CASE STUDY

imec

Bridging the ‘missing middle’ in Australia’s future semiconductor sector

Image courtesy of imec

A model of strong partnerships, shared infrastructure and pooled resources could take technologies from lab to market faster in Australia’s semiconductor sector.

Scientists across the country are developing new semiconductor materials, innovative technologies and early prototypes that underpin the technologies of tomorrow.

However, the pathway from prototype to commercial product is far from straightforward. Australia’s semiconductor sector has a ‘missing middle’ – a gap between when technology is first developed and when it is ready to be scaled up for commercial manufacturing.

One international model Australia can learn from is imec, a world-leading research and development centre for advanced semiconductor technologies, headquartered in Belgium.

Imec brings industry partners, academia and government organisations together around shared challenges, state-of-the-art infrastructure and precompetitive research. Imec was established to help de-risk technologies before they move towards commercial development and manufacturing.

At the heart of imec’s success is its Industrial Affiliation Program (IIAP), which allows semiconductor companies to work together on technologies that are too complex, expensive, or nascent to develop efficiently on their own. This model allows the financial burden and risk to be spread across multiple partners, rather than a single company.

Through the IIAP, multiple companies across the supply chain can pool resources to collaborate on fundamental problems they need to solve, and then share the results with all partner companies in the program. This collaborative network avoids IP blocking and helps translate technology from the lab to the market much faster.

Dr Romano Hoofman, Strategic Development Director at imec said that the IIAP allows "the customers and the suppliers to work together and steer each other to accelerate breakthroughs and innovation."

Industry partners also contribute advanced equipment to imec's facilities, giving imec access to technologies that would otherwise be prohibitively expensive, while allowing equipment suppliers to work alongside their major customers in shared research programs. Next to the IIAP programs, industrial partners also work together with imec in bilateral projects on activities that cannot be shared with others.

Imec is also home to the NanoIC pilot line, one of 5 pilot lines established under the European Chips Act. Building on imec's existing pilot line capabilities, NanoIC enables companies and researchers to develop and test beyond-2nm system-on-chip technologies before they move towards large-scale production. These technologies underpin advances across AI, communications, quantum computing, energy and much more.

"With pilot lines, it's not the intention to do high-volume production, but for companies to test out ideas and then later on, if it's successful, go directly to a foundry," Dr Romano Hoofman explained.

Imec also coordinates the EU Chips Design Platform, an initiative that helps lower barriers for small companies to access European chip design capabilities, such as fabrication, packaging and testing.

Imec said the platform aims to reduce costs and save time.

"Typically, when you start as a small company, you need access to IP and electronic design automation tools, which can be quite expensive. What we try to do through the EU Chips Design Platform is to negotiate good pricing for the startups," Dr Romano Hoofman explained.

The platform also provides access to pre-installed cloud software, training, business coaching, and financial assistance, with plans to eventually create a 'one-stop-shop.'

The impact of imec's model extends well beyond its research facilities. For every euro invested, imec generates 11 euros in added value and 4 euros in fiscal return. Its ecosystem has also supported more than 300 start-ups, 120 spin-offs and over 13,400 jobs, showing the broader economic value of sustained investment in semiconductor capability.

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