EU CHIP CHRONICLES

DEEP DIVE INTO THE CHIPS ACT

From objectives to infrastructure to stakeholder opinions, everything you need to know about the legislation that will transform the European semiconductor sector

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Foreword

Welcome to this first in a series of the **Chip Chronicles** magazine, a publication of the ALLPROS. eu project - a coordination action funded by the European Commission Digital Europe Programme to enhance **Europe's digital sovereignty in the chips industry** through the consolidation of the community and empowering it through the creation of a knowledge platform.

These last months have been crucial for the European semiconductor industry with the entry into force of the EU Chips Act which we dedicate this issue to.

Within this issue, we start with an overview of the Chips Act as well as an explainer article on the various pillars of the Chips Act shedding light on the Chips for Europe Initiative Pillar, Investment in Manufacturing Facilities Pillar and the Coordination and Crisis Management Pillar - all designed to strengthen Europe's semiconductor sector. Complementing these articles, we have also gathered a number of views from the community on their thoughts and potential implications of the EU Chips Act. We have a feature article on the Chips Joint Undertaking and its impending launch, what is known so far and how to engage with them.

We spotlight **European excellence** with our **supply chain success stories report**. This article highlights the remarkable success stories of supply chain collaboration within the European semiconductor industry. In the midst of a global semiconductor shortage crisis, these recent developments exemplify effective strategies to mitigate disruptions and ensure ongoing production while deepening partnerships.

During the summer, ALLPROS.eu was busy publishing a novel **policy brief on open source silicon**. Our article in this issue shows how open source silicon could hold the potential to support Europe's quest for more self-sufficiency in the global semiconductor industry.

We've also sat down with Frank Bösenberg, managing director of the largest regional semiconductor cluster organisation, Silicon Saxony on what he thinks are the three major topics that are currently impacting the sector today.

Our first months of 2023 were busy in a series of organised events where we showcase reports that bring novel insights including Competence Centres for Semiconductors: Considerations from Users - a report of the workshop organised in conjunction with the KDT Joint Undertaking, and Bridging the Skills Shortage in the EU Semiconductor Industry - that summarises the community's views and ways forward to address the skills shortage.

I hope you will find this issue as insights-packed and timely as we do and hope you will enjoy this issue. If you would like to share some of your stories with us we would be happy to include them in our future editions.

Silvana Muscella
ALLPROS.eu Technical Coordinator

⊡ The European Chips Act

✐ By Diego Dylan Domenici, Trust-IT

The European Chips Act: Launch and Overview

On 21 September 2023, the EU achieved a significant milestone in the world of semiconductors with the activation of the Regulation establishing a framework of measures for strengthening Europe's semiconductor ecosystem, otherwise known as the Chips Act.

Semiconductors are the fundamental building blocks of our digital age, powering everything from smartphones and automobiles to critical infrastructure in healthcare, energy, defence, communications, and industrial automation. Recognizing their strategic importance, the European Commission introduced the Chips Act to address the challenges arising from Europe's reliance on foreign suppliers and to reaffirm its presence in the global semiconductor market.

The 3 Pillars of the Chips Act

The European Chips Act consists of three pivotal pillars designed to transform Europe's semiconductor landscape:

1 **Chips for Europe Initiative:** This initiative aims to bridge the gap between research and industrial activities. It fosters innovation, facilitates knowledge transfer, and promotes the industrialization of advanced technologies within European businesses. With €6.2 billion in public funds, the Chips for Europe Initiative will stimulate innovation and production, establish competence centres across Europe, and support startups and SMEs through dedicated financing mechanisms.

2 **Investment in Manufacturing Facilities:** The second pillar incentivises public and private investments in chip manufacturing facilities, which are critical to increasing production capacity and ensuring the security of supply. The Act creates a framework for Integrated Production Facilities and Open EU Foundries, laying the foundation for a resilient semiconductor ecosystem.

3 **Coordination and Crisis Management:** The third pillar establishes a coordination mechanism between Member States and the Commission to strengthen collaboration and monitor semiconductor supply. In times of crisis, this mechanism can be activated to address shortages effectively.

Responding to Global Semiconduct or Shortages and Security Concerns

✎ By Matilde Castleberry, Trust-IT

The semiconductor industry faced unprecedented disruptions over the past two years, affecting economic sectors due to increased demand for electronic devices, the COVID-19 pandemic, supply chain dislocations, and geopolitical tensions. These events exposed vulnerabilities in global value chains and Europe's dependency on a limited number of foreign suppliers.

The Chips Act represents a pivotal moment in Europe's

semiconductor industry, strengthening its position in the global market. With a comprehensive strategy addressing innovation, production, and security, Europe is poised to play a leading role in the semiconductor revolution, ensuring a resilient and competitive future.

In a rapidly evolving technological landscape, the European Chips Act is a testament to Europe's commitment to securing its place in the semiconductor world.

Vox Populi on the Chips Act
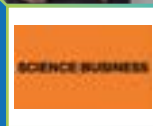
💬 Erasmia Dupenloup, CEO, **Minalogic**

"Europe, through the Chips Act, has equipped itself with a powerful and ambitious tool which highlights the geostrategic nature of microelectronics. The Chips Act will create unprecedented momentum in microelectronics. The Chips Joint Undertaking will also support microelectronics SMEs in innovation and investment. Minalogic, as the digital technology cluster for France's Auvergne-Rhône-Alpes region, will leverage all these initiatives for the benefit of its ecosystem andl build on the work carried out within the framework of the Chips Act through dissemination activities across Europe."

💬 Raffaele Guerini, Policy Officer, **Science|Business**

"The EU Chips Act is a fascinating example of the EU trying to build a "coalition of the willing" to address what it sees as a strategic weakness. With Europe's semiconductor industry lagging behind international rivals, an effective partnership between industry and research – properly enabled and resourced at EU and national level, and carefully focused on areas where European science and technology can compete at a global level – will be critical if Europe is to stand any chance of regaining lost ground."

💬 Andre Cave, Secretary General, **European Small Business Alliance**

"The EU Chips Act stands as a potential game-changer for SMEs within the European semiconductor sector. The Act opens the door for SMEs via Competence Centres—hubs for innovation and skills enhancement. Traditional financial roadblocks are sidestepped through funding routes, including the Chips Fund and an InvestEU-backed semiconductor equity investment facility. Complemented by the ECIC and the Chips JU, the legislation sets the stage for SMEs to play a critically important role in securing the supply of semiconductors - the building blocks of Europe's digital future."

💬 Etienne Walter, General Manager, **EPI**

"We, at European Processor Initiative (EPI), absolutely welcome the EU Chips Act, and look forward to having state-of-the-art chip foundries in the EU. The current absence of such foundries in the EU is a critical miss and weakness for the European Union.

Our EPI initiative is focused on processor chips design for high-end (HPC) market; thus, we are complementary with the EU Chips Act activities in foundries setup. Both initiatives make a perfect match for complete EU high end processor sovereignty."

💬 Hendrik Abma, Director-General, **ESIA**

"The entry into force of the "EU Chips Act" is a hugely important milestone for the European semiconductor industry as the EU is focusing on the security of supply and increasing the share of production.

With the complexity of the global value chain, it will be of utmost importance to consult and coordinate with the various segments of the ecosystem in Europe, ideally through a standing body as the Alliance on Processors & Semiconductor Technologies. In this context, ESIA advocated for the Alliance to commence its work without delay, ensuring that indispensable input is being heard and considered.

A continuous dialogue with industry and dedicated EU associations (like ours) will be key to transform the ambition of the "EU Chips Act" into action and ensure an efficient pipeline between technological innovation and increasing the manufacturing footprint in Europe."

💬 Věra Jourová, Vice-President for Values and Transparency, **European Commission**
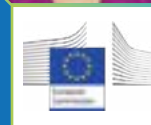
"The global race for leadership in chips is a fact and Europe must secure her active part in it. In the EU we have great talent and research, but we are missing out in linking those advantages with production and roll-out of the technology. The Chips Act will support investment and research facilities so Europe can become an innovation powerhouse with a strong stake in the global market."

