declared in a joint statement that they would work together on promoting and protecting critical technologies, but again, there was no specific mention of additive manufacturing.⁶¹ The EU also has cooperation on industrialisation through the EU-Japan and EU-Korea Green Partnerships, but these focus on climate issues and do not mention critical technologies or economic security.⁶² Having examined the

⁶⁰ European Commission website. “Digital partnerships”. Updated July 9, 2025.
<https://digital-strategy.ec.europa.eu/en/policies/partnerships>

⁶¹ Council of the European Union, “EU-Japan Summit 2025 – Joint Statement”, July 23, 2025. 11834/25
<https://data.consilium.europa.eu/doc/document/ST-11834-2025-INIT/en/pdf>

⁶² Ministry of Foreign Affairs of Japan, “Japan-EU Green Alliance operational work plan – Toward further cooperation”, May 27, 2021.
<https://www.mofa.go.jp/mofaj/files/100533226.pdf>

agreements most likely to concern additive manufacturing, we find no evidence that the EU has used bi- or plurilateral agreements to advance cooperation in this area, and therefore do not expand on this topic further.

Partnering on economic security	
Policies	Connection to additive manufacturing
Trade and technology Councils	Analysed by looking at statements published in relation to the two Trade and Technology Councils.
Free Trade Agreements	Analysed by looking at how additive manufacturing or critical technologies is mentioned in press releases from the Commission related to all ongoing EU free trade negotiations.
Foster bilateral and plurilateral cooperation	Projects deemed irrelevant based on preliminary searches
Partnerships with developing countries	
Global Gateway	
Partnership for Global Infrastructure Investments	
Critical Raw Materials Club	
Reform of the WTO	

European Commission. "European Union – Republic of Korea Green Partnership" May 22, 2023.
<https://ec.europa.eu/commission/presscorner/api/files/attachment/875269/EU-Korea%20Green%20Partnership%20-%20text.pdf>

2 EU additive manufacturing policy related to strategic competition

In the previous section, we described the policies in the Economic Security Strategy, and which of those policies we have identified as directly related to additive manufacturing. In the following sections, we will look at the policies directly related to additive manufacturing in greater detail, in order to provide an overview of the policy work that the EU is conducting in the area of additive manufacturing.

2.1 Promoting competitiveness

2.1.1 EU Funding of additive manufacturing

EU policy in the areas of science and research dates back to the very beginning of the Union. Throughout the Union's existence, a continuous rationale of the EU framework programs, including the recent Horizon 2020 (2014–2020) and Horizon Europe (2021–2027), has been about geopolitical competition. The first program was strongly associated with the idea of a “technology gap” vis-a-vis the US in particular, but also Japan.⁶³ Today, the map of technological superpowers has obviously changed, with the EU positioned amid the economic rivalry between the US and China, but the geoeconomic foundations of policy remain. Moreover, Russia's full-scale invasion of Ukraine has pushed defence and security into the domain of R&I policy.

An overall question to ponder is how the rising tensions in the global geopolitical fabric has affected R&I policy in the EU. They clearly have. The 2023 report *Horizon Europe Strategic Plan 2025–2027 analysis* by the European Commission speaks about investments in research and innovation as instrumental for “resilience against cross-border threats and disruptions.”⁶⁴ The Commission also highlights how R&I policies can boost EU resilience more broadly by transforming the foundations of the economy. One example is the goal of establishing “technological sovereignty”, meaning that the EU should develop a strong technological base in order to minimise its dependence of foreign goods and expertise.⁶⁵

Turning to additive manufacturing research, one place where we would expect to see a focus on the technology is in the EU funding instrument The Strategic Technologies for Europe Platform (STEP). STEP aims to support the European industry and boost investment in critical technologies in Europe by leveraging existing EU funds in three strategic areas:

- Digital technologies and deep tech innovation (six subcategories).
- Clean and resource efficient technologies (23 subcategories).
- EU Biotechnologies (seven subcategories).

Additive manufacturing is mentioned under Clean and resource efficient technologies, under the subcategory Advanced materials, manufacturing and recycling technologies, where it is listed as one of about ten areas. In other words, additive manufacturing is included in STEP, but only as a subordinate and almost peripheral part.⁶⁶

Looking specifically at how recent framework programs relate to additive manufacturing one might assume that additive manufacturing would have increased in priority, considering

⁶³ Nikos Kastrinos, “40 Years of Framework Programmes in 70 Years of EU Research: A Brief History”, *Science Business*, 11 July 2024.

⁶⁴ Nicholas Deliyannis et al (eds.), *Trends in Advanced Manufacturing R&I: Advanced Manufacturing Projects and What They Tell Us About the Future of the Manufacturing Industry* (Luxemburg: Publications Office of the European Union, 2023), p. 6.

⁶⁵ E.g. Francesco Crespi et al, “European Technological Sovereignty: An Emerging Framework for Policy Strategy”, *Intereconomics* 56, no. 6 (2021); Jacob Edler, “Technology Sovereignty of the EU: Needs, Concepts and Pitfalls”, in Julien Ravet (ed.) *Science, Research and Innovation Performance of the EU 2024* (European Commission, 2024).

⁶⁶ EU Strategic Technologies for Europe Platform, https://strategic-technologies.europa.eu/project-promoters/step-targeted-investment-areas_en Accessed October 29, 2025

the rhetoric portraying it as a critical technology capable of decentralising industrial production.

