

Are Your R&D Plans Big Enough?

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1. Introduction

The advanced materials market is expected to significantly grow over the next 5-8 years. The opportunities are there, but are the European companies ready to take them? Research shows that the European industry is behind in terms of investments, start-ups, and patents.

There are a number of technical challenges that the advanced materials market faces, but without solving the problems listed above, it would be difficult to overcome the technical challenges and keep the leading innovation position in the market.

The goal of my presentation is to bring attention to opportunities, show underlying challenges of the advanced materials market, and share potential ways to solve these challenges.

2. Current State of the Advanced Materials Market, Its Trends and Challenges

To give some examples of advanced materials market growth, according to Statista, the global market size for composites was 86.4 billion U.S. dollars in 2020 and will amount to 145 billion U.S. dollars in 2028. BCC Research claims that the global market for advanced aerospace materials is expected to grow from \$26.4 billion in 2023 to \$39 billion by the end of 2028. According to the European Commission, global demand for batteries is set to increase 14-fold by 2030. Revenue in the semiconductors market is projected to reach US\$613bn in 2024, it is expected to show an annual growth rate (CAGR 2024-2027) of 6.3%, resulting in a market volume of US\$736bn by 2027.

While the markets of various advanced materials are growing, there is also a number of existing technological challenges that need to be solved to secure a sustainable and prosperous future:

- 1) process optimisation
- 2) decarbonisation
- 3) mass customisation
- 4) zero defect production
- 5) circular economy
- 6) multi-materials processing
- 7) new materials processes.

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3. The European Advanced Materials Industry and Challenges It Faces

The European Union and its companies have all the chances to utilise the opportunities as they have the highest share of innovation leaders (41.9%), followed by China with 17.4%, and Japan with 11.5%. The US has only 4.5% of innovation leaders in this area. Another advantage for the EU is coming from a balanced industry ecosystem in advanced materials with a share of 13.7% resident companies.

However, the US takes a lead in the biggest and the most diverse start-up ecosystem, both in terms of the share of start-ups (around 50%) in advanced materials, and in terms of the share of capital raised (69.7%). The EU accounts only for 18.6% of start-ups, which is less than half of that of the US, and only 6.3% of raised capital. This is a big issue for the EU because start-ups may offer more radical innovations, they are usually more agile and responsive to disruption in the market.

Another challenge lies in the fact that the EU industrial R&I investments on advanced materials are not even half of those in the United States of America (EUR 19.8 billion investment in 2020 compared to EUR 50.3 billion).

There's also a rising gap in patents: the EU accounts for 15% of patents in advanced materials while the US has 28% and Japan—24%. The patent trend is rising in the US, China and Japan, but it remains stable in Europe.

Another important factor among many others acknowledged by the European Commission is the gap between groundbreaking research and industrial application which influences collaboration and strategic alignment, preventing the integration of advanced materials into industries.

All these factors combined pose a threat to the leading positions of European companies in the advanced materials market.

4. Insufficient Investments

The U.S. has a more developed capital market and a more specialised banking sector. VCs in the US tend to risk more and they also have stronger relationships with corporates. It allows American companies to be more efficient with investments.

It is difficult for the EU to compete with the quantity of the US investments due to certain peculiarities. That means the European companies need to find other ways to overcome the problem of limited financial resources:

- taking a more agile approach to innovation management;
- decreasing a level of bureaucracy and decentralising innovation;
- supporting start-ups and spin-offs that are able to develop radical innovations needed by the market;
- taking a more proactive approach in fostering innovation and relying less on the government, regulations and their initiatives;
- taking novel approaches to develop innovations and collaborate with other organisations.

5. Collaboration as the Solution

One of the solutions to the problem of limited resources is collaboration with other entities. However, willingness to collaborate should come from all stakeholders to be truly effective.

The European Union government is paying a lot of attention to the question of cooperation between the industry, academia and other players. AMI2030 is a great example of an initiative designed to unite organisations from various European countries.

Yet, this should not be the only solution. Collaboration should happen not only on the macro level, but also on the micro level. Keeping in mind the gap between groundbreaking research and industrial application, it is important to build bridges between enterprises and universities, and the initiative should be taken from both sides.

The companies might work towards:

- creating more industry-focused research centres at the universities;
- investing more into collaboration with students that might later become their employees;
- working with smaller, more applied universities across Europe and other countries that are not included in Top 100 universities;
- popularising science and making it more appealing to the younger generation;
- supporting university spin-offs.

Universities also need to move towards the industry and their challenges, as universities are also a part of the market economy. Losing market share leads to decreasing profits and taxes, which academia will also feel as cuts in programs and grants.

One of the main missions of Disruptiv is supporting collaboration between academia and the industry, to foster innovation and creativity, help the different parties in the process understand each other and find reliable partners by utilising novel approaches and frameworks.

6. Conclusions

The advanced materials market offers big opportunities in its growth and perspectives while also setting challenges that have to be solved. However, for the European industry to succeed and keep its leading innovation position, it is important to overcome other problems such as insufficient investments and the gap in research.

With limited resources, it is time to unite for all the stakeholders, including industry, academia and the government and become proactive in solving the challenges we face. At the end of the day, it is for our own benefit to be able to utilise the opportunities the market gives. The data suggests that European firms need to step up or their R&D in advanced materials risks being insufficient to maintain market share.

7. References

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