💬 Thierry Breton, Commissioner for Internal Market, **European Commission**

"With the entry into force today of the European Chips Act, Europe takes a decisive step forward in determining its own destiny. Investment is already happening, coupled with considerable public funding and a robust regulatory framework. We are becoming an industrial powerhouse in the markets of the future – capable of supplying ourselves and the world with both mature and advanced semiconductors. Semiconductors that are essential building blocks of the technologies that will shape our future, our industry, and our defence base."

💬 Lucilla Sioli, **European Commission** DG Connect Artificial Intelligence and Digital Industry Director
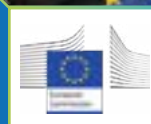
"The semiconductor industry and the innovation in semiconductors are essential for the green transition because semiconductors power all the electronic devices we have. And so, more energy efficient semiconductors are, the more energy efficient our computers, our smart devices are going to be."
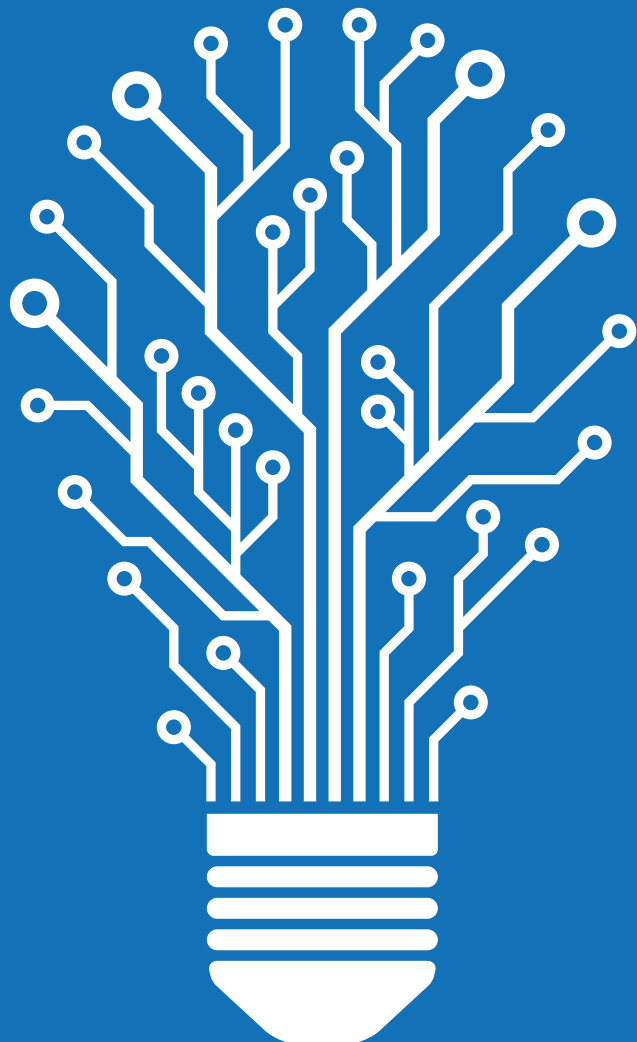
Chips Act Pillar Explainer

By Diego Dylan Domenici, Trust-IT and Sivan Pätsch, OpenForumEurope

Pillar 1, Chips for Europe Initiative: A boost for Europe's technological leadership and innovation

The first pillar of the Chips Act will reinforce Europe's technological leadership and innovation in the field of semiconductors by supporting research, development and industrialisation of cutting-edge chips technologies. It will also foster education, skills and talent in microelectronics and establish a certification procedure for energy-efficient and trusted chips.

The Chips for Europe Initiative will be mainly implemented through the Chips Joint Undertaking (Chips JU), a public-private partnership that brings together the European Commission, Member States and industry stakeholders. The Chips JU multiannual financial framework will have a budget of €6.2 billion from public funds, with €3.3 billion coming from the EU's budget.

The Chips JU will support collaborative projects along the entire chips value chain, from design to manufacturing to packaging. It will also provide access to state-of-the-art design tools, pilot lines and testing facilities across Europe, enabling SMEs and start-ups to prototype and validate their innovative chip solutions.

The Chips Act will also create a new legal form for funding under the Act, European Chips Infrastructure Consortia (ECIC). ECICs will facilitate the creation of consortia by simplifying and structuring the interaction between private and public consortium members, specifically Research and Technology Organisations (RTOs).

The Chips Act will also oversee an innovative virtual design platform to reinforce Europe's design capacity. This will be accessible on open, non-discriminatory and transparent terms and stimulate a wide cooperation of user communities with design houses, start-ups and SMEs, intellectual property (IP) and tool suppliers, designers and RTOs.

To support European industry, especially SMEs, a network of competence centres across the Union will provide expertise to start-ups as well as vertical sectors and improve their skills. The network of competence centres will facilitate open, transparent, and non-discriminatory access to and effective use of the design infrastructure and the pilot lines and will spur innovation and attract new, highly-skilled talent.

One of the key objectives of the Chips for Europe Initiative is to ensure that Europe remains at the forefront of research and innovation in semiconductors. The Initiative will target strategic areas such as advanced computing, artificial intelligence, quantum technologies, neuromorphic computing, photonics, sensors and power electronics. It will also support the development of next-generation chip technologies, such as nanoelectronics, 2D materials, chiplets and 3D integration.

Another important aspect of the Chips for Europe Initiative is to foster the quality and security of chips for critical applications. The Initiative will establish a certification procedure for energy-efficient and trusted chips, based on common standards and criteria. This will guarantee that chips used in sectors such as health, transport, energy, defence and space meet high requirements in terms of performance, reliability, resilience and sustainability.

Finally, the Chips for Europe Initiative will address the skills gap and talent shortage in microelectronics by supporting education and training programmes in microelectronics at all levels, from vocational to doctoral. It will also encourage mobility, diversity and inclusion in the chip workforce, while fostering collaboration between academia and industry.

The first pillar of the European Chips Act is an essential component to achieve Europe's target of doubling its global market share in semiconductors to 20% by 2030. By reinforcing Europe's technological leadership and innovation in semiconductors, it will also contribute to the green and digital transitions, as well as to Europe's technological sovereignty and resilience.
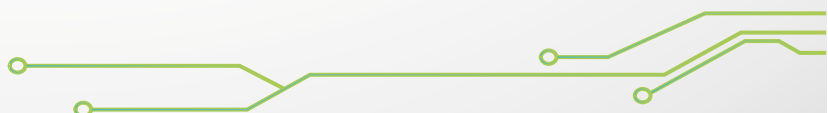
By Diego Dylan Domenici, Trust-IT