A number of major projects related to additive manufacturing has received funding the last years. The REPAM project (10,6 million € in 2024) aims to incorporate scrap in order to strengthen the industrial powder production and recycling. STRONG-UR on bioprinting of tissues (7,8 million € in 2024) is another example. The ADMIRABLE project (10,3 million € in 2023) will enhance European naval vessel capabilities by investing in advanced manufacturing technologies and additive manufacturing of composite based fire-resistant materials for stealth. MagNEO (7,7 million € in 2023) intends to develop additively manufactured permanent magnets for energy and mobility applications.⁶⁷

However, looking at the overall funding trend over the last 10 years we see no indication that the increased emphasis on technological sovereignty and critical technologies has translated into additive manufacturing being given higher priority in terms of overall EU funding. Fig. 3 shows the percentage of total funding through Horizon contracted to additive manufacturing projects. It provides no indication of increased support in the 2020s.

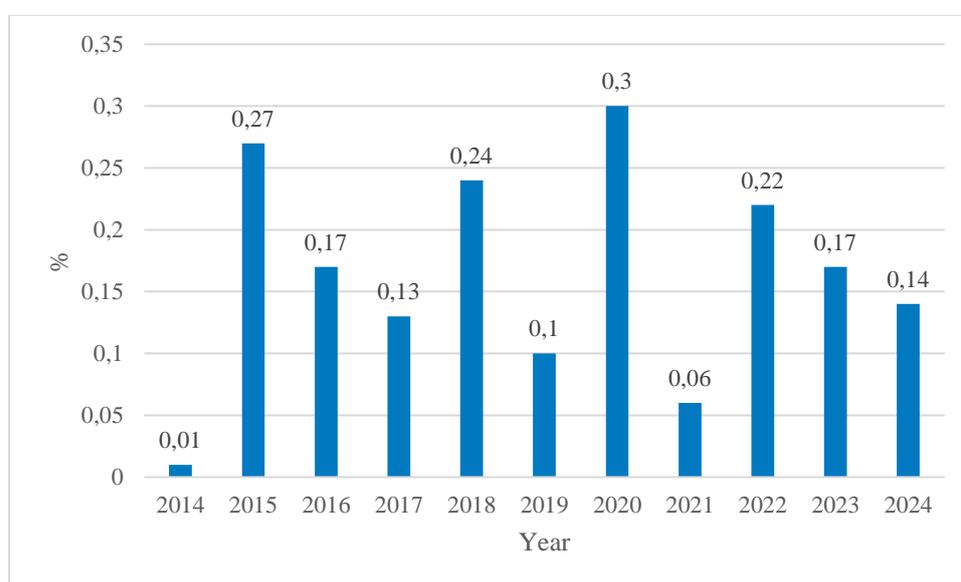


Figure 3. Percentage of funding of Horizon 2020 and Horizon Europe projects with “additive manufacturing” in title. All figures are based on contracted amounts, not consumed. Source: Financial Transparency System.

Note that the Financial Transparency System captures only projects with “additive manufacturing” in the title, i.e. the data in fig. 3 covers a relatively small section, about 100 projects for the whole period. An alternative source of examining additive manufacturing funding is the EU Funding & Tenders Portal. The portal gives access to the projects that explicitly deals with additive manufacturing or 3D printing, although the terms are not featured in the title. This renders about 100 projects per year. Unfortunately, extracting data from the portal requires manual reading of each supported project to establish that they actually deal with additive manufacturing. Hence, obtaining data from the full ten-year period above would be exceedingly labour-intensive. For delimitation purposes, the focus here has been on a dataset covering the period 2021–2024. The calculations are illustrated in Figure 4, below.

⁶⁷ European Commission: EU Funding & Tenders Portal, <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home>. Accessed October 29, 2025

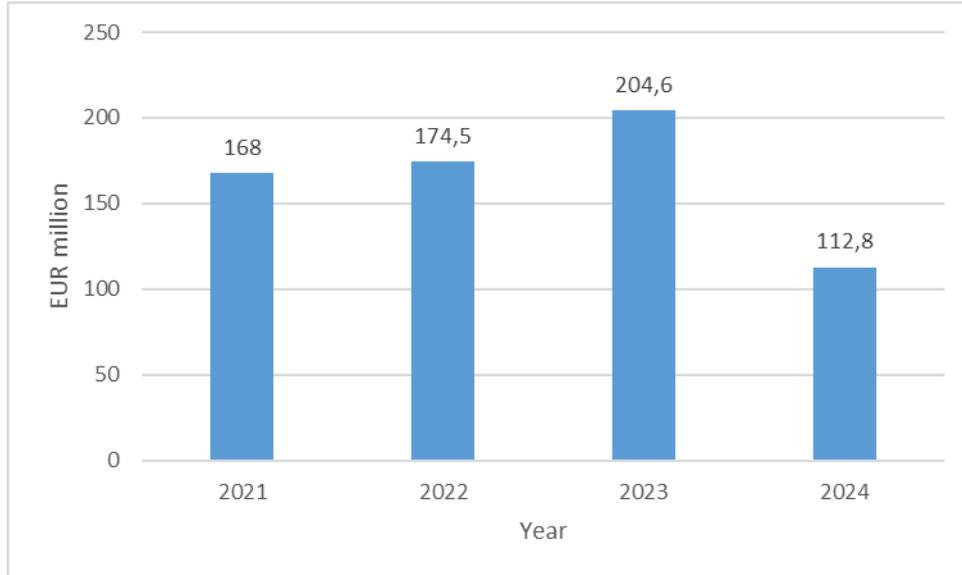


Figure 4. EU funding of additive manufacturing-related projects 2021–2024 (EUR million). Source: EU Funding & Tenders Portal.

