

India to Build Chip Manufacturing Ecosystem, Talent Pool

India is known for its semiconductor design expertise, which has been successfully nurtured since the 1980s. However, manufacturing capability and capacity has been limited despite having built a fab as far back as 1983 in the form of Semiconductor Complex Limited (SCL), established by M.J. Zarabi, considered one of the pioneers of the current chip industry in India.

The geopolitics of recent years have changed that inertia in developing the manufacturing ecosystem, and now there are several active efforts to build that capacity and resilience in the electronics and system design, and manufacturing value chain in India. Over the last year, the government has been busily courting local and global players to catalyze this local capability.

As a result, Micron Technology announced big investments in India last year for a chip assembly and test plant in India—along with state and government support, it is reported this could amount to a total investment of \$2.75 billion. Earlier this year, the Indian government approved the establishment of three semiconductor units under the [Development of Semiconductors and Display Manufacturing Ecosystems in India](#) plan: a fab Tata Electronics in the state of Gujarat in partnership with Taiwan's PSMC; another Tata outsourced semiconductor assembly and test (OSAT) facility in the state of Assam in north east India; and an assembly, test and packaging facility by CG Power in partnership with Renesas Electronics Corporation.

As the country went to the polls for its general election, EE Times took the opportunity to talk to executives across the whole value chain from design to manufacturing to understand both the ambition, as well as the reality and path to building out the manufacturing ecosystem in India.

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What was clear from our conversations was that while India excels in creating the chip designs for the rest of the world, there is little that is created as IP for products designed in India specifically for the Indian market. Many talked about the ambition to do that. Some felt there was not a mindset in India to build a fabless company that could scale on the back of creating chip designs manufactured in India for global markets.

Many companies still provide outsourced design services and are succeeding well at that—all while still have massive growth plans (one company told me it had agreements for some \$1.3 billion worth of orders for designing chips for leading global customers). Another company, SmartSoC Solutions, told me they had grown “silently” since being established in 2016 to develop a customer base of over 45 companies, including key players like AMD, Google and Samsung.

But there are some success stories for home-grown Indian consumer products manufacturers. BoAt Lifestyle is one such company, which has grown to become the world's number two (by volume) manufacturer of true wireless earbuds, and India's number one audio and wearables brand. The company's co-founder and CEO spoke to us about the challenges of producing consumer electronics products for the Indian market, from the end-user requirements and sourcing chips, to their path to doing more of the manufacturing in India.

When it comes to manufacturing, while various fabs and OSATs were being commissioned, the biggest gap in the industry is talent to staff those facilities. This is why Kaynes Semicon has partnered with training and recruitment experts to develop centers of excellence and bring apprentices out of universities into finishing schools.

To get a snapshot of the entire value chain, from design and manufacturing (plus the training and skills needs), we recorded a series of video interviews with some key players in the Indian market, which you can watch below.

Sameer Mehta: Developing and Growing an Audio and Wearables Brand

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In this interview, boAt Lifestyle co-founder and CEO Sameer Mehta talks about his company's journey since starting in 2016.

“We wanted to make products suited to the Indian audience and aesthetically better than what was available, and more aspirational,” Mehta said. He highlights some of the challenges at the beginning: for example, getting first-party support from chip manufacturers, which meant having to work with ODM partners in China. In 2020, the company started its own R&D lab.

“It was a tough journey, but now we have scale, the chip manufacturers now support us. We were initially making 100% in China. The ecosystems didn’t exist in India. But in the last 2-3 years, government incentives have helped,” he added.

Mehta said the company now manufactures 70% of its devices in India now. He talks about enabling product differentiation using custom software over a low-cost chip, allowing them to give the same experience as any other brand in the world.

Raghu Panicker, Kaynes Semicon: An OSAT Targeting HPC and Beyond

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In this interview, Raghu Panicker, CEO of Kaynes Semicon, gives us some background to the origins of the current semiconductor industry in India from the 1980s by two key figures: M.J Zarabi and Wally Rhines. He says that initial investments in manufacturing back in 1983 were not followed up by support from the government, which is where the design expertise started to grow—ultimately developing IP for the rest of the world (but not for India). He explains Kaynes’ role in providing manufacturing and packing for the semiconductor industry.

He talks about Kaynes’ investment in the next wave of growth—HPC, for data centers in India, and becoming an AI enabled OSAT.

He also talks about the contract that Kaynes has just won from the government-owned Centre for Development of Advanced Computing (CDAC) to supply 3,000 RUDRA high-performance computing (HPC) servers. These were designed by CDAC and manufactured by Kaynes, to be used for building the PARAM RUDRA supercomputing systems under the country’s national supercomputing mission.

Hitesh Garg, NXP Semiconductors: The Indian Design and Startup Ecosystem

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Hitesh Garg, India country manager for NXP Semiconductors, talks about key markets for NXP globally and in India, particularly automotive and industrial. He explains some of the dynamics of the design ecosystem in India, as well as NXP's role in providing inputs into Indian government policy on the Indian semiconductor industry—particularly on system design for the Indian market. He also highlights their work with the Indian startup ecosystem.

Satya Gupta: Changing the Way Electronics and VLSI Design is Taught

In this interview, we talk to Satya Gupta, a veteran of the Indian electronics industry in India. He has several influential roles in the industry and in policymaking, but here we

chat about his role as president of the VLSI Society of India. We also touch on the way electronics is taught, and how it needs to change to meet the talent needs of a growing system design and manufacturing industry.

Bhanupriya Krishna: Developing the Skills Base for Semiconductor Manufacturing

In this interview, Bhanupriya Krishna, founder and managing director of Perceptives Solutions, talks about the lack of talent for addressing the semiconductor manufacturing industry in India. She touches on how their work with universities and industry, including partnership with Kaynes Semicon, will provide hands-on training of apprentices and establishing centers of excellence to get students and apprentices industry ready.

Rohin Y: Developing Optoelectronic Processors for Data centers and Near-Edge Compute

In this interview, Rohin Y, founder and CEO of Lightspeed Photonics, talks about building a company that aims to solve the bottlenecks of interconnects between processors with photonics using heterogeneous integration.

Pradeep Vajram: The Semiconductor Investor Perspective

In this interview, serial entrepreneur and investor Pradeep Vajram challenges the current thinking in India to develop chips and IP for India only, highlighting that scale is key for investors in Indian semiconductor startups, which means these startups need to be developing products for both India and global markets, not just India alone.