Pillar 2, Security of Supply: Promoting European Excellence and Open Innovation
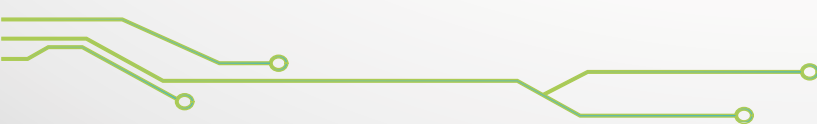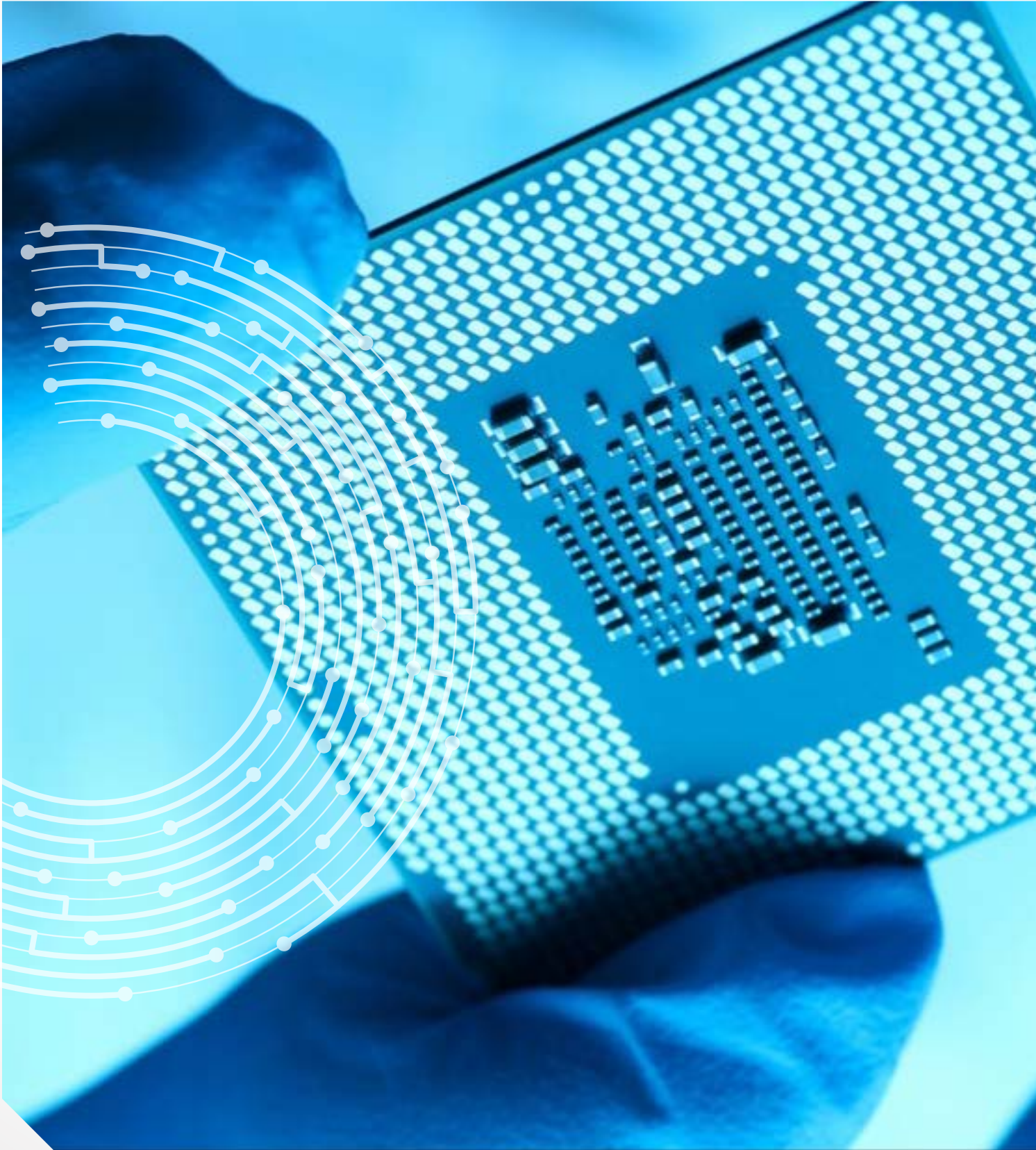
One of the core objectives of the second pillar is to reinforce the EU's capacity in the production of mature nodes, which are essential for the functioning of its economy. Simultaneously, the EU aims to prepare for investments in the production of nodes smaller than 10 nanometers (nm). This dual approach is crucial to maintain competitiveness in the rapidly evolving semiconductor landscape.

A noteworthy aspect of this pillar is its potential for economic impact thanks to its potential to induce employment. According to research from SIA and Oxford Economics, for each worker employed by the semiconductor industry, an additional 5.7 jobs are supported in other sectors of the economy. This highlights the far-reaching economic implications of a robust semiconductor industry.

Central to Pillar 2 is the concept of a "First-of-a-kind facility" in the Union. This term refers to an industrial facility, encompassing both front-end and back-end operations, which is not already present in the Union. Importantly, this designation can apply to any technological node, whether it represents the leading edge or not. The Commission acknowledges the significance of First-of-a-kind facilities and considers the "First-of-a-kind" label, among other factors, in possible State aid procedures. These facilities can take the form of Integrated Production Facilities (IPFs) or Open EU Foundries (OEF), each with its unique characteristics and responsibilities..

Integrated Production Facilities (IPFs)

IPFs are vertically integrated semiconductor manufacturing facilities. They engage in various activities, including front-end manufacturing, producing equipment or key components predominantly used in semiconductor manufacturing within the Union, designing integrated circuits, and providing back-end services. In essence, IPFs play a multifaceted role in the semiconductor ecosystem.

Open EU Foundries (OEFs)

On the other hand, OEFs are semiconductor manufacturing facilities that allocate a certain extent of their production capacity to manufacture chips based on the designs of other companies, particularly fabless companies. This flexibility allows for collaborative chip production within the EU.

Facilities designated as IPFs or OEFs receive several benefits. These include a streamlined approach to administrative applications and priority access to the pilot lines established under the "Chips for Europe Initiative" within Pillar 1 of the CHIPS Act. Additionally, the application process for IPF or OEF status is separate from the State aid assessment for First-of-a-kind facilities, although efforts are made to align these procedures where possible. In times of crisis, the Commission, in consultation with the European Semiconductor Board, can request undertakings granted IPF or OEF status to prioritize orders for crisis-relevant products. This mechanism ensures that the semiconductor industry can respond swiftly to critical situations.

Another facet of Pillar 2 is the recognition of "design centres of excellence." These are centres established in the Union that significantly enhance the EU's capabilities in innovative chip design. They achieve this through their service offerings or by developing, promoting, and strengthening design skills and capabilities. The Commission has the authority to award a "design centre of excellence" label to these establishments. The specific procedures for applications, as well as the requirements and conditions for granting, monitoring, and withdrawing the label, will be defined by the Commission through delegated acts.

In summary, The second pillar of the CHIPS Act lays the groundwork for ensuring the security of semiconductor supply in the EU. By fostering the development of First-of-a-kind facilities, including IPFs and OEFs, and recognizing design centres of excellence, the EU aims to bolster its semiconductor industry's capabilities and economic impact. This comprehensive framework is essential for maintaining competitiveness and resilience in an industry critical to the digital future of Europe.
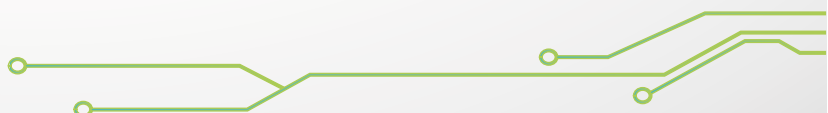
By Diego Dylan Domenici, Trust-IT and Davide Casarin, WhiteResearch