As fig. 4 shows, the financial data for the 2021–2024 period reflect the picture of figure 3 above. There is no clear trend in the funding of additive manufacturing-related projects, indicating that the political focus on strategic competition and technological sovereignty has not yet translated into actual EU expenditures on additive manufacturing.

However, there has been some change in the type of additive manufacturing projects receiving EU funding. By examining how funding is distributed across different programmes, an indicative trend emerges. Fig. 5 shows the annual amounts of funding from 2014 to 2024, and how they were distributed among different programs. Horizon 2020 and Horizon Europe were obviously the main channels of funding over the period. As the diagram shows, however, recent years have seen a notable increase in funding via the European Defence Fund (EDF). In 2024, it accounted for roughly one third of all EU funding for additive manufacturing.

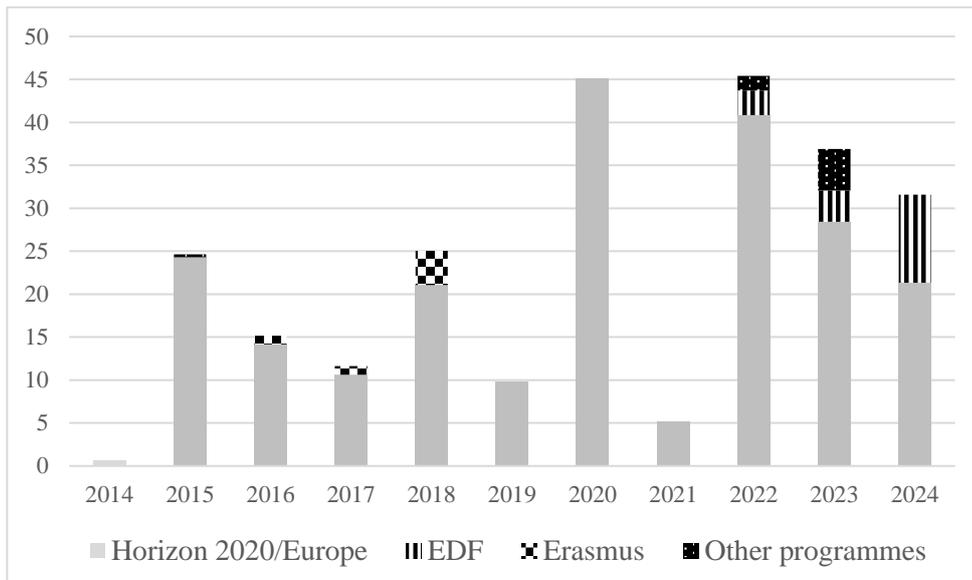


Fig. 5. EU funding on additive manufacturing through different programs 2014–2024 (EUR million). Source: Financial Transparency System.

We have not found any documents that explicitly indicate whether deliberate decisions lie behind this shift. The figures could suggest a stronger link between additive manufacturing funding and strategic competition. However, it must be noted that the EDF, formally established in 2016, only began allocating funding in 2021. The increase in additive manufacturing funding through the EDF therefore reflects the EU's broader prioritization of defence in general as much as any stronger association between strategic competition and additive manufacturing in particular.

2.1.2 Stakeholder dialogue and sector analysis

The EU industrial Strategy, and its 2021 update, made increased competitiveness and strategic autonomy one of its pillars.⁶⁸ The 2021 update emphasised building Single Market resilience, identifying and mitigating strategic dependencies, and accelerating upskilling to support a systemic transformation of EU industries.

One consequence of these strategies was the Industrial Forum, consisting of industrial representatives, Member States authorities, NGOs, research institutions and social partners. The purpose was to support the Commission in its analysis of industrial ecosystems and in implementing the updated Industrial Strategy from 2021.

In turn, the Forum set up five task forces to address topics of importance across different industrial ecosystems. One of the task forces addressed the advanced manufacturing industry.⁶⁹ As mentioned earlier in the report, additive manufacturing is the most prominent technology within the advanced manufacturing technology area.⁷⁰ The Task Force consisted of, among others, Orgalim (representing Europe's Technology Industries), and Cecimo (European Association of the Machine Tool Industries and related Manufacturing Technologies), seven Member States, and eleven Directorate-Generals.

The overall work of the Task Force work was chaired by Orgalim and Cecimo, supported by other Task Force members. The European Commission participated actively in the process and provided extensive oral and written input on the drafting of the Task Force report that was published in 2023. The report reflected collective views of the Industrial Forum, not necessarily the position of individual members nor the position of individual Member States or the European Commission.⁷¹

The Task Force report began by stating that the deployment of advanced manufacturing in Europe was not progressing fast enough. Other markets were moving forward aggressively, and Europe's current position of strength could be easily eroded. The report presented 37 policy recommendations divided into seven categories, directed at the Commission, the EU Co-legislators, Member States, the Industry, the Research Community and Trade Unions. The categories were:

- access to capital,
- supply chain resilience,
- data economy,
- the Single Market and standardisation,
- skills gaps,
- availability of advanced manufacturing industry data, and
- the EU sustainability goals.

In order to follow up two of the recommendations of the Task Force, the Commission initiated the so-called ADMAN study in 2023, and published two reports about the study in

⁶⁸ European Commission, *Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery*, (2021), COM(2021) 350 final.

⁶⁹ EU Industrial Forum, *Advanced Manufacturing at the heart of a resilient, sustainable and competitive Europe Recommendations by the EU Industrial Forum*. (2023).

