This paper describes policies to grow the UK semiconductor industry in support of the Industrial Strategy.
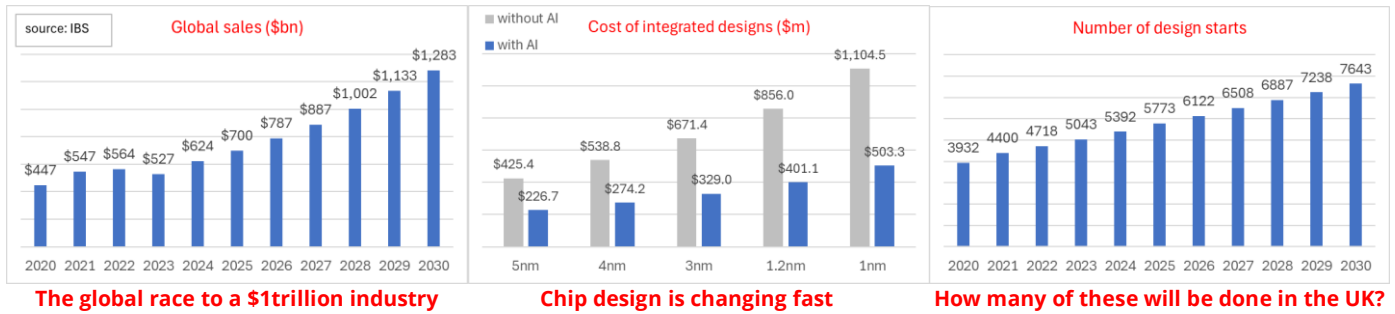
Si SILICON CATALYST

UK Semiconductor Policy Paper

Is the growth in the worldwide semiconductor industry leaving the UK behind?

The global race to a $1trillion industry — **Chip design is changing fast** — **How many of these will be done in the UK?**

Executive Summary

The semiconductor industry is central to delivering key Government objectives: a resilient economy and the drive to Net Zero through decarbonisation, clean energy and efficient data networks. The UK has been at the heart of the global semiconductor industry for decades. It is now in danger of being left behind in the race for growth and the creation of next generation global unicorns. With the greatest value created in the design part of the value chain, our chip design community is experiencing systemic challenges that threaten its existence.

We recommend 3 policy interventions to reinvigorate the UK semiconductor industry and deliver growth:
1. A National Semiconductor Institute acting as a single point of contact between government, industry and academia
2. Scale growth with a swift private-sector competition for three new £100m funds and one new £1bn blitz scale fund
3. Develop the world's best semiconductor talent within the UK by eliminating systemic barriers

Problem statement

The semiconductor industry is the third most profitable industry in the world, with global sales forecast to reach £1tn by 2030. With the world's third largest semiconductor research base outside of the US, the UK has been at the forefront of this industry for over 40 years, creating 16 "unicorns" (valued at over $1bn each), including Arm. The Perspective Economics report[1] identified that 85% of the revenue generated by UK-headquartered semiconductor companies comes from chip design activities; these companies attract 66% of the employment.

The latest UK chip unicorn (Raspberry Pi) reflects startup success from a decade earlier. Systemic challenges now make it far harder for UK startups to gain any form of momentum, let alone reach unicorn status. The UK risks falling irretrievably behind without coordinated action. Following widespread consultations, Silicon Catalyst UK has identified the following challenges facing the industry:

1. Global competition is increasing, with regions such as the US, EU and Asia taking coordinated action to support their semiconductor ecosystems. These regions have a single point of contact between government, academia and industry to provide informed insight to government and streamline industry support.
2. The funding required for design startups to reach unicorn status is increasing, as are the rewards. This trend favours ecosystems with sophisticated, mature, patient and semiconductor literate venture capital funds, such as the US, significantly outcompeting the UK's underdeveloped community.
3. High growth potential companies require access to talent – to innovate, and to grow as the market grows. The UK's ageing demographic is stifling economic growth, while increasing competition for global talent exacerbates the problem. This is very apparent in the UK's semiconductor industry.