Pillar 3, Monitoring and crisis response: Ensuring Stability in the Semiconductor Industry
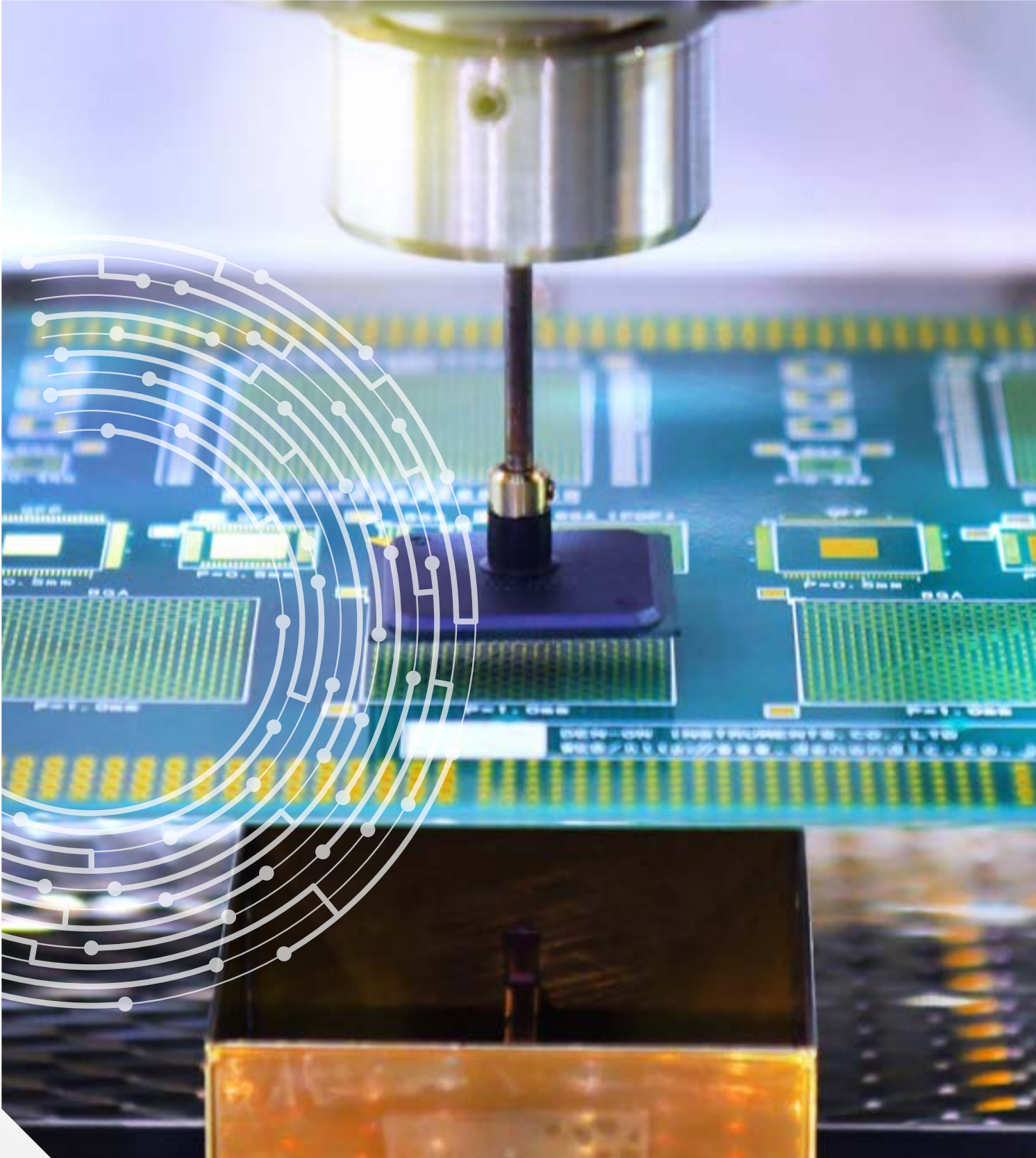
Finally, we will take a closer look at how the 3rd Pillar is framed in Chapter IV of the Chips Act and how it is articulated through the establishment of a monitoring system, the identification of criteria defining a crisis stage and the setup of an appropriate emergency toolbox to address crises themselves.

To stay ahead of potential disruptions, Member States are now mandated to engage in regular monitoring of the semiconductor value chain. This process involves carefully tracking early warning indicators while also assessing the availability and integrity of services and goods provided by key market actors. By sharing relevant findings with the European Semiconductor Board, Member States contribute to a collective effort in maintaining a resilient semiconductor ecosystem.

Collaboration and information sharing are pivotal in this monitoring endeavour. The Act actively encourages main users of semiconductors and other stakeholders to provide timely information about significant fluctuations in demand and disruptions in their supply chains. Additionally, Member States are required to establish mechanisms and administrative setups that facilitate the seamless exchange of information, thus ensuring a coordinated and well-informed response to potential crises.

In the unfortunate event of a semiconductor crisis, the Chips Act outlines a comprehensive crisis stage activation process. Concrete evidence triggers the Commission's power to activate the crisis stage through an implementing act and convene extraordinary meetings of the European Semiconductor Board.

During the crisis stage, the Commission is empowered to take decisive actions to mitigate the impact. This includes assessing the necessity for coordinated procurement, where Member States jointly purchase semiconductors, intermediate products, or raw materials affected by the crisis. Additionally, the Commission can engage in consultations and cooperation with relevant third countries to seek cooperative solutions and address supply chain disruptions.

To ensure effective crisis management, the Act establishes an emergency toolbox. The Commission gains the authority to impose priority rated orders on Integrated Production Facilities and Open EU Foundries, ensuring the prioritisation of crisis-relevant products. Furthermore, the Act allows for common purchasing, enabling the Commission to act as a central purchasing body on behalf of participating Member States for public procurement of crisis-relevant products in critical sectors.

The third pillar exemplifies the European Union' commitment to safeguarding the semiconductor industry. By implementing robust monitoring mechanisms, facilitating information exchange, and enabling coordinated crisis responses, the Act and its third pillar in particular, aims to ensure stability and resilience in the semiconductor value chain. As technology continues to advance and our reliance on semiconductors grows, the Chips Act stands as a testament to the EU's dedication to maintaining a secure and resilient semiconductor ecosystem, safeguarding the future of the European economy.
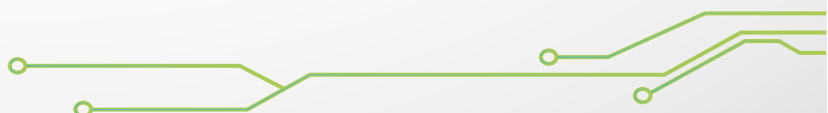
Chips JU: Europe's game-changer in semiconductor technology

By Niccolò Zazzeri, Trust-IT

In the ever evolving landscape of technology, innovation is not a choice; it's a necessity.

Europe is embracing this philosophy, which is exemplified by the Chips JU official launch on November 31st, 2023 and December 1st 2023 in Brussels. The Chips JU entered into force on September 21, 2023 after the amendment to the ECA regulation establishing the Joint Undertaking, expanded and renamed The Key Digital Technologies Joint Undertaking (KDT JU). But what exactly is the Chips JU? And what should we expect from the launching event?

The Chips Joint Undertaking (Chips JU) is a significant initiative within the European semiconductor ecosystem, established as a response to the surging demand for semiconductor technology. The Chips JU aims to bolster Europe's semiconductor industry by enhancing technological capacity and innovation, with a substantial budget increase, gathering resources from the European Union, its Member States, third countries, and private sector stakeholders.

The official launch of the Chips JU is set on November 30 and December 1, 2023, in Brussels. This launch signifies a pivotal moment in Europe's technological journey in advancing Europe's digital sovereignty and global leadership in the semiconductor field, supporting research, development, innovation, and future manufacturing capacities.

What to expect from the launching event?

During this momentous event, attendees can anticipate a series of engaging discussions, presentations, and workshops. These sessions will delve into the core objectives and strategies of the Chips JU, with a strong focus on research, development, and fostering the skills necessary for the semiconductor industry.

One key highlight is the presentation of the Chips JU's Strategic Research and Innovation Agenda (SRIA). This comprehensive document outlines the Chips JU's vision for the future and the steps it will take to get there. Expect insights into exciting areas such as open-source RISC-V building blocks, AI at the edge, and design innovation for a pan-European chip infrastructure.

A gathering of visionaries and innovators

The Chips JU launch event promises to be a historic gathering of some of the brightest minds in the microelectronics and semiconductor industry. Hosted by the Smart Systems Integration (SSI) community, this event brings together researchers, industry leaders, policymakers, and innovators who share a common vision - to revolutionise the way we think about, create, and utilise, microelectronics.

GLOBAL CHIPS: FROM CRISIS TO STRATEGIES

ALL PROS.EU

EPISODE 1

SEMICONDUCTORS, CONNECTING OR DIVING THE WORLD?

THE CHIP SHORTAGE AND THE NEW ARMS RACE EXPLAINED

Unlock the secrets behind the technology that powers our daily lives! Dive into the world of semiconductors with our latest blog. We'll take you on a journey through the heart of microelectronics, we'll tackle the current arms race, we'll uncover the faces behind our circuits and we'll embark on a brief trip around the world to discover the policies that promise to rejuvenate the sector. Don't miss this opportunity to demystify the building blocks of our digital age.

🔗 Read more at ALLPROS.eu

Semiconductors industry deserves more women on board - ALLPROS.eu

Looking for short and eye-catching content? Head on over to our **YouTube channel** and discover our promotional videos for an inclusive European Semiconductor Industry, as well as our video interview series and recordings of all our past events!

▶ **youtube.com/@allproseu/**

ALLPROS.eu Suite of Tools for the Semiconductor Industry

By Valeriya Fetisova, Trust-IT

Are you a European chips enterprise developing cutting-edge technologies? Are you a start-up that is bringing innovation to the sector? Or perhaps you represent an organization raising awareness about the challenges faced by the semiconductor industry?

Discover the tools that ALLPROS.eu is developing and leverage the opportunity to promote your solutions while being up-to-date with the key developments in the chips industry.