⁷⁰ Joint Research Centre online tool, "European Advanced Manufacturing Monitor", Last updated September 24, 2024. https://web.jrc.ec.europa.eu/dashboard/DGTES_ADMAN/index.html

⁷¹ EU Industrial Forum. *Advanced Manufacturing at the heart of a resilient, sustainable and competitive Europe*.

2024. The two recommendations were to identify a method for data collection in the advanced manufacturing category, and to generate trusted data sets at European level for advanced manufacturing deployment, global competitive position, and economic/environmental/societal gains.

The first report, *Advanced Manufacturing Study. Preliminary findings on EU's Advanced Manufacturing industry in the global landscape*, addressed existing data gaps by providing a comparative overview of the advanced manufacturing industry. It discussed the metrics proposed to map the industry at global level and presented some preliminary findings, with a special emphasis on the EU's position relative to global competitors. The purpose was to support EU policymakers, industrial stakeholders, and Member States in assessing and enhancing the performance of the advanced manufacturing industry in Europe.⁷²

The second, *Strategic Insights into the EU's Advanced Manufacturing Industry: Trends and Comparative Analysis*,⁷³ presented the final results of the ADMAN study. It examined the advanced manufacturing sector within the global competition with China and the US, and highlighted the need for targeted policies to support the growth of the advanced manufacturing industry in the EU, particularly in innovation, investment, and international collaboration.

Apart from these reports initiated by the task force itself, no work seems to have been done to follow up on the policy recommendations from the task force. Talking to an industry expert, the authors of this report were told that the recommendations had not been picked up by the EU services.⁷⁴ A meeting with policy experts at DG Grow gave us a similar impression.⁷⁵ The work done in the Task Force and the two reports emphasised the importance of additive manufacturing in the EU, and pointed out that the EU is falling behind its international competitors. This can be seen as a measure to increase the focus, and to join forces. However, as the Task Force reports merely provided policymakers with information and highlighted the need for further action, it is fair to conclude that the work of the Task Force and the Industrial Forum has not yet translated into tangible policy proposals to enhance the competitiveness of the additive manufacturing industry.

2.2 Protecting against economic security risks

2.2.1 Foreign Direct Investment Screening regulation

The Foreign Direct Investment Screening Regulation was introduced by the EU in 2020. The EU can use this regulation to protect European industries by preventing foreign actors from making investments in the EU that may have a harmful impact on national security. Implementing investment restrictions is a competence of the member states but the EU Commission has a coordinating role and issues opinions to the member states on investment restriction.⁷⁶

To be able to issue these opinions, the EU Commission first conducts a screening of transactions that it is notified of by member states. The outcome of these screenings is confidential, so we cannot know how often the Commission has recommended the stoppage of investments related to additive manufacturing. However, the Commission does publish aggregated data on its assessments. These show that 39 percent of the planned investments subjected to a detailed assessment by the Commission concerns manufacturing. When evaluating these manufacturing cases, the Commission applies several factors to determine

⁷² Calza et al. *Advanced Manufacturing Study*.

⁷³ Josefina Fabiani et al. *Strategic Insights*. The status of the document was to provide evidence-based scientific support to the European policymaking process, and the contents did not necessarily reflect the position or opinion of the European Commission.

⁷⁴ Interview with industry Expert, conducted June 27, 2025.

⁷⁵ Interview with policy experts at DG Grow, conducted September 26, 2025.

⁷⁶ European Commission website, "investment screening" Accessed September 3, 2025.
https://policy.trade.ec.europa.eu/enforcement-and-protection/investment-screening_en?

whether an investment may impact EU security or public order. In 51 percent of the cases, the cited reason for the screening is that the manufacturing investment concerns a critical technology.⁷⁷

We cannot know how often foreign direct investments in additive manufacturing are subjected to restrictions. The area of manufacturing is broad and screenings of critical technologies within the area could refer to many things that are not additive manufacturing. However, the fact that manufacturing is the sector most commonly subjected to a detailed assessment by the Commission, and the fact that the factor most commonly cited to initiate a detailed assessment is that it concerns a critical technology certainly indicates that additive manufacturing has not been overlooked by the Commission.

2.2.2 Regulation of dual use export controls

In 2021, the EU also created a common export control regulation for dual use technologies. It prevents the sale of technologies with military applications to actors outside the Union, unless the appropriate authorisation has been granted.⁷⁸ The member states are responsible for upholding the regulation and for granting export authorisations, whereas the Commission ensures that the list is up to date in terms of what constitutes a dual use technology.

The Commission monitors additive manufacturing and other emerging technologies via the EU Joint Research Centre. The centre helps the EU with implementing and coordinating its export controls, and monitors selected emerging technologies, including additive manufacturing, to determine whether new items should be added to the export control list.⁷⁹ Before September 2025, additive manufacturing would sometimes be covered by the regulation, depending on if it met other criteria, but the technology itself was not explicitly listed. Today, however, additive manufacturing equipment is explicitly covered by the export control regulation.⁸⁰ Given that the EU is actively monitoring additive manufacturing technology to ensure that relevant products are covered by export controls, and that such technologies are now explicitly included in the regulation, it appears that the EU has done what it can in this area within its mandate.

