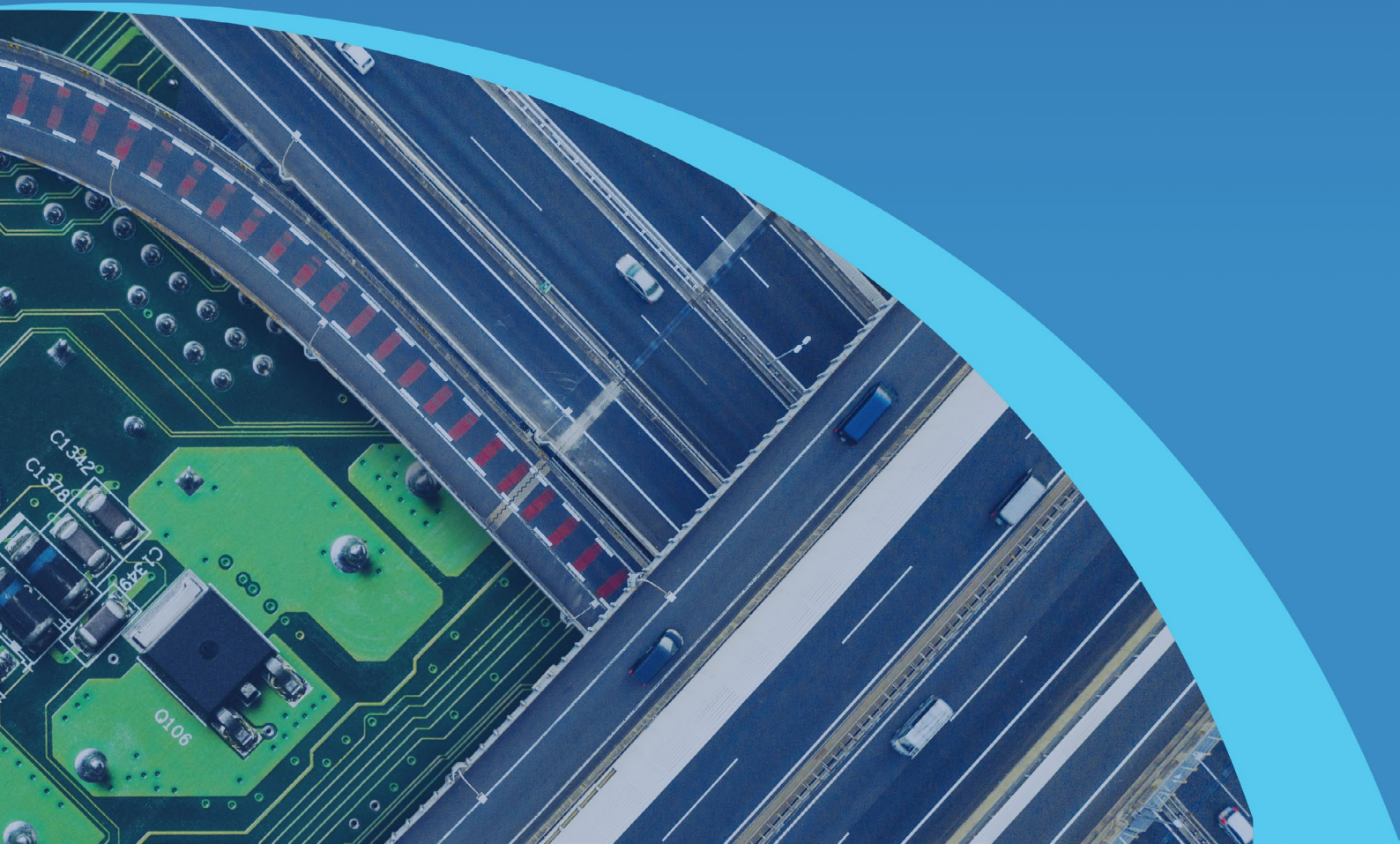
CLEPA
European Association of Automotive Suppliers