Marketplace

Your One-Stop Marketplace for Semiconductor Innovation and Excellence

From manufacturing, to design and commercialization, Europe needs to capitalize on the advancement made by the industry to boost the resilience of the sector.

The ALLPROS.eu Marketplace aims to bring the industry players closer to exchange best practices and collaborate to achieve leadership in the global supply chain.

For who: large companies, SMEs & start-ups, organizations, clusters

Advantages:

- Free of-charge promotion of your solutions, products, calls for collaboration, and more
- Access to opportunities and innovative products from across Europe
- Becoming part of a unique European semiconductor community focused on collaboration

Expected launch: November 2023

Observatory

There has not been a better time to work in semiconductors. Especially, if you are up-to-date with the major events, opportunities, news, and insights in the field.

The ALLPROS.eu Observatory offers its community an overview of the latest developments in the chips industry. If you are seeking knowledge and insights on the European semiconductor sector, the Observatory is the platform you are looking for.

- News & major European events
- Opportunities, surveys, and best practices
- Updates from companies, projects and organisations
- Market analysis and reports
- Publications, interviews, videos and much more!

Discover the Observatory on the ALLPROS.eu website!

Radar

The semiconductor industry is evolving at a fast pace. To keep a comprehensive understanding of the European semiconductor landscape, ALLPROS.eu is developing a first-of-a-kind Radar.

The ALLPROS.eu Radar will map and help to visualize semiconductor products and technologies according to:

- Technological Readiness level
- Market Readiness level
- Funding level
- Technological Openness Level

Subscribe to ALLPROS.eu newsletter to receive updates on the Radar launch date!

Thematic Working Groups

The future of the European semiconductor should be shaped collaboratively. To achieve this, we invite you to join the ALLPROS.eu Thematic Working Groups (TWGs). The TWGs are tailored forums to discuss the most pressing topics in the semiconductor field.

Check out the ALLPROS.eu website and fill out the form to express your interest!

Skills Needs, Shortages and Gaps in the Semiconductor Industry – Survey Findings

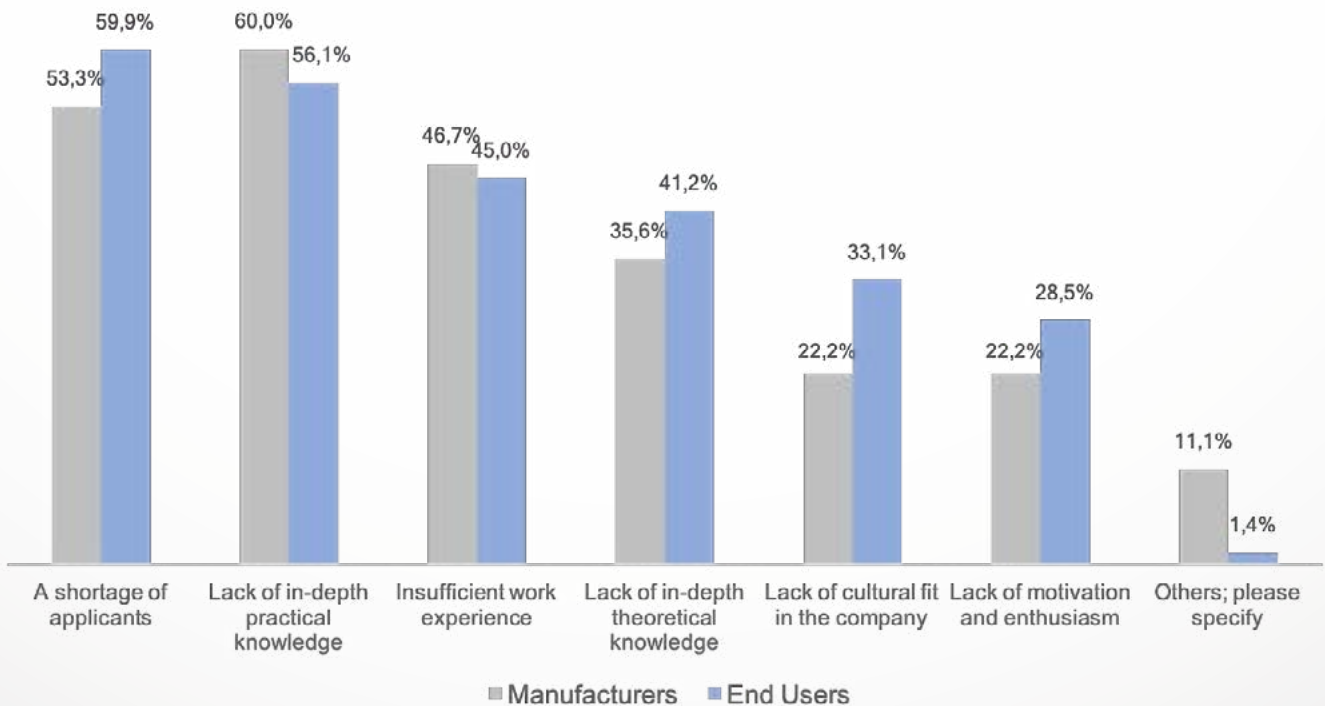✎ By Leonardo Freitas, IDC EMEA and Giorgio Micheletti, IDC4EU

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023.

Over the past three months, ALLPROS.eu has conducted two quantitative, semi-structured surveys to capture the needs, shortages and gaps related to skills in the semiconductor industry in Europe. IDC (International Data Corporation) has interviewed 50 representatives of chip manufacturers as well as 580 end-users of semiconductors across all industry sectors in the European economy. The skills shortage is evident - over half of respondents, both within semiconductor manufacturing and end-user industries, have witnessed severe skill shortages over the last 12 months.
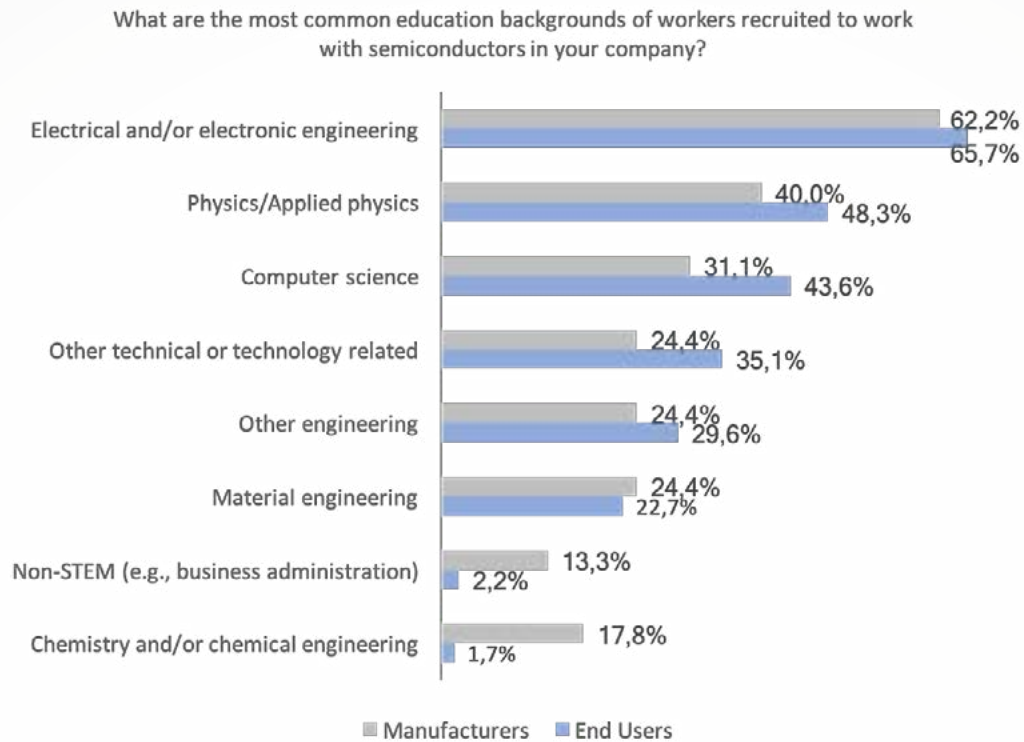
One-third of the end-user industry is looking to hire specialised staff to work on semiconductors. Hiring pressure is much stronger for semiconductor manufacturers, as nearly 80% of respondents in Europe are looking to recruit specialised staff.