2.2.3 Exclusion of third country entities from EU research and innovation projects

For EU funded R&I projects like Horizon Europe, the EU has always been able to exclude certain countries or entities.⁸¹ However, in the standard eligibility conditions produced before 2020, issues of EU security interests were barely mentioned.⁸² In the eligibility criteria for the Horizon programme after 2020, however, the issue is explored in much greater depth, explicitly mentioning the option to restrict participation in research related to EU strategic interests.⁸³

⁷⁷ Council of the European Union, “Fourth Annual Report on the screening of foreign direct investments into the Union”, October 17, 2024. COM(2024) 464

⁷⁸ European Union, *Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items (recast)*, Official Journal of the European Union, L 206, 2021. <https://eur-lex.europa.eu/eli/reg/2021/821/oj/eng>

⁷⁹ Joint Research Centre Website, “Strategic trade control” Accessed August 20, 2025. https://joint-research-centre.ec.europa.eu/projects-and-activities/nuclear-safeguards-and-non-proliferation/strategic-trade-control_en

⁸⁰ Directorate-General for Trade and Economic Security, “2025 Update of the EU Control List of Dual-Use Items”, September 8, 2025. https://policy.trade.ec.europa.eu/news/2025-update-eu-control-list-dual-use-items-2025-09-08_en

⁸¹ European Union, *Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in “Horizon 2020 – the Framework Programme for Research and Innovation (2014–2020)”*, Official Journal of the European Union, L 347, 20 December 2013. Article 9.5. <https://eur-lex.europa.eu/eli/reg/2013/1290/oj/eng>

⁸² European Commission, “Horizon 2020 Work Programme 2014 – 2015 general annexes”, December 10, 2013. C (2013)8631 https://www.h2020.md/sites/h2020/files/1595112-18._general_annexes_wp2014-2015_rev1_en.pdf

⁸³ European Commission, “Horizon Europe Work Programme 2023–2025 general annexes”, May 14, 2025. C(2025) 2779

The question then is if the increased focus on security in the standardised eligibility conditions is reflected in tighter rules about who gets to access EU funding on additive manufacturing? We searched the EU Funding and Tenders Portal database for calls for proposals with the term “additive manufacturing” since 2013, when the first calls for proposals were published. 102 calls for proposals fit this description. Of these, 93 used standardised eligibility conditions. nine calls for proposals had produced their own eligibility conditions instead of using the standardized one. Going through these nine manually, we judge that out of these nine, three calls for proposals had more stringent limitations on which entities could participate. Two of the calls concerned defence applications of additive manufacturing and were published in 2021. The third was related to data spaces for additive manufacturing and was published in 2024.⁸⁴

A few things can be noted. Firstly, the first two calls for proposals on additive manufacturing with additional eligibility limitations were published in 2021. This is the same time period that strategic competition discourse was gaining momentum in the EU and additive manufacturing was first being discussed as a strategic technology. Secondly, it is noteworthy that the third call for proposals with more stringent participation limitations is not directly related to defence, but instead appears to be linked to European competitiveness. This is especially interesting because as late as 2021, several additive manufacturing projects related to issues connected to strategic competition, such as the call for proposals called “Space technologies for European non-dependence and competitiveness” used the standardised eligibility requirements. This may indicate that additional eligibility conditions are gradually being introduced to broader categories. However, given our limited number of data points, all that can be said with certainty is that additional eligibility limitations have existed since 2013, but were not applied in this area until 2021.

2.2.4 Standardisation

Over the last decade, standard setting has transformed from an economic issue into a geopolitical one. The EU Strategy on Standardisation notes that “European standardisation operates within an increasingly competitive global context”.⁸⁵ The view of the EU that standardisation has become a geopolitical tool is also shared by academia. Tim Rühlig argues that standardisation carries with it four dimensions of power: economic, legal, political and ideational.⁸⁶

Within the additive manufacturing sphere, standardisation is primarily managed by three existing bodies: the American Society for Testing and Materials (ASTM); the International Organization for Standardization (ISO); and the European Committee for Standardization (CEN). These bodies cooperate to ensure that their standards are aligned. While European actors are active in all three organisations, CEN is most closely related to the EU. EU members are obliged to withdraw any national standards that contradict the European standards set by CEN and the Commission may request that CEN initiate certain standardisation work.⁸⁷

https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-13-general-annexes_horizon-2023-2024_en.pdf

⁸⁴ European Commission, “EU Funding and Tenders Portal”, Accessed November 20, 2025.

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home>

⁸⁵ European Commission, *An EU Strategy on Standardisation - Setting global standards in support of a resilient, green and digital EU single market*. February 2, 2022. COM(2022) 31. <https://ec.europa.eu/docsroom/documents/48598>

⁸⁶ Tim Rühlig, *The Shape of Things to Come: The Race to Control Technical Standardisation*. The European Union Chamber of Commerce in China. 2021. pp 53–59

⁸⁷ Cenelec Website, “European standardisation”, Accessed September 8, 2025. <https://www.cenelec.eu/european-standardization/>

The EU Commission did initiate such a request to CEN starting with the 2023 Work Programme for European Standardisation. The work program lists what European standardisation deliverables the Commission plans to request from CEN in order to meet the EU's policy objectives related to standardisation, including objectives relating to strategic competition.⁸⁸

In the work programmes from 2023 to 2025 the Commission asks CEN to “develop European standards supporting additive manufacturing.” In 2025, the Commission made 78 standardisation requests across a range of policy areas, six of which were designated as policy priorities, signalling their heightened importance. The policy priorities include standards related to critical technologies such as quantum technology development, as well as critical raw materials for electric vehicle batteries, but not additive manufacturing.⁸⁹ Thus, while some standardisation work related to critical technology areas is considered a policy priority by the Commission, this is not the case for additive manufacturing.