Vision for a strong automotive electronics and semiconductor ecosystem

Four priorities for future growth and innovation



Index

Background 2

01 R&D powerhouse for automotive electronics 3
- Framework Programme 10
- Important Projects of Common European Interest
- Secure path for transitioning to PFAS alternatives
- Public-private collaboration

02 Competitiveness & investment conditions 5
- Energy prices & supply
- Expansion of talent pool
- Administrative efficiency

03 Targeted and streamlined funding for industrialisation 6
- Comprehensive support for automotive electronics value chain

04 Global markets & supply chains 7
- Need for open trade
- EU-US cooperation
- Cooperation with other regions

Conclusion 8

Background

The automotive industry is undergoing a transformative shift driven by key technology trends such as advanced driver assistance systems (ADAS), the growing connectivity of vehicles, the emergence of software-defined cars, and the rapid expansion of hybrid and electric vehicles (EVs). These innovations are not only redefining mobility but also highlighting the critical role of automotive electronics, semiconductor technology and software in driving this change.

A strong automotive electronics and semiconductor ecosystem today already serves as a bedrock to Europe's position as a world leader in the automotive industry. Europe has established strengths in RD&I and design of power electronics, automotive microcontrollers (MCUs), sensors, advanced analog solutions, and their integration within automotive technologies. However, maintaining a competitive edge will require close collaboration between industry and policy makers to ensure a resilient and forward-looking automotive electronics ecosystem in Europe.

The EU Chips Act has rightly reinforced the funding landscape for semiconductor development and manufacturing. Chips power everything from sophisticated infotainment systems to complex ADAS and autonomous driving capabilities. As vehicles evolve, the number of chips required per car is soaring, with electric vehicles powertrains, for instance, containing ten times more semiconductors than their internal combustion counterparts[1]. These chips are integrated in control units, or systems that manage aspects such as ADAS features, climate control, powertrain performance, or power electronics control. The interplay of chips, automotive electronics, systems, and software is crucial in determining vehicle performance.

Looking ahead, the rise of the software-defined vehicles will require flexible, safe and secure architectures, enhanced sensors, and advanced AI and machine learning solutions. This evolution underscores the increasing need to foster the development of both software and hardware. Additionally, the high-voltage batteries in electric vehicles are driving the demand for new power electronic chip devices to manage converters such as inverters, on board chargers, and DC-DC converters.

In the last two years, industry players have announced significant investments to expand semiconductor manufacturing capacities in the EU, signalling a strong commitment to advancing Europe's semiconductor capabilities. However, competition remains fierce and will require a long-term strategy to complement and build upon the efforts made over the past years.

This strategy should be based on four pillars:

1. Reinforce Europe's role as an R&D powerhouse for semiconductor and automotive electronics

2. Strengthen competitiveness, reinforce investment conditions and build on existing strengths

3. Secure targeted and streamlined funding to derisk and catalyse private investment in manufacturing capabilities

4. Expand access to global markets and strengthen integration in global markets

1 German Association of the Automotive Industry, "Semiconductor Crisis Requirements for future relevance, competence and resilience for Europe", May 2023, accessed 10 April 2024, at https://www.vda.de/en/news/publications/publication/semiconductor-crisis

1. R&D powerhouse for automotive electronics

While increasing manufacturing capacity is crucial, fostering research, development, and innovation across the broader spectrum of semiconductor activities is equally important. Investing in cutting-edge research will allow us to build on existing strengths in R&D and complex chip design and ensure that Europe remains a leader in semiconductor innovation. This includes supporting innovative semiconductor technologies, such as chiplets, which are emerging as a key enabler for modern automotive systems. Europe's capabilities in advanced packaging, combined with the strengths of its machinery and equipment sectors, position it well to lead in this evolving field. Technologies like microcontrollers, advanced processors, power management solutions, and system integration within vehicles are integral to the future of the automotive industry. Encouraging research, development, and innovation will not only drive technological progress but also create high-value jobs and spur economic growth across the region.

Framework Programme 10

To ensure Europe's continued global competitiveness, Horizon Europe and its successor, Framework Programme 10 (FP10), should retain a similar structure while granting more autonomy and increasing financial resources. This expanded capacity will enable FP10 to strategically target funding for projects with a substantial impact on critical sectors like automotive electronics and the semiconductor value chain. These sectors are essential for Europe's industrial leadership.