Although the UK remains the tech start-up capital of Europe, the above points explain why we are failing to turn semiconductor design startups into scale-ups, and not realising their full growth potential.

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[1] Semiconductor sector study - GOV.UK (www.gov.uk)

<u>Single point of contact.</u> The US Semiconductor Industry Association (SIA) coordinates activities between government, industry and academia as part of the CHIPS and Science Act. Similar focal points exist around European centres at IMEC (Belgium), CEA Leti (France) and Fraunhofer (Germany). These organisations navigate the complex semiconductor landscape, attracting investment and helping governments to deliver their national strategies. The UK needs a similar organisation to coordinate domestic semiconductor activities in support of AI, quantum and telecoms, as well as representing the UK semiconductor industry at an international level.

<u>Funding challenges.</u> The semiconductor industry was created by venture capital (VC) funded startups, and it will continue to be disrupted by startups. Although the UK enjoys the world's second largest VC base, the high risk "deep tech" semiconductor sector is poorly served, as we mobilise too little capital, too slowly. The cost of designing a leading-edge chip, such as the ones designed by Nvidia (the world's most valuable company), is several hundred £million, yet this is where most of the revenue is made. The UK has created 16 semiconductor unicorns to date. As the semiconductor industry identifies what comes next, the UK needs to create the next generation of semiconductor unicorns. This will require VCs that have the fund size, investment strategy, risk appetite informed with detailed sector knowledge to invest and provide operational support from series A to D. As these VCs do not currently exist in the UK or Europe, successful early stage startups seek funding from the US, which leads to a partial loss of UK business, or entire companies relocating to the US.

<u>Talent shortage.</u> Most of the UK's designers are entering the last decade of their careers, as there has been a sustained decline in new semiconductor engineers graduating into UK industry since the 1990s. Most companies now compete for the world's best talent, but UK companies are disadvantaged by bureaucracy that does not exist elsewhere.

Recommendations
1. **Create a National Semiconductor Institute**
- Focused on growing the UK ecosystem by attracting international partners, investment and talent
- Facilitating UK access to international chip foundries, both silicon and compound semiconductors
- With a world-class design competency centre to lead the world in AI-driven design
- Developing standards and emergent semiconductor manufacturing for next generation packaged chips

2. **Transform the funding ecosystem**
- Launch swift private-sector competition for three new £100m funds and one new £1bn blitz scale fund
- Incentivise corporates to invest VC funds in deep tech
- Extend the successful ChipStart UK programme with a ChipScale UK programme to scale-up SMEs
- Reform grant funding systems to serve the needs of semiconductor startups

3. **Launch a skills initiative**
- Eliminate barriers to attract the world's brightest semiconductor talent to the UK
- Promote UK engineering as a high-value career, attracting a new generation of university staff and students to deliver the industrial strategy

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Industry fact
92% of UK semiconductor companies are SMEs. The National Semiconductor Institute will help them to navigate scale-up support, attract investment and attract overseas talent, enabling them to compete in rapidly growing international markets.

Recycling capital startup fact
Marvel was founded in 1995 by Dr Sehat Sutardja, his wife Weili Dai and his brother Pantas Sutardja. They raised $90m from their IPO in 2000. The company currently has over 6,500 employees and $5.5bn in revenue. When the founders exited, they had accumulated $700m of equity, reinvesting in: Silicon Box, Alphawave, Blue Cheetah, Danger Devices, Dream Big Semiconductor, Dyno Sense, Credo Technology and others.

Clean energy fact
50% of the world's electricity is consumed by electric motors. New compound semiconductors (where the UK has a comparative advantage) will make these motors much more efficient. Similarly, using less energy for cloud and edge-based computing (where the UK has a track record of world-leading chip design) will result in 10 times compute power at 1/10th the energy, driving up productivity while delivering our clean energy targets.

Contact Silicon Catalyst UK for detailed briefing material to support these recommendations.