This focus in the Commission's standardisation requests is clarified in implementing decision C(2025)129, in which the Commission makes a formal request to CEN related to additive manufacturing, among other matters. This decision turns the vague text about “supporting additive manufacturing” into more concrete policy-level priorities.⁹⁰ It asks CEN to develop a classification scheme for raw materials, to develop provisions to securely facilitate the traceability of manufactured parts and to develop standards concerning machines and supporting equipment related to aspects of security, and defence and space utilization.⁹¹ All of these requests are clearly linked to strategic competition.

Thus, a process seems to have begun to translate the Commission's discourse on strategic competition into concrete policy in the area of standardisation. In the work program from 2022, additive manufacturing is not mentioned. In 2023, the same year that additive manufacturing is included in the EU's list of critical technology areas, the term appears in the work programme document. In early 2025 the strategic phrases of the work programme were turned into more concrete policy steps via the Commission implementing decision C(2025)129. Since CEN is an independent organization, it can choose to accept or reject the implementing decision from the Commission.⁹² In this case they chose to accept it, meaning that they will start standardisation work in line with the request made by the Commission.⁹³

Based on this, we can say that the Commission's more strategic view of additive manufacturing is beginning to have policy impact in the area of standardisation. It should be noted, however, that additive manufacturing was not included among the Commission's policy priorities, illustrating that being listed as a critical technology does not automatically translate to being a top policy priority.

2.2.5 The Critical Raw Materials Act

The Critical Raw Materials Act from April 2024 was developed and adopted in order to secure a reliable EU access to critical raw materials. The act is broad in scope but contains only one section that explicitly mentions additive manufacturing. This section requires large companies that use strategic raw materials to manufacture certain products or technologies,

⁸⁸ European Commission, “The 2025 annual Union work programme for European standardization” Official Journal of the European Union, March 27, 2025. C/2025/1818.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52025XC01818&qid=1755520238752>

⁸⁹ Ibid.

⁹⁰ European Commission, “Commission implementing decision on a standardisation request to the European Committee for Standardization and to the European Committee for Electrotechnical Standardization as regards machinery and related products in support of Regulation (EU) 2023/1230 of the European Parliament and of the Council”, January 20, 2025. C(2025) 129.

⁹¹ C(2025) 129 annexes 1 and 2.

[https://ec.europa.eu/transparency/documents-register/detail?ref=C\(2025\)129](https://ec.europa.eu/transparency/documents-register/detail?ref=C(2025)129)

⁹² European Union, “Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardization”, Official Journal of the European Union, article 10(3).

<https://eur-lex.europa.eu/eli/reg/2012/1025/oj/eng/pdf?>

⁹³ Email conversation with employee at the Swedish Institute for Standards, September 12, 2025.

including additive manufacturing, to conduct a risk assessment of their strategic-raw-material supply chains every three years, and to take mitigation measures if significant vulnerabilities are identified.⁹⁴ This makes the act an example of a recently added regulation aiming to enhance EU security and explicitly referencing additive manufacturing.

The Commission intends to create an EU monitoring dashboard where, among other things, results may be published in some form.⁹⁵ However, since the legislation has been in place for less than a year at the time of writing, the dashboard is not yet in place and data on how the Critical Raw Materials Act has been implemented is currently not available.

2.3 Partnering on economic security

2.3.1 Free Trade Agreements

The EU has free trade agreements with over 70 countries. Given that trade negotiations often last for many years we chose to limit ourselves to ongoing trade negotiations, to see if additive manufacturing has been a part of the Commission's focus the last few years. Currently, nine free trade agreements are either under negotiation or in the process of being adopted or ratified.⁹⁶ However, the EU reports from the negotiations rarely discuss specific goods at all. We therefore reviewed the latest EU press releases for each of these trade negotiations to determine whether critical technologies or additive manufacturing were presented as areas of focus.

Issues of economic security was mentioned in the majority of trade deals. Many related to critical raw materials, such as the trade agreements with Chile, Indonesia, Mercosur, and the Philippines.⁹⁷ In the case of India, critical technologies in general were mentioned, but exemplified with space and AI rather than additive manufacturing.⁹⁸ The one case that appears to relate to additive manufacturing is the recently launched free-trade negotiations with the United Arab Emirates, which highlight advanced machinery as an important area for future trade. However, it is not mentioned in a strategic context. On the contrary, the press release does discuss some strategic sectors, which includes hydrogen, renewable technology and critical raw materials. Additive manufacturing is instead mentioned in relation to cooperation and economic growth in general.

By way of conclusion, it appears that in matters of economic security, the EU's primary focus in free trade negotiations is on access to raw materials and the securing of value chains, which only indirectly relate to additive manufacturing. Critical technologies are mentioned only occasionally and the one sentence related to additive manufacturing does not approach it from a strategic angle. Any potential work in the EU's free trade negotiations on additive manufacturing as a critical technology thus seems to be limited in its scope.