With greater flexibility and financial support, FP10 can drive breakthroughs in key areas such as new materials, advanced manufacturing processes, and cutting-edge semiconductor technologies tailored for automotive applications. An integrated approach that includes hardware, software and digital technologies to foster next-generation innovations and solidify Europe's leadership in the automotive electronics and semiconductor ecosystem.

In addition, enhanced autonomy and funding will accelerate progress in transformative technologies like battery management systems, connected and autonomous vehicles, and edge AI. By prioritising these advancements, FP10 will ensure that Europe remains a competitive force in the rapidly evolving global market.

Important Projects of Common European Interest

IPCEIs enable large-scale, cross-border projects that single member states might struggle to support. However, they often face bureaucratic inefficiencies and unpredictable timelines. A clear and standardised application process, with a reliable 8 to 12-month timeline from submission to project start, would enhance efficiency and help companies better align their internal timelines and budgets. For automotive suppliers developing advanced driver-assistance systems, electric vehicles, and connected car technologies, this alignment is vital. A predictable funding framework would allow companies to realistically assess their chances based on how well they meet the criteria.

Additionally, funding reclaims should only occur in cases of proven violations of clear and pre-determined funding rules, excluding financial returns from faster-than-anticipated market uptake. Faster time-to-market should be seen as a positive signal of the project's success and commitment to achieving its goals.

Secure path for transitioning to PFAS alternatives

Successfully transitioning away from substances like per- and polyfluoroalkyl substances (PFAS) in the semiconductor and automotive electronics industries requires careful planning to maintain industry performance and reliability. These industries depend on PFAS and similar chemicals for their unique properties, making their phase-out a complex task. While the European Chemicals Agency (ECHA) has recommended restricting PFAS, the EU must consider the significant impact on the semiconductor and electronics sectors, as no current alternatives can match the performance of these substances.

The industry is addressing this challenge by actively exploring and developing alternatives. To support this transition, dedicated research and innovation programs focused on sustainable manufacturing practices are essential. Establishing fast-track processes for developing and validating PFAS alternatives is crucial, with a focus on collaboration between industry, academia, and regulatory bodies. This collaboration will expedite the discovery and implementation of new materials and methods, bringing promising alternatives to market more quickly.

These efforts must be backed by robust funding and policy frameworks. The EU should provide financial incentives and grants for research into sustainable alternatives, encouraging investment from both large corporations and smaller enterprises. Additionally, regulatory bodies should offer clear guidelines to help companies navigate the transition and comply with new standards.

The use of semiconductors in automotive electronics involves various substances of concern. Despite strict controls and adherence to End-of-Life Vehicles (ELV) regulation, environmental and health risks persist. We support ongoing R&D to identify and develop alternatives, although it is uncertain whether all such substances can or need to be replaced. Currently, the precision and stability provided by PFAS are crucial for producing the high-performance chips needed for advanced automotive applications, making their continued use essential for industry progress.

Public-private collaboration

Maintaining public-private collaboration with key players in the semiconductor and automotive electronics industries is essential for developing and sustaining the EU's competitive edge in both emerging and established technologies. These partnerships should also include software developers, Tiers 1 suppliers, and other stakeholders involved in hardware/software integration. Those partnerships foster collaboration between industry and research institutions, exemplified by initiatives like the EU Chips Joint Undertaking, which play a pivotal role in advancing innovation.

To maximise the effectiveness of these collaborations, it is crucial for the industry to be actively involved from the outset in the development and execution of new EU programs, such as Framework Programme 10. This proactive engagement helps identify critical trends, streamline regulatory processes, and allocate resources efficiently. By integrating industry insights and expertise into policy-making, the EU can create a more conducive environment for technological innovation, ultimately strengthening Europe's position in the global semiconductor and automotive electronics markets.

