

Chips Act 2.0

Call for evidence

EVIDEN/Bull S.A.S answer

Disclaimer

The purpose of this document is to answer a public consultation initiated by the European Commission related to the Chips Act 1.0, in order to prepare the Chips Act 2.0 and with a focus on Advanced Chips.

With a 50 years legacy in making chips and systems, Eviden/Bull is not only the biggest system integrator in EU, delivering the fastest HPC & AI Super Computers in Europe, but is also a design house, engineering advanced chips, notably for High Speed networking, but not only.

The following answer to the call for evidence, is focusing on advanced node chips for the AI related markets, from the perspective of a System Integrator and also a Chip design house which has direct access to these markets and an interest in increasing EU sovereignty in that space.

European Chips ACT

Abstract

The EU Chips Act Package (a.k.a. Chips Act 1.0) was an answer from EU to the COVID 19 crisis on chips shortage and its impacts on Europe's economy, especially on the car ecosystem, and an evidence of an unacceptable dependency on foreign companies or even geo-political wills.

In that respect, the Chips Act 1.0 Pillar 1 was focused on re-enforcing or improving EU offering capabilities on the full chain, from design to back-end to become sovereign as much as possible.

Its main market and the principal target was to reinforce the mature node ecosystem (65 to 90nm and later 20-29nm), serving the industrial markets in Europe, principally the car industry, for which European demand was really existing.

In other words, increasing EU sovereignty through the Chips Act 1.0 by enabling investments in the Mature Nodes manufacturing offering ecosystem could have been impactful – ONLY because there was local demand for locally engineered chips AND because there was a local demand for them.

The net conclusion is that increasing the manufacturing offering ecosystem, with the massive investments needed (in tens of Billions €) to become sovereign is impossible if there is no local demand for EU born technologies, especially for advanced node chips.

The advent of Generative AI, starting 2022, the current race to AGI, all the geo-political battles on Chips, have completely obsoleted all existing thinkings on what needs to be done, especially in advanced node chips, as levels of investments in advanced node chips are skyrocketing and are putting EU in a trailing position (in 2022 US was already investing 7X more in micro chips than EU, and China 16X more than EU).

This completely new dynamic must trigger a completely new approach to making EU sovereign, especially because if advanced node chips are prevalent in Data Centers generative AI workloads, they are becoming the de facto requirements to power the “Software Defined Cars” era (initiated by Tesla and the Chinese car makers). It would partly putting at risk investments made recently in EU on mature node offerings (65-90 and 20-29nm).

This document aims to explain why the EU Chips Act 2.0 should consider focusing on developing the EU based demand for Advanced Node chips, privileging European born/engineered technologies rather than focusing first on developing the corresponding manufacturing ecosystem offering.

If the demand for advanced node chips comes from European design houses, it will enable the current (mature node) European ecosystem to invest in the corresponding technologies, i.e. the (local) demand is creating the (local) offer, not the reverse.

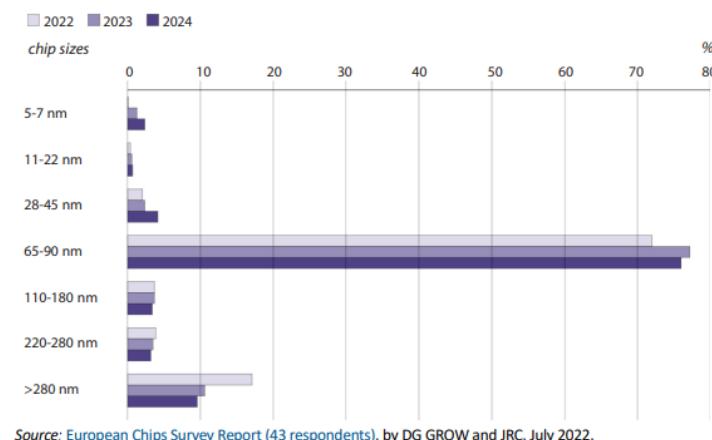
The 2022 findings leading to the Chips Act 1.0

The Chips act 1.0 was introduced by the EU in February 2022 to respond to the global supply chain disruptions seen during the COVID 19.