⁹⁴ European Union. "Regulation 2024/1252 establishing a framework for ensuring a secure and sustainable supply of critical raw materials", Official journal of the European Union. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L_202401252#pbl_1

⁹⁵ Guillaume Ragonnaud, "Critical raw materials act", European Parliament Briefing, PE 747.898, 2024. https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/747898/EPRS_BRI%282023%29747898_EN.pdf

⁹⁶ European Commission Website, "Negotiations and Agreements" Accessed September 26 2025. <https://policy.trade.ec.europa.eu/select-language?destination=/node/447>

⁹⁷ European Commission press releases. "EU-Chile Interim Trade Agreement enters into force" February 1, 2025. "EU and Indonesia conclude negotiations on free trade agreement" September 23, 2025. "EU and Mercosur reach political agreement on groundbreaking partnership", December 6, 2024, "EU and the Philippines announce resumption of negotiations for a free trade agreement" March 18, 2024. https://ec.europa.eu/commission/presscorner/detail/en/ip_25_374
https://ec.europa.eu/commission/presscorner/detail/en/ip_25_2168
https://ec.europa.eu/commission/presscorner/detail/en/ip_24_6244
https://ec.europa.eu/commission/presscorner/detail/en/ip_24_1504

⁹⁸ European Commission. "Leaders' Statement following the visit of President of the European Commission Ursula von der Leyen and College of Commissioners to India, 27-28 February 2025" 28 February, 2025. https://ec.europa.eu/commission/presscorner/detail/en/statement_25_647

2.3.2 Trade and Technology Councils

The EU's Trade and Technology Councils are forums fostering trade and technology cooperation based on shared values. The EU currently has two such forums, one with the United States and one with India, launched in 2021 and 2023, respectively.⁹⁹

Through the EU-US Trade and Technology Council, the countries have agreed to promote international standards for critical technologies, explicitly mentioning additive manufacturing as a critical technology.¹⁰⁰ This indicates that the countries approach cooperation on additive manufacturing as an issue of security policy as well as of economics. The US and the EU have also agreed to support each other in their work on investment screening and controls to protect sensitive technologies, which additive manufacturing often qualifies as. However, with the inauguration of the Trump-administration, interest in the Trade and Technology Council seems to have waned considerably. No meeting of the Council took place in 2025, unlike previous years, highlighting the shift in policy approach of the new administration.¹⁰¹

The EU-India Trade and Technology Council also discusses exchanges on strategic technologies, but the focus is on AI and semiconductors.¹⁰² We have found no evidence that additive manufacturing has yet been discussed as part of this forum.

⁹⁹ Angelos Delivorias, "EU-India Trade and Technology Council". European Parliamentary Research Service, January 2024. [https://www.europarl.europa.eu/RegData/etudes/ATAG/2024/757587/EPRS_ATA\(2024\)757587_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2024/757587/EPRS_ATA(2024)757587_EN.pdf)

¹⁰⁰ Office of the United States Trade Representative, "U.S.-EU Joint Statement of the Trade and Technology Council" May 31, 2023. <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2023/may/us-eu-joint-statement-trade-and-technology-council>

¹⁰¹ European Commission, "EU-US Trade and Technology Council", Accessed November 24, 2025. https://commission.europa.eu/topics/international-partnerships/eu-us-trade-and-technology-council_en

¹⁰² European Commission, "Key outcomes of the second EU-India Trade and Technology Council" 28 February, 2025. <https://digital-strategy.ec.europa.eu/en/news/key-outcomes-second-eu-india-trade-and-technology-council>

3 Conclusions

This study has sought to answer two questions. What is the EU doing to improve its competitiveness in the technological field of additive manufacturing? In addition, has the EU's increased focus on strategic competition from the early 2020s led to new or expanded efforts to strengthen EU additive manufacturing?

To explore these questions, we studied the policy tools of the Economic Security Strategy to see which tools directly impacted additive manufacturing. The Economic Security Strategy divides its policy tools into three sections; Promoting, Protecting and Partnering on Economic Security and competitiveness. Below follows a summary and analysis of each section.

Under the section on promoting competitiveness, we examined how EU R&I funding to additive manufacturing has developed over time. While individual projects, particularly those in industrial development, have received substantial funding, overall EU funding going to additive manufacturing has remained relatively steady over time. We found no indications that either the increased focus on strategic competition in the early 2020s or the designation of additive manufacturing as a critical technology in 2023 has led to an increase in overall R&I funding for the technology. The only noteworthy tendency was that a larger share of additive manufacturing funding was channelled through the European Defence Fund from 2022 onwards, suggesting an increased incorporation of additive manufacturing into the realm of EU defence policy.

Our other variable to measure the EU's work under the Promoting section was the work done under the EU Industrial Forum. Here a Task Force consisting of EU experts, external stakeholders and member states produced a policy document warning that the EU risked falling behind and presenting 37 policy proposals to address this trend. Two of these proposals were implemented through the production of studies aimed at collecting data on the advanced manufacturing sector, deployment levels, the EU's competitive position, and economic, environmental and societal gains. These reports and policy documents can be seen as efforts to increase focus and to join forces, an approach highlighted as necessary by Mario Draghi in his report. At a normative level, this represents a relevant action taken by the EU during the period since 2020.

However, after speaking with representatives from DG Grow as well as an industry expert, it seems that the EU services has not taken up the other policy proposals produced by the Task Force. This seems to be due to lack of interest or demand from the member states. A natural next step, according to the industry expert, would have been to translate the reports and policy proposals into an advanced manufacturing strategy.¹⁰³ At present, however, there is no indication that such work is underway.

Overall, there is clearly ongoing work to improve the competitiveness of the additive manufacturing industry. However, with funding staying at a steady level and the Task Force's policy proposals largely not being taken up by the services, we see few examples of new or expanded proactive measures to strengthen the industry as a result of the EU's increased focus on strategic competition in the early 2020s. Some of the EU work on standardisation could perhaps be seen as proactive measures, and the work of the Task Force deserves recognition. However, even taking this into account, developments in this area during the 2020s have been limited, both in terms of new proactive policies and in terms of available funding.

