Funds, local mkt key to reducing China dependence in electronics

India Has Excellent Tech Capabilities, but That isn't Enough

Sujit John & Shilpa Phadnis | TNN

India imports most of its electronic products. It's one of the country's biggest import bills. Much of those imports are from China. Semiconductor chips are at the heart of electronics products, and of everything around us – smartphones, PCs, cars, watches, drones, medical devices, and modern defence equipment. Senator Ben Sasse of the US Senate's intelligence committee last year said that modern wars are fought with semiconductors. And India is almost totally dependent on China and Taiwan for chips.

The country has fantastic semiconductor design talent, but much of that talent is in the India engineering and R&D centres of global semiconductor giants like Intel, Samsung, and Qualcomm. Considering the tensions with China, building an indigenous semiconductor and electronics industry appears urgent.

That urgency is visible across government, industry and academia, says Satya Gupta, chairman of the India Electronics & Semiconductor Association (IESA). The production-linked incentive (PLI) scheme announced last year for electronics manufacturing was an indication of that.

Gupta says some 300-400 meaningful startups are now working on building electronics products.

Vinay Kumar's PathShodh Healthcare is one of those, and it won IESA's annual startup award last month in the healthcare category. Kumar, an Indian Institute of Science (IISc), Bangalore, alumnus, has developed what he calls a "lab in a palm." The small device can measure eight different parameters, including diabetes markers like HbA1c, and markers for early detection of kidney failure. "Normally, to test all this, it will require five big machines that collectively cost Rs 1.5 to 2 crore," he says. Hundreds of his devices are being used to diagnose people in remote areas.

Cardiologist Dr Srikanth Sola's Devic Earth is another success story. The venture won IESA's startup award in the environment category last month. Dr Sola, who was practicing in the US, moved to India in 2008, and immediately noticed how pollution was causing cardiac issues among many. He used his knowledge of biomedical engineering to develop technology that controls pollution across large areas, unlike traditional air purifiers that can cover only small spaces. It's now being used in offices and factories.

Gupta, who runs a company called Seedeyas Innovations, is also working on technology that can be installed on top of moving vehicles and which can absorb pollution particles.

Electronics products like these take about five years to develop. Kumar and Dr Sola developed them with grants from various organisations, including governmental ones. Developing semiconductor technology, however, is far more expensive – many millions of dollars – and may take 10-12 years. "You need investors who are really patient. And India just doesn't have that kind of money today," says Parag Naik, co-founder of semiconductor company Saankhya Labs, which has developed a tracking system for the Indian Railways.

G S Madhusudan, co-founder of InCore Semiconductors, which builds processors that are used in a variety of areas, attributes the lack of venture capital interest to the absence of a serious ecosystem development plan by the government.

In the countries that have developed successful semiconductor ecosystems, governments have played big roles in providing finance and have also often helped create local markets.

Madhusudan says a local market for semiconductors has emerged, given the growing manufacture of electronic products in India. But he says the government can do a lot more, such as by mandating that all low-energy fans, ACs, refrigerators should use local chips.

HIGH SENSE OF URGENCY IN INDUSTRY, GOVT, ACADEMIA

"There's a high sense of urgency now in the different parts of the ecosystem – industry, government, academia – to create indigenous electronics & semiconductor products. A major policy focused on fabless product companies is expected soon. Such companies require a lot of funding, infrastructure

Satya Gupta | CHAIRMAN, INDIA ELECTRONICS & SEMICONDUCTOR ASSOCIATION

"We do hard things, we do semiconductor, we do telecom infrastructure, which is even harder. It's an extremely long gestation period, 10-12 years. You need investors who are really patient. India now has a critical mass of companies, people who understand how to build such products. What is lacking is finance

Parag Naik | CO-FOUNDER, SAANKHYA LABS

"I need orders. A local market for electronics has emerged, like controllers in washing machines, in inverter-based fans. But the government should mandate that all low-energy fans, ACs, refrigerators should use local chips. It's the government's job to help the local industry

G S Madhusudan | CO-FOUNDER, INCORE SEMICONDUCTORS

"I'm optimistic about the whole ecosystem. About a decade ago, when I was in college, every technical entrance exam had the question, what is the full form of VLSI (very large-scale integration) and LSI. Now, these are common things that youngsters talk about every day

Vinay Kumar | CO-FOUNDER, PATHSHODH HEALTHCARE

"When I came back from the US, I could see the impact of pollution on public health. Given my knowledge of biomedical engineering, we hit upon the idea of pulsed radio wave technology – which is how MRI scanners work – to coalesce and contain air particles. It took five years to develop a commercial product

Dr Srikanth Sola | CARDIOLOGIST & FOUNDER, DEVIC EARTH

How to build your semicon skills

Naik says if you are reasonably good in math and physics, the rest of the stuff will fall in place if you have the right attitude. "Also, getting your hands dirty is as important as clearing your examinations. I have been a big advocate of vocational training, the German model. A lot of vocational guys are good at semicon. In India, students and employees are more worried about the look and feel of the office, what kind of tea is served. We need to get over that," he says.

Madhusudan agrees that what's essential is solid basics, and most of our engineers don't have that. "If you are a semiconductor person, your basic analog background, design and digital backgrounds must be solid. You must focus on lab work. The semicon field is hardcore engineering. It's not like running an app. If you get a chip wrong, it's $20-30 million down the drain," he says.

Gupta says all the foundational resources needed are available on the internet. "But when I go and interact with students, I find they are not leveraging these resources, many don't have the drive to do it," he says.

Madhusudan says the fundamental characteristic of an engineer must be curiosity. "I don't need high IQ people. I need people who are curious," he says. The problem is, even colleges make it difficult. "There are colleges that close their labs at 4pm because the buses have to leave. If the kid wants to play around with an oscilloscope, how on earth are you going to turn an engineer out. And things like RF (radio frequency) are very tough," he says.

Naik says the middle class should also not obsess about stability, that you have to work for an Infosys or MNC brand. "If you get that out of your way, you'll have a great career," he says.