2. Competitiveness & investment conditions

Semiconductors and automotive electronics are capital-intensive industries. The construction of manufacturing sites as well as research and development require significant upfront investment. To ensure further investment in the European semiconductor industry, the European Commission must strengthen its competitiveness and address the fulfilment of key framework conditions, including competitive energy prices and access to skilled workers. Furthermore, the EU should reduce the administrative burden for companies and harmonise policies and regulations.

Energy prices & supply

Energy costs are a significant factor in the semiconductor manufacturing process. According to the International Energy Agency (IEA), electricity prices for industries in the EU in 2023 were almost double those in the US and China, despite an estimated 50% price decline in the EU in 2023 compared to 2022. This substantial price gap between energy in the EU and those in the US and China significantly hinders the competitiveness of EU industries. The EU should focus on ensuring competitive and stable energy prices to attract and retain semiconductor manufacturers.

Additionally, semiconductor manufacturing facilities require a continuous, reliable energy supply. Even short power interruptions can lead to significant production losses. Building a robust energy infrastructure and coordination at European level are essential to ensure a stable and secure energy supply. Consequently, grid stability is another important element to ensure the competitiveness of the European semiconductor industry and to attract investment.

Expansion of talent pool

Addressing the skills shortage in the semiconductor industry is crucial for a robust automotive ecosystem. The EU lags behind global leaders like the US or China in digital economy skills and faces a talent drain, with more EU PhD holders working abroad than non-EU PhD holders working within the EU. Bridging this gap requires connecting private sector developments with a robust ecosystem of public and private research hubs. Currently, the EU's educational institutions are not producing enough graduates in electronical fields per million inhabitants compared to global competitors.

Raising awareness about the critical role of semiconductors is essential to making the industry more attractive to new talent. To address this, the EU needs to increase investment in PhD programs and facilities as part of an EU-wide strategy. Strengthening existing programs through improved coordination among member states, educational institutions, and research centres will help optimise resources and promote greater integration across the semiconductor sector. By focusing on talent development and retention, the EU can enhance its competitiveness, attract investment, and drive the advancement of innovative semiconductor technologies.

Administrative efficiency

Reducing the administrative burden on companies is essential. Streamlined regulations and simplified bureaucratic processes will make it easier for businesses to operate and expand. This includes faster approval times for projects, less paperwork, and more efficient coordination between regulatory bodies. By minimising administrative hurdles, the EU can create a more business-friendly environment, encouraging investment and innovation in the semiconductor automotive electronics industry.

3. Targeted and streamlined funding for industrialisation

Comprehensive support for automotive electronics value chain

The EU Chips Act represents a significant step forward in providing substantive funding for new semiconductor manufacturing facilities. While the focus on manufacturing is crucial and substantial funding has already spurred investments, it is equally important to ensure that other essential elements of the automotive electronics value chain are supported. Areas such as complex design, advanced packaging, and integration within decarbonised road mobility technologies should also be adequately supported. The growing influence of generative AI and its implications for data-intensive, real-time processing systems, alongside the rising demand for hardware, should also be factored into future strategies. In particular, the continuous evolution of both software and hardware is crucial for the development of software-defined vehicles (SDVs). This also includes the development of flexible, safe and secure architectures, such as those based on RISC-V IPs, the development of superior sensors, and built-in trust systems based on AI and machine learning that create scalable hardware platforms.

Moreover, Europe's existing strengths in semiconductor manufacturing equipment should be strongly supported and leveraged. This sector is pivotal to the industry, and further strengthening its position would provide Europe with a strategic advantage in the global semiconductor ecosystem.

Moving forward, addressing potential gaps in the funding framework is crucial to maintaining and enhancing European competitiveness across the entire automotive electronics value chain. A balanced and consistent policy approach, developed through close cooperation with businesses and stakeholders, is necessary to ensure the efficiency and coherence of these efforts. European policies must leverage existing strengths and drive investment across the entire value chain to compete globally. Thereby, dedicated roadmaps for research, development, and manufacturing serving the needs of the European lead markets such automotive, industrial IoT, etc., should be developed. These roadmaps should bolster next-generation innovations in highly functional safe electronics that are capable of real-time execution of big amounts of data.