For the policies that fall under the section on protecting from risks and threats, the picture looks somewhat different. The EU monitors additive manufacturing through the Joint Research Centre to keep its export controls up to date, and has declared additive manufacturing equipment dual use items. It has introduced foreign direct investment

¹⁰³ Interview with industry Expert, conducted June 27, 2025.

screening regulation covering manufacturing, with the category “manufacturing relating to a critical technology” being the largest category of investments that is screened. It has strengthened the rules governing access to funding through Horizon Europe, and, in some cases, has chosen to exclude third countries from strategic additive manufacturing projects. It has introduced standardisation work on additive manufacturing from a strategic perspective, and it has introduced new provisions in the Critical Raw Materials Act, requiring additive manufacturing companies to identify and address vulnerabilities relating to raw materials.

These regulations have all been introduced or significantly developed in the 2020s. Given this, we can conclude that the EU has introduced several new or expanded measures to protect the competitiveness of EU additive manufacturing over the past five years. The Commission has clearly worked on defensive measures to protect the industry against hostile actors. However, there is still more that could be done. One example is the risk assessment by member states that has been initiated for four of the critical technology areas on the EU’s critical technology areas list, but not yet for the critical technology area covering additive manufacturing. However, the EU has taken a number of steps to protect the competitiveness of critical technologies in recent years, and additive manufacturing has been directly covered by many of these measures, indicating a higher level of ambition than in previous years.

Finally, on partnering, the EU has established a Trade and Technology Council with the US, which has initiated cooperation on additive manufacturing standardisation. However, cooperation through the trade and technology council seems to have been deprioritised by the new US administration. Additive manufacturing has also been highlighted in one ongoing free trade agreement negotiation, although not put forth in a strategic context. As for bi- or plurilateral agreements between the EU and third countries covering certain technologies, we found agreements focusing on other critical technologies, but none focusing on additive manufacturing.

Given this, it appears that the EU has made some efforts to strengthen additive manufacturing by partnering with others. However, the efforts have been limited, consisting primarily of cooperation with the US through the trade and technology partnership, which may now be winding down. Based on our findings, much of the EU’s work relating to economic security appears to be focused on access to critical raw materials rather than critical technologies. At the same time, other critical technologies were more frequently mentioned in bi- and plurilateral agreements, as well as in trade deals, implying that additive manufacturing could receive greater emphasis if the political will was present.

Summarising the analysis above, the EU has clearly increased its defensive measures centred around protecting additive manufacturing competitiveness in the union from hostile actors. The EU has done less when it comes to strengthening the technology through partnerships with others and promoting the competitiveness of EU additive manufacturing. An argument that can be raised against this analysis is that promoting competitiveness is better done through reforms which targets large sections of the economy, including but not limited to the additive manufacturing industry. The EU Commission might, for example, point to ongoing work through its simplification omnibus packages, which cover areas such as defence, small and mid-cap companies and investment.¹⁰⁴ This work may benefit some additive manufacturing companies without explicitly targeting them. This is a relevant point. At the same time though, the EU has taken specific measures to boost competitiveness for some other critical technologies, for example semiconductors through the EU Chips Act.¹⁰⁵ We have also shown above that the US and China are taking measures to support and promote their additive manufacturing competitiveness.

¹⁰⁴ European Commission, “Simplification”, Accessed November 25, 2025. https://commission.europa.eu/law/law-making-process/better-regulation/simplification-and-implementation/simplification_en

¹⁰⁵ European Commission, “European Chips Act”, Accessed September 26, 2025. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-chips-act_en

If the EU wished to pursue a more active policy approach to additive manufacturing, the stakeholder work carried out under the Industrial Forum could be developed into a dedicated strategy. In preparing this report we spoke with EU public servants in DG Grow and with an industry expert. In both interviews, the importance of active engagement from member states was emphasised. Although all critical technology areas are officially considered equally important by the Commission, if an area receives insufficient interest from member states the Commission is unlikely to initiate reforms in the area. At present, the Commission does not appear to view additive manufacturing as sufficiently high on the agenda to warrant a more coordinated effort to strengthen its competitiveness.

Thus, belonging to a critical technology area, as defined by the EU, does not automatically imply that the EU will move forward with comprehensive reforms. In this case, we can see that the EU has been quite proactive when it comes to defensive reforms focused on protecting additive manufacturing, but less proactive when it comes to partnerships or promoting competitiveness. This is particularly notable in the light of the Draghi report, which emphasised the importance of strengthening EU competitiveness and innovative capacity, as well as the Strategic Compass, which underscored the need for increased investments in critical technologies. At least in the area of promoting competitiveness, there appears to be a mismatch between the rhetoric in Commission statements and EU documents, and the limited amount of new or expanded policy work undertaken during the last five years. This corresponds to a broader pattern. Draghi himself recently argued that, since the release of his report, the EU has not done enough to strengthen its competitiveness.¹⁰⁶

It does not automatically follow from our report that additive manufacturing should be a higher policy priority. Such a judgement would require comparing the benefits of giving greater priority to additive manufacturing with those of prioritizing other policy areas, which lies beyond the scope of this report. However, by outlining the limits of current EU policies to support additive manufacturing within the Union, we provide policymakers with one part of the puzzle to inform such decisions. Not much proactive EU policy work to promote additive manufacturing has been initiated in the last five years, despite the increased EU focus on strategic competition. If policymakers in the member states want greater ambition from the EU in this area, active engagement within the EU system is needed in order to make it a reality.

¹⁰⁶ Belga News Agency, "Mario Draghi criticises EU's slow implementation of competitiveness reforms", September 16, 2025.
<https://www.belganewsagency.eu/mario-draghi-criticizes-EU's-slow-implementation-of-competitiveness-reforms>

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