It's important to note that while the disruptions seen during the COVID 19 have affected many of the industries relying on semi-conductors in Europe, ranging from DataCenter, networking (Phones), robotics and the Car industry, some of the production centers were in Europe but lacking raw materials or even discrete, very cheap components coming from far east. At the end of the day, stopping car production because of a missing 0.002\$ component sourced in far east or because of a EU made mature node ASIC has the same impact.

Net result was reflected in the European Chips Survey to prepare the Chip Act 1.0 (<https://ec.europa.eu/newsroom/dae/redirection/document/89124>), which, with 141 answers, was the basis of the recommendations of the Chips Act 1.0. In short the pooled responders, mostly suppliers or the EU industry, directed their findings towards the increase of the semi-conductor back-end

Figure 6 | Projected aggregated demand of EU companies surveyed by size of microchip between 2022 and 2024



Source: European Chips Survey Report (43 respondents), by DG GROW and JRC, July 2022.

ecosystem in EU, mainly for (very) mature nodes (65-280+nm).

Not surprisingly, the responders, European suppliers to the industry and producing In Europe were focused on increasing the manufacturing offering of their existing lines of products, i.e. making more mature node chips.

Thus, the Chips Act 1.0, without better or clearer targets, enabled the mature node Chip ecosystem to increase their production or to increase their productivity with post Covid 19 incentives.

In summary, the Chips Act 1.0 pilar 1 has had positive effects on the mature node ecosystem and on the industries relying on the mature node semiconductors, generally speaking for EU sovereignty.

The focus made in the Chips Act 1.0 on developing the **offering** was probably the good answer because and only because there was a strong **demand** for locally engineered and manufactured microchips, notably by the Bosch/NXP/Infineon chip manufacturers for the European Car industry.

In other words, if these companies hadn't developed the corresponding IPs, focusing the Chips Act on the offering (grow the manufacturing ecosystem capacity) wouldn't have had the same effect.

The 2022 sudden AI rise market dynamics changed dramatically the landscape. It must change the Chip Act 2.0 focus.

As said above, back in 2022, the Chips Act 1.0 was not specifically targeting the advanced microchips. In fact the surveys showed that most respondent did not see any demand for advanced node microchips ($\leq 7\text{nm}$).

It's probably hard to anticipate a wave like the AI wave, but it is also highly likely that none of the respondents were in the Datacenter business as even in 2022, most of the chips used in that market were already using or targeting the advanced node chips, at least using nodes $<17\text{nm}$.

The generative Large Language AI Models advent and the chock produced by OpenAI ChatGPT, the consequent in-interrupted rise of AI since, have increased the race towards the more Advanced Node chips, bringing this segment to ~22% (growing) of the foundry's businesses in 2025, while the mature nodes (the 28nm suite spot), where most of the market capacities lies, represent ~25% (~45% if combined with up to 65nm).

In brief, at the same time as TSMC is shifting away from mature nodes towards the most advanced nodes, the European ecosystem has (over?)capacities in the mature node market, but has almost no ecosystem for the Advanced Node Chips that are required for AI.

If we set apart the backend ecosystem on which most Advanced node chips designers (Nvidia, AMD, Broadcom, etc...) are relying on, i.e. TSMC, Samsung, SMIC, Global Foundries, etc... the main difference between the mature ecosystem and the advanced node ecosystem is the design houses and the IP they generate. We have the design houses and the final customers in EU for Mature Nodes, but we only have a few design houses (Eviden being one of them), not the critical mass for Advanced Nodes, while a significant market exists and fulfilled mostly by US companies.

As interim conclusions,

- we could say that while there is demand (est. ~35B€ in 2025) for advanced chips in EU, especially for AI, we don't have yet the design houses that could fulfill this demand from European companies.
- Creating or increasing the backend OFFER for advanced node will likely not help IF there is no EU company capable of competing with US or Chinese Advanced Chips/AI accelerators as an example.
- Recent history shows that it's difficult for TSMC or Intel to justify a 50+B\$ investment in more capacity in Europe if there's no local customers for it.

Hence, a Chip Act 2.0 strategy that would focus only on creating more Advanced node back end offering is likely to again reinforce existing back end providers, including foreign ones through joint ventures, while not answering the main problem: who's creating the advanced node chips final products in Europe?

The following paragraph provides options to address this challenge.