4. Global markets & supply chains

Need for open trade

A globalised supply chain offers critical advantages for the competitiveness of Europe's semiconductor and automotive electronics industry. The high investments required to design chips and build and operate chip manufacturing facilities highlight the need for scale. In addition, global specialisation remains important given the investment levels and capacity utilisation needed for profitability in the semiconductor sector. However, trade disruptions during Covid underscore the need for all value chain stakeholders to reassess supply chain resilience and mitigate dependencies on single countries or regions. Diversifying supply sources and enhancing resilience are essential to safeguard against future disruptions and ensure continuous supply and innovation.

EU-US cooperation

The EU-US Trade and Technology Council should serve as a platform for a transparent subsidies program in the semiconductor sector, including discussions on trade restrictions to avoid unilateral extraterritorial laws, such as US export restrictions or ICTS investigations. Enhancing the movement of workers and researchers across borders can help address the skills gap and growing semiconductor demand. This cooperation between two established geographies in the electronics ecosystem should play a significant role in the harmonisation of standard and mutual recognition of conformity assessment.

Cooperation with other regions

Strengthening cooperation with Japan, South Korea, and Taiwan is essential. These countries are leaders in semiconductor manufacturing and technology, and collaboration with them can provide significant benefits to the European automotive electronics sector. Joint ventures, technology exchanges, and research collaborations can enhance technological capabilities, improve supply chain resilience, and foster innovation. Fostering open trade and reducing barriers with these countries can help secure a stable supply of essential components and materials, ensuring that Europe remains competitive in the global semiconductor landscape.

Addressing the availability of raw materials is also vital. The semiconductor supply chain is complex and requires close coordination between raw material suppliers, component manufacturers, and chip makers. Therefore, the EU must continue to establish raw materials agreements to secure and diversify its supply chain. To be truly effective, these agreements should also encompass processing capabilities.

Conclusion

In conclusion, Europe can still position itself as a key player in the automotive electronics industry, but this will require a holistic approach and close cooperation with industrial players. This new approach must encourage research and development within the European Union by leveraging existing programmes and covering the entire value chain from design to integration. Emphasising innovation and fostering cutting-edge research will be critical to maintaining Europe's leadership in semiconductor technologies.

Secondly, the key to European competitiveness lies in creating conditions that encourage investment. This includes reducing the administrative burden, strengthening regulatory coherence, and addressing skills shortage in Europe. All of this will be essential to attract private investments and drive the industry's growth. Additionally, public support must complement private investment, particularly by reducing funding gaps and facilitating access to necessary financial resources.

Mario Draghi's report on the future of European competitiveness also warned that Europe is falling behind global competitors and must close innovation gaps, drive forward the transition to decarbonisation, and sustainably strengthen its economic resilience. To achieve this, it is vital to ensure that Europe fosters the right environment for innovation and industrial leadership, particularly in sectors like automotive electronics and semiconductors.

Finally, ensuring access to the global market is crucial. Expanding Europe's footprint in global markets through strategic partnerships and trade agreements will help secure the supply chain and enhance competitiveness. Implementing these priorities will not only strengthen the automotive electronics and semiconductor industries, but also drive broader economic growth, innovation and job creation across Europe.

For further information, please contact
CLEPA's Market Affairs Officer, Archibald Poty

About CLEPA

CLEPA, the European Association of Automotive Suppliers, represents over 3,000 companies supplying state-of-the-art components and innovative technologies for safe, smart, and sustainable mobility.

CLEPA brings together over 120 global suppliers of car parts, systems, and modules and more than 20 national trade associations and European sector associations. CLEPA is the voice of the EU automotive supplier industry linking the sector to policy makers.

The automotive sector accounts for **30% of R&D** in the EU, making it the number one investor.

European automotive suppliers invest over **30 billion euros** yearly in research and development.

Automotive suppliers register over **39,000 new patents** each year.

Automotive suppliers in Europe generate **1.7 million** direct jobs.

CLEPA
Cours Saint-Michel 30g,
1040 Brussels, Belgium
www.clepa.eu

Follow our activities:
@CLEPA_eu