The talent pool in the area is much smaller than needed: a shortage of applicants is the main reason for end-user companies and 2nd reason for manufacturers on why it is difficult to recruit. When it comes to looking for workers, both sides (end-users and manufacturers) are fishing from the same pond (e.g., looking for the same backgrounds and skills), which worsens the war for talent.

What problems does your company usually face when recruiting technical staff?

|	A shortage of applicants	Lack of in-depth practical knowledge	Insufficient work experience	Lack of in-depth theoretical knowledge	Lack of cultural fit in the company	Lack of motivation and enthusiasm	Others; please specify
Manufacturers	53,3%	60,0%	46,7%	35,6%	22,2%	22,2%	11,1%
End Users	59,9%	56,1%	45,0%	41,2%	33,1%	28,5%	1,4%

Electrical/Electronic Engineering is the most common and sought after background to work in semiconductors, followed by physics and Computer science. This is the case for both pure manufacturers and the end-user industry, showing a potential for saturation when it comes to finding such talents. Non-STEM backgrounds prove to be less common for workers in semiconductors despite the current strong need for business/soft skills in the industry.

What are the most common education backgrounds of workers recruited to work with semiconductors in your company?

Background	Manufacturers	End Users
Electrical and/or electronic engineering	62,2%	65,7%
Physics/Applied physics	40,0%	48,3%
Computer science	31,1%	43,6%
Other technical or technology related	24,4%	35,1%
Other engineering	24,4%	29,6%
Material engineering	24,4%	22,7%
Non-STEM (e.g., business administration)	13,3%	2,2%
Chemistry and/or chemical engineering	17,8%	1,7%

End-users still heavily rely on semiconductor manufacturers to develop, produce and deploy finalised products. At the same time, most end user companies are still in the early stages of implementing departments specialised in semiconductor value adding (beyond the purchase and installation).

Beyond technical skills, Business/soft skills are of high importance for the semiconductor industry (both for manufacturers and end users). Communication, problem solving, project management and ability to work independently were the highest ranked attributes. Given the high reliance on workers with a STEM background, such soft skills must be developed further within the semiconductor value chain.

IMPORTANCE OF SOFT SKILLS FOR NEW EMPLOYEES
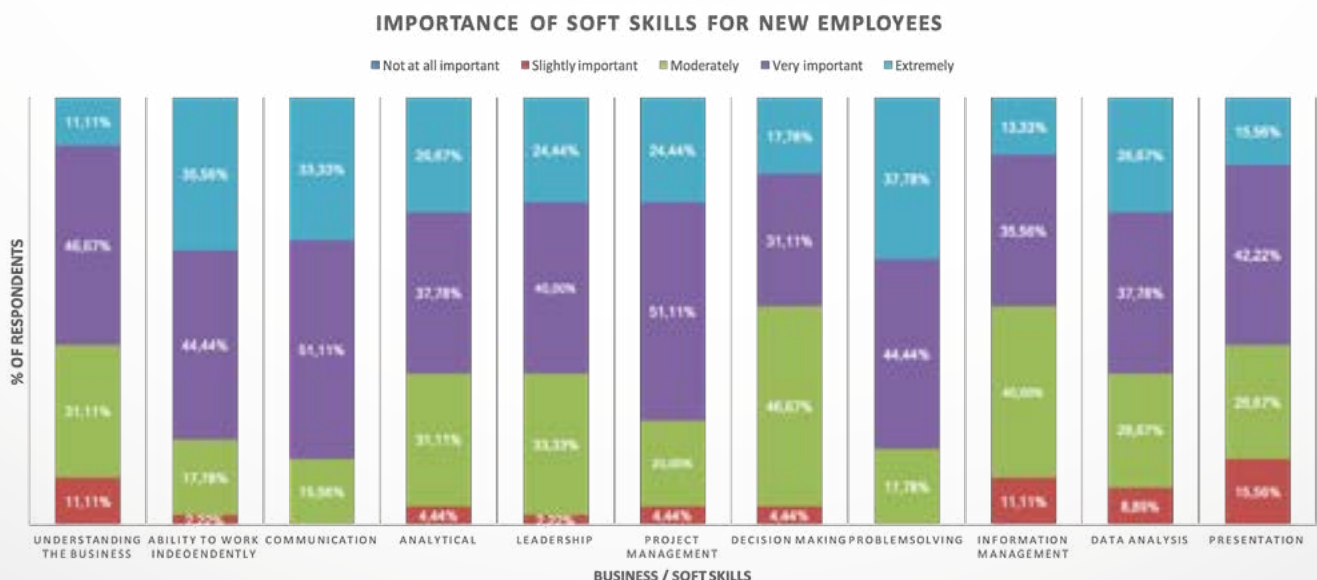
Supply Chain success stories

By Anielle Guedes, IDC4EU

This article highlights the remarkable success stories of supply chain collaboration within the European semiconductor industry. In the midst of a global semiconductor shortage crisis, these recent developments exemplify effective strategies to mitigate disruptions and ensure ongoing production while deepening partnerships.

1. Partnerships to build on the European strengths in semiconductors: R&D and materials

Partnerships are being forged to leverage Europe's strengths in semiconductors, particularly in R&D and materials. Two noteworthy collaborations have emerged: **Hewlett Packard Enterprise** (HPE) has teamed up with **SiPearl** to deliver advanced solutions for HPE's Center of Excellence in Grenoble. This partnership signifies HPE's commitment to bolstering Europe's supercomputing capabilities. SiPearl, a product of the European Processor Initiative, is focused on advancing European microprocessors, contributing to Europe's prominence in high-performance computing.

Meanwhile, **STMicroelectronics** is embarking on a groundbreaking €730 million investment to establish a chip materials factory in Italy, a first-of-its-kind endeavour for Europe. This facility will manufacture silicon carbide (SiC) substrates, a crucial component in SiC chip production with applications in automobiles and industrial sectors. With the creation of 700 new jobs, this initiative addresses the surging demand for SiC chips, known for their efficiency and ability to handle higher voltages compared to conventional silicon chips. STMicroelectronics' substantial investment aligns with Europe's objective to strengthen its semiconductor supply chain self-reliance amid chip shortages.

2. Diversified Sourcing while working beyond the Tier 1 suppliers and Resilience Planning for Business Continuity and Operational Resilience

One key strategy employed by the semiconductor industry to enhance business and operational resilience is diversified sourcing to minimise the risks of disruptions. This approach involves establishing multiple supply channels, ensuring a broader network of suppliers to rely on in times of crisis. For instance, **NXP** has taken significant steps to strengthen its business continuity plan and supplier management practices. This includes supplier tiering, where suppliers in various tiers are selected to create a diverse supplier database. Additionally, NXP works closely with suppliers deep within the supply chain, ensuring that each supplier has a documented business continuity plan in place, demonstrating their ability to handle supply contingencies effectively.