2026-2030: addressing the AI challenges and EU sovereignty.

As expressed in previous paragraphs, the market landscape has dramatically changed in the last years, from a microchips market in which EU was globally quite well established, on the biggest segment in volume and revenue (mature nodes), with local customers e.g. the car industry driving the specifications, and a complete ecosystem responding to them, and even exporting outside EU.

The advent of AI is not only hurting our capabilities to fulfil the DC space (we lack most of them) but is also likely to hurt the European mature node ecosystem because the Car industry is about/already changing its paradigm from the platform based cars, to the Software Defined Cars, in which the focus is set on EV, autonomous driving, and user experience, with AI everywhere, requiring Advanced node chips, like in DC systems, drastically if not totally removing mature nodes requirements in cars.

In this situation, not only Europe is lacking many capabilities for Data Center AI, but all the mature node ecosystem will tomorrow lack advanced node design capabilities, hard and soft IPs, back end and advanced packaging, i.e. previous investments made through Chip Act 1.0, increasing the offering for mature nodes will shortly be obsoleted.

As an example of this forced mutation, for SW defined cars, some German car makers have been condemned to buy the HW and SW platform from US makers, such as Qualcomm, removing part of the market of EU mature nodes firms.

What should we do from now?

1. **Increase the demand for EU-born technologies, especially when public money is at stake.** As demonstrated previously, the demand for Advanced Node chips is already high in Europe, and is going to continue growing at a faster pace than any other segment due to AI requirements, and is almost totally fulfilled by US or far East companies.

While it is impossible to replace for the moment companies like Nvidia in this market, EU should put in place a legislation that promotes, incentivize or enforce the use of EU born technologies (by companies headquartered in EU) for each and every € invested with public money.

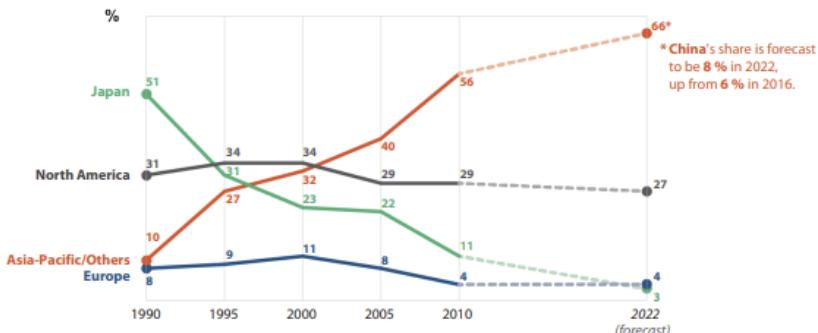
When public money is used in Public-Private Partnerships, the investment made into EU-born technologies should correspond at least prorate to the public money invested into the PPP.

The intent here is to incent startups and existing companies in this space to invest in cutting edge technologies knowing there will be a ROI, and helping them grow to a critical mass.

2. Increase dramatically the investment made in the ecosystem and focus on high TRL and Fabless products.

As stated earlier, EU is lagging behind US, China and other Asian countries.

Figure 4 | Shifts in share of capital expenditure related to semiconductors by company headquarters location in 1990-2022



Source: Commission, SWD (2022) 147, p. 74 based on Techinsights (IC Insights) data.

In 2022, US was forecasted to spend almost 7X EU Capex in semiconductors, ASIA/China 16X EU Capex expenditure, and has probably increased since.

While the level of investments needed for advanced node chips is increasing exponentially, the EU, the member states and the ecosystem of companies in that space will need to choose where the investment capacities need to go first and where they have the better leverage for the future.

Our thinking, a first argument, is that the best leverage for the future is to invest in Intellectual Property differentiation with high TRL, mainly because higher IP differentiation = better margin = better research loop = more wealth creation and sovereignty for EU.

The second argument is that enabling the creation of Advanced node chips for AI or related workloads, will trigger the transformation from mature node to advanced node of the existing European companies. Growing IP is the never ending story of this industry.

Chips Act 2.0 could notably turn Europe's hardware IP fragmentation into an unmatched advantage, by fostering the development, piloting industrialization of a standardized, adaptative chiplet platform and marketplaces. This can be achieved by gathering the EU world-class RTOs (CEA, IMEC, Fraunhofer) with innovative chips startups and an industrialization arm such as Eviden, around a collaborative multi-year research, development and industrialization project.