Another strategic move seen in the semiconductor industry, exemplified by Infineon, is signing multi-year supply agreements for critical materials like silicon carbide (SiC) wafers. These agreements not only secure a consistent supply of essential materials but also support a multi-sourcing strategy to bolster supply chain resilience. Infineon is significantly expanding its manufacturing capacities at its production sites in Malaysia and Austria to serve the growing SiC demand. This involves a multi-supplier and multi-country sourcing strategy aimed at increasing resilience for the benefit of their broad customer base and securing new top-quality
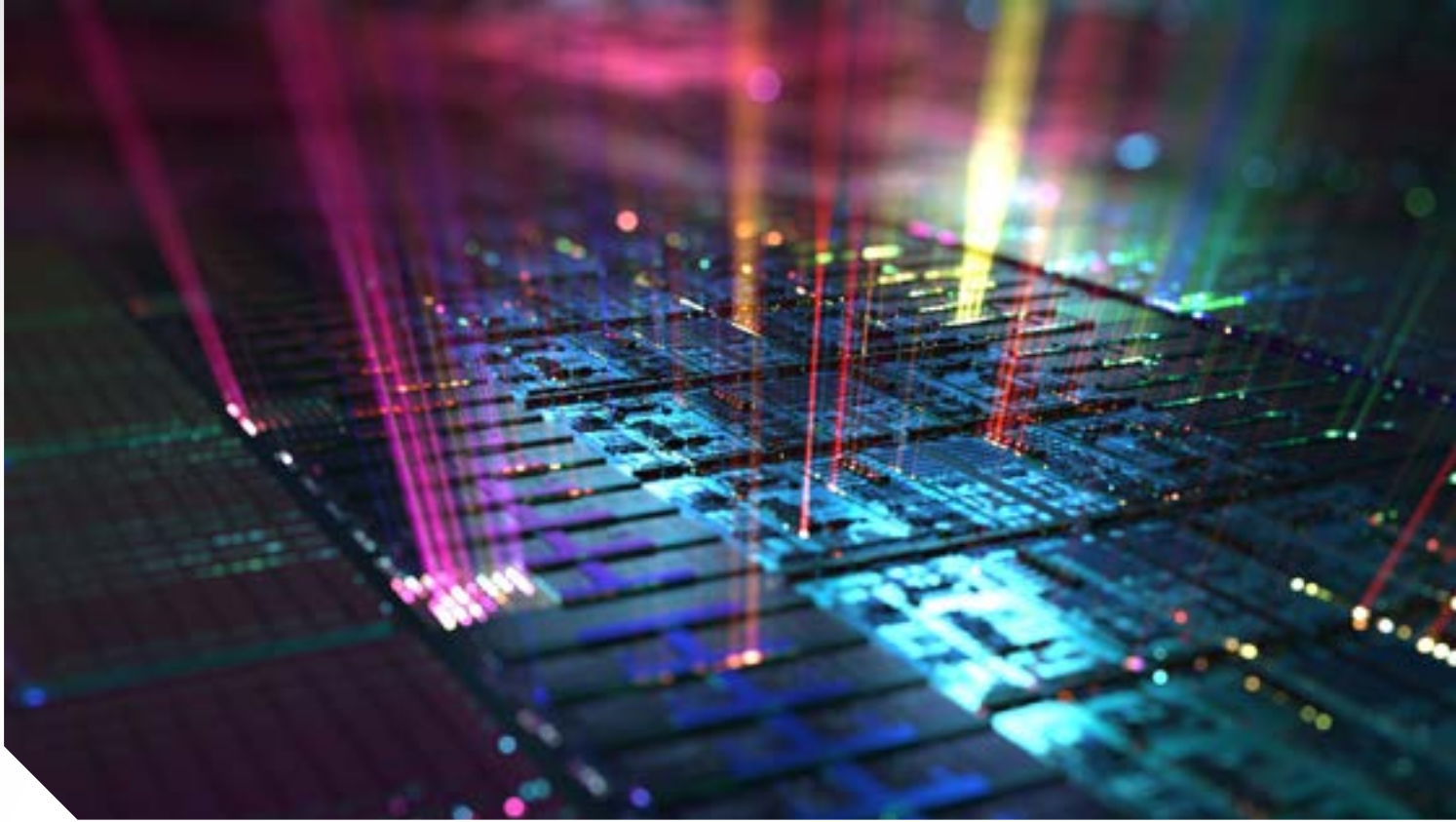
sources globally. This strategic shift allows them to navigate supply chain challenges while advancing their goals of decarbonization and digitalization by ensuring a stable and competitive supply of critical semiconductor materials.

3. New facilities investments bringing supply chains closer

Intel is making significant strides in strengthening its presence in Europe with two major investments. First, in Germany, they are investing over 30 billion euros to expand their manufacturing capacity, creating "Silicon Junction," a facility that will operate at a more advanced technology level than initially planned. This facility will be the first of its kind in Europe, contributing to the European Union's goal of a more robust semiconductor supply chain. Intel is also prioritising sustainability by adhering to green building principles and adopting high environmental standards to minimise its carbon footprint. In a separate move, Intel is investing up to $4.6 billion in a cutting-edge semiconductor assembly and test facility near Wrocław, Poland. This investment addresses the growing need for assembly and test capacity, further solidifying Intel's commitment to fostering a thriving European chip ecosystem.

A major joint venture is in the works, with **Taiwan Semiconductor Manufacturing Company** (TSMC) leading the way, holding a 70% stake. **Bosch**, **Infineon**, and **NXP** will each own a 10% stake,

pending regulatory approvals and other conditions. This ambitious project, hinged on the operation of a major semiconductor fab, is set to surpass 10 billion euros in total investments, with funding coming from equity investments, borrowing, and strong support from the European Union and the German government. It's a significant step towards securing a stable supply of semiconductors for various industries, including automotive and IoT, and advancing innovation in Europe. In conclusion, the past two years have exposed a glaring vulnerability in the global chip supply chain, as a multitude of unforeseen events disrupted production and logistics on an unprecedented scale. These disruptions, further exacerbated by issues in global logistics and material shortages, have underscored the systemic weaknesses in the current state of affairs. To address this critical issue and secure Europe's position in the industry, the EU must prioritise investments in design capabilities that are lagging behind those of the U.S. and Asia and continue supporting industry partnerships and innovation.
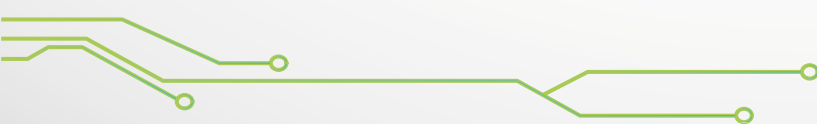
Policy Brief: Open Source Silicon holds a potential to support Europe's quest for more independence in the semiconductor industry
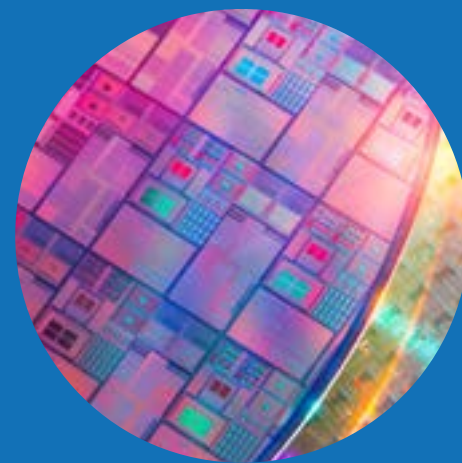
By Paula Grzegorzewska, Open Forum Europe

What is Open Source Silicon?

The term "open source silicon" refers to publicly accessible hardware designs and components in integrated circuit (IC) design processes via software, encompassing the freedom to access, use, modify, and distribute these designs. It may or may not involve royalty or licensing fees.

Open source advancements have influenced chip design and inspired a wave of innovation, fostering startups and technologies, both open source and proprietary, with the prominent and open RISC-V standard often seen as a key catalyst for this transformation. It allows the design, integration, and modification of processors, fostering innovation in low-power and high-performance computing.

Universities use it for education, attracting talent and facilitating research. Numerous start-ups basing their innovative efforts to a large extent on these open chip architectures have emerged in Europe and around the world, promising more growth and less monopolisation.

Europe excels in inputs like equipment, chemicals, and innovative research but faces strategic weaknesses in production processes, notably chip design. The open source silicon landscape primarily focuses on the first step of the semiconductor value chain - chip design, encompassing different architectures, standards, IP cores, and software, using electronic design automation tools for simulation and verification.

Geopolitical Shift in Semiconductor Industry

Recent years have witnessed intricate geopolitics affecting the global semiconductor landscape, leading to regional economic decoupling efforts. These geopolitical tensions, particularly between the US and China, have driven significant trade conflicts, and pushed Europe to look for more independence through increasing its own capacities.

China has ambitious goals for its domestic semiconductor industry, as outlined in its Made in China 2025 strategy and governmental incentives. These efforts are backed by substantial investments through the China Integrated Circuit Industry Investment Fund ("the Big Fund"). While China has made progress in increasing global sales, it still heavily relies on imports of tools and equipment from the US and Europe. China is investing significantly in chip design, recognized as a key revenue driver and though a late adopter, and strategically utilises open source silicon, particularly RISC-V, in industrial R&D.