In summary, Chips Act 2.0 should incentivize massively the creation of high TRL products, mainly targeted at fabless design houses & startups, because it has the potential to leverage/or trigger the rapid transition of the existing (mature node) ecosystem.

In comparison, the investment needed to create an advanced node fab in Europe, with not enough local market to be sustainable will not have the same impact on all the European Chips Ecosystem.

Concerning the size of the investment needed to enter this market and to stay in it, the Nvidia example is self-explanatory:

130.5B\$ of revenue in 2025 (FY closing in June 25), 75% gross margin, an operating net income of 62% (81.4B\$), 42B\$ of available cash, and finally, Nvidia invested 13B\$ (10%) in R&D.

A single company (yet the market leader) has invested 13B\$ alone in high TRL products, in one year.

With Chips Act 2.0, the EU commission should set the ambition to the level that meets the unprecedented challenge that the AI revolution poses to the world, to Europe and its 450M citizens economy, finally our potential downgrading in the worldwide economy.

EU should take a more active stake of a larger investment, directed towards EU born/headquartered companies or organizations with high TRL – in line with the Draghi report recommendations – which would translate into a direct contribution of 40B€ to 50B€ of new money provided through the Chip Act 2.0, for the period 2026-2029, representing 30% of fundings leveraged (plus 30% from member states and 40% from private investments) representing potentially 130 to 160B€ investment in 3 years.

Funding should be available to projects supported by European companies. Eligibility criteria could be inspired by the rules enforced in the framework of instruments such as the European Defence Fund (EDF) and the European Defence Industry Programme (EDIP).

In summary:

- Public money should be invested first in technologies that have direct impacts on citizen wealth, employment, security and living standards, in extenso, EU or member state money shall be used to grow the EU based Chips ecosystem, prorate to public money share when investing for instance in advanced AI systems (e.g. AI & Giga factories).

Act for a “Buy European” change of directions, in line with the Draghi report recommendations.

- Because the Advanced Node challenge, triggered by AI is exponentially increasing the investment required to keep up in this race, the EU should lead and increase its own investment, through the Chips Act 2.0, to a minimum of 50B€.
- Last, it is highly envisioned that the European startup/ScaleUp ecosystem, who currently has difficulties to raise funding through the private VC channels, will be able to leverage largely a “Buy European” initiative in which public money is serving EU-born products.

This would be an extremely important booster over the current situation in which a CY2025 +20B\$ market for GPUs in Europe, is partly paid by EU/Member state public money, going directly to US GPU or cloud market leaders.

Summary

1. Eviden, as an integrator of advanced super computers for AI and High Performance Computing, but also as an Advanced Node design house (notably for BXI network interconnect), is willing to act as a strong actor in this ecosystem, in France, in Europe, with Germany as a close partner, for our common sovereignty.
2. With the AI industrial revolution, the EU and the commission, have a strong drive and responsibility in enabling the conditions for European companies and member states, not only to keep up the extremely fast market dynamics coming from USA and far Asia, but to leapfrog it, by aggregating the fantastic European research and growing startup/companies ecosystems onto a common goal.
3. Because there is no company who can afford developing a product without a market, and because the advanced node spendings in Europe are going to products and services in USA and Asia, the main focus of the Chips Act 2.0 should shift from increasing the manufacturing offering ecosystem to enabling first the fabless high TRL or final products companies & startups doing Advanced Node designs. If they have access to a market in Europe for their products, they will in turn drag behind them the rise of a local Advanced node ecosystem (potentially raised from the Mature Node existing ecosystem). In other words, a local market demand, fulfilled by local fabless design houses will enable the underlying ecosystem, from manufacturing to raw materials and equipment suppliers. Not the reverse.
4. Finally, the EU commission, for the Chips Act 2.0, should put in place a legal framework that enables the direct and mandatory use of public money on EU born technologies when available, a “EU Technology first” regulation, enabling the demand for Advanced Node Chips for European Companies. Moreover, a direct and larger (50B€) investment of new money coming from EU, representing 30% of the total leveraged investment, is needed to stay as much as possible on par with the new AI industrial revolution, to face the potential downgrading of Europe.