The US government supports open source silicon through initiatives like the CHIPS for America Act, emphasising the benefits of open source and open science for the domestic semiconductor ecosystem. However, the US is also considering restricting certain open source developments to like-minded international partners in response to China's efforts in this domain. India aims to establish a robust open source silicon innovation ecosystem and supports this effort on a governmental level.

Europe's Approach to Open Source Silicon

In alignment with Europe's digital sovereignty goals and Open Strategic Autonomy, the European Chips Act focuses on enhancing collaboration within Europe and integrating the RISC-V standard. Initiatives like the Chips Joint Undertaking (Chips JU) support capacity-building actions, combining resources from various programs and entities. The European Commission funds R&D projects integrating or focusing on RISC-V, recognizing the role of open source in increasing resilience and fostering regional R&I activities in this domain. However, open source silicon is not mature in terms of policies supporting it and some experts say it is at a stage similar to that of open source software twenty years ago.

In order to achieve network effects by opening and initiating overt exchange of innovation inputs rooted in open source, it is relevant to take advantage of the broad collaboration, participation and community of OS dynamics and to nurture and cultivate them institutionally in European universities and research institutes.

Recognizing open source silicon's vital role in advancing European semiconductor R&D is crucial, while fostering collaboration and lowering barriers to entry. As chip requirements grow and become more specialised, especially in AI, open source silicon, notably RISC-V, gains global acceptance. Despite Europe's involvement in open source hardware, some components are missing, and a shortage of key microelectronics skills persists, making open source essential for research, education, and talent acquisition.

Open source silicon's modularity and interoperability offer opportunities for bottom-up industry strengthening, especially with the growing importance of chiplets and the need for higher interoperability, benefiting smaller players like start-ups and SMEs who can easily identify niches, innovate, and scale up in a complementary manner, while addressing legal uncertainties through coordinated expertise.

Initial recommendations for Europe's chip sovereignty by strategic openness

1. Encourage open source hardware in research and academia through funding and policies for open source silicon and encouraging using OSH in European research institutions.

2. Openness as diversity: Encourage women in STEM and propose concrete synergies between women in STEM initiatives and semiconductor R&D.

3. Foster an innovative R&D initiative that combines open EDA development and open PDK integration in a regulatory sandbox environment.

4. Support and invest in legal certainty for small players that are integrating open source silicon, i.e. start-ups and SMEs.

5. Cyber and hardware security: Approach security through transparency

6. Build capacities to govern, map and study the open source silicon landscape, including measuring the impact of OSH and growth of open source silicon.

In conclusion, embracing the open source approach within the domain of semiconductor and processor technologies holds immense potential across various sectors. The benefits for academia and education will amplify innovation and collaboration, resulting in accelerated advancements in Europe's semiconductor R&D. Enhanced hardware security through transparency, collective scrutiny and contribution will bolster the robustness of technologies as well as societal trust. Moreover, the bottom-up industrial reinforcement intensified modularly through open source silicon will empower smaller players in Europe and significantly diversify the value chain.

These opportunities, in turn, will be decisive for strengthening the resilience of the European industry and value chain, as well as for collaborating with like-minded allies to better overcome difficulties and bottlenecks together and achieve more digital sovereignty and increased capacities of the EU.

3 Major Topics Impacting the European Semiconductor Sector – Interview with Silicon Saxony's Frank Bösenberg

By Rob Carrillo, Trust-IT

© Silicon Saxony

The Pareto Principle states that 80% of consequences in any situation usually come from 20% of the causes. Perhaps applying this principle, also known as the "80/20 rule", might help us make sense of the near daily barrage of developments in the semiconductor industry.

ALLPROS.eu sat down with the Managing Director of Silicon Saxony, the largest regional semiconductor cluster organisation in Europe, Frank Bösenberg. In this interview, we discussed his thoughts on the biggest current developments that will affect the industry for years to come.

1. Chips Act

First on the list is the launch of the European Chips Act which has been covered thoroughly in other parts of this magazine. "*With the settlements of major fabs in Europe, whether enlarging or building of new fabs, this is a really important development which will support further growth*," Frank said.

He noted especially that the Chips Act provides significant investments in front-end semiconductor manufacturing which entails chip fabrication from a blank wafer to a completed wafer. Having the capacity for this in Europe is already a significant step in securing Europe's competitiveness.

But it isn't just about growing Europe's share of supply. There is an innovation aspect as well. "*There is a popular idea in the industry - the fab is the lab. Having newer fabs in Europe is important. This will help encourage the development of homegrown innovative semiconductor research results in Europe, bringing them faster into use*," Frank highlighted.

2. Talent shortage

"*This is a challenge, but it's a challenge that unites us,*" Frank continued. "*All clusters face this challenge globally, even for Saxony which as a large cluster is in a slightly better position compared to others. Efforts will have to be taken to make this talent growth and availability really happen.*"

While the talent shortage in the industry has been apparent for several years already, Frank says the effects have been more dramatic in the current months. Rapid growth in the industry coupled with a lack of skilled talent has made this challenge resonate across the industry. With the Chips Act expected to further expand Europe's semiconductor industry, the skills shortage question becomes even more important. Apart from these, the participation

of women in the industry is not significant enough as has been highlighted by several experts[1].

From a regional perspective, the head of the Saxony cluster highlighted another aspect - demographic change. *"In Germany and specifically in the eastern German cluster, we have this specific challenge of demographic change. Even if we have a relatively high share of young people and women engaging in*

Science, technology, engineering, and mathematics (STEM) fields, the amount of people available in the regional pipeline is still limited due to the shrinking share of younger people in the population."

He says this is not something unique to Germany but is something that affects a lot of clusters across the world, including Taiwan, Singapore, and South Korea.

3. Ongoing geopolitical tensions

The influence of international policies between major producers of semiconductors have added a significant level of complexity to an already challenging landscape.

Over the summer of 2023, China announced restrictions on the export of important raw materials used for chip production, gallium and germanium - the latest in the string of tit-for-tat actions between global semiconductor players. At present, Europe is almost a hostage to such changes in international trade policy and limitation of vital supply.

Referring specifically to the "Chip War" between US and China, Frank says, *"Europe needs to find its role in the current geopolitical semiconductor situation."* He says technology sovereignty within the EU should be the aim, but not necessarily at the point of decoupling the EU, which would have counterproductive effects. Attaining technological sovereignty should be pursued only to reduce risk and overdependence.

He added that for European countries to be able to navigate and survive the ongoing Chip War, Europe needs to act as one and address it with a common European policy.

A European solution

The three points mentioned previously - the Chips Act, skills shortage and geopolitical tensions will undoubtedly continue to make an impact in the European and global semiconductor industry in the coming years. These topics touch upon some of the biggest challenges in the industry. How companies, clusters, or countries manoeuvre these will decide whether Europe comes out stronger in the end.

"We believe collaboration cannot be extensive enough. Clustering together is about creating critical mass. We have done it with Silicon Saxony, but on a global scale, we cannot face these challenges on our own. To do that, we need to be acting together as Europe. Only then can we gain substantial critical mass on a global scale - by acting collectively as Europeans on as many aspects as possible," Frank ended.

1   Webinar: Bridging the skills shortage in the European Semiconductor industry, https://allpros.eu/events/bridging-skills-shortage-european-semiconductor-industry

ALLPROS.eu Reports

The ALLPROS.eu project gathers key players in the industry, bringing forward ideas that can help address the challenges of the European semiconductor sector.

Have a look at some of the latest reports you may have missed.

Find them all here: https://zenodo.org/communities/allpros-eu

Competence Centres for Semiconductors: Considerations from Users

Following the online workshop on Competence Centres in Semiconductors held on 18 April 2023 in cooperation with KDT JU, ALLPROS.eu released the post-event report summarising views from a wide range of representatives from the semiconductor industry in Europe on expected services, specialisations, and conditions offered by the Competence Centres.

Learn more: https://allpros.eu/node/109

Bridging the Skills Shortage in the EU Semiconductor Industry

The post-event report on Bridging the Skills Shortage in the EU Semiconductor Industry showcases views from industry experts and leaders, policymakers, academic leaders, and industry associations on the link between gender inclusion and the skills shortage in the semiconductor field.

Learn more: https://allpros.eu/news/post-event-report-bridging-skills-shortage-eu-semiconductor-industry

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