

India in the Semicon Party - All that and a bag of chips! Not yet.

We have a lot to catch up on – being late to this party. But the good news is we have less air in our packs. And we are not small potatoes anymore.

By Pratima H



The thing about a potato, a Postman, or a taxi driver is that they are invisible, not because of being absent but because they are omnipresent and obvious. They are everywhere. And that's exactly why it is hard to distinguish one when the big question pops. Many recipes are made or ruined by potatoes' sheer presence or absence. Many detective stories show the sleuth

explaining in the climax why no one was able to see the real culprit- disguised as an everyday driver.

Invisibility by ubiquity has a lot of power. But it is not a cloak that is earned easily. One has to try hard to be indispensable. More so, when it is about being the potato stuffing inside a smartphone, a new-age car and of course, a computing device. It cannot be too

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- **Anushree Verma**
Director Analyst, Gartner

soft or too hard. It has to be 'just right'. And in the right shape.

Because someone might like them thinly sliced. And someone else might prefer them as fries with their burger. There is so much appetite now. And so many possibilities.

FRENCH FRIES ARE BELGIAN- AND FRIED TWICE

For a country that has been the soul of every technology buffet all over the world, India took a while to realise that there is more to this party than being the software salt. It can not only aim for but also gain from, cracking the potato game. But the good news is that we know well the game of invisible fuel – scalability with talent and cost advantages sprinkled 'just right'.

India has been a late entrant in the semiconductor manufacturing market, which is dominated by Taiwan, followed by countries such as South Korea, China, the USA and Japan, as Devroop Dhar, Founder, Primus Partners confronts at the very onset. "While India had started its journey to becoming a semiconductor powerhouse in the 80s with the State-owned enterprise SCL starting production in 1984 in Mohali, however a massive fire in 1989 brought production to a grinding halt."

With scattered and dampened attempts not exactly encouraging us here, we chose to go after the outsourcing and Cloud Gravy train instead. And it worked. Tremendously. Beautifully. Creating a billion-dollar industry with mega deals and marquee clients from all over the world. It is only in the last

few years that we 'properly' realized the value of the winning 'steak'. It was hard to outpace countries and well-established supply chains that had become semicon powerhouses of the world. But we begin trying. And with the right peelers and pots.

While India lost out in the initial race, however, the Government has now brought in an attractive PLI scheme to attract investment in this space, Dhar explains. "This has resulted in the announcement of the setting of semiconductor manufacturing plants in Gujarat, Assam and Kolkata, with ground-breaking ceremonies done for some of them. While the initial progress has been concentrated on backend areas such as assembly, test, and packaging, a front-end fab manufacturing setup has also been established. It is expected that India will slowly further move up the value chain as few more companies are looking at investing in this space in India."

Anushree Verma, Director Analyst at Gartner affirms that traction. "India is taking steps but is very early on to compete on an international front. We have started seeing initial projects being commissioned, but the yield will take a few years to start giving revenue. Initially, it is not going to be the leading-edge nodes and the focus is more on mature semiconductor technology, compound semiconductors and display fabs etc. I believe it will take at least 8-10 years to be compared on an international front."

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The overall semiconductor industry is dominated by Taiwan, South Korea, China, USA and Japan. While countries such as Taiwan, South Korea and China lead in the space of fab manufacturing and backend areas like Assembly, Testing and Packaging, USA has a lead in research and design.

- **Devroop Dhar**, Primus Partners

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billion last year, reckons Dhar. “By 2030, about 10 per cent of the global semiconductor consumption is expected to be in India. Electronics production is expected to increase nearly five times to about \$500 billion, highlighting the strong need for semiconductor. With such a huge consumption requirement, India must focus even more on this sector towards becoming self-reliant.”

The industry is at a nascent stage in India with the first set of large-scale production expected to commence in a couple of years, avers Dhar. “India will continue to see large-scale investment in this space, as well as collaboration between Indian firms and global leaders in the semiconductor space. Companies would also be looking at diversification of their supply chain beyond China, which would once again be a good opportunity for India to expand its footprint. India also has an advantage of a large pool of chip designers, with an estimated 20 per cent of the total chip designers globally being in India.”

SOME HOTTEST JACKET POTATOES

India has tried well to catch up against early movers and top guns in this market. And it has tried doing it with some real skin in the game now.

What has worked very well in India is the strategic and surgical use of initiatives like Production Linked Incentive (PLI) and Design Linked Incentive (DLI) models. There is also a focus on critical minerals needed for the semiconductor industry – like the Critical Mineral Mission to boost domestic production and overseas acquisition. Plus, support factors like customs duty exemptions and mining auctions for critical minerals.

This has transpired into many landmark projects; like the project with Micron was approved at nearly ₹22,000 crore. Earlier this year, three major semiconductor projects totalling investments of ₹1.26 lakh crore were given the green nod. One was the Powerchip Semiconductor Manufacturing Corp. (PSMC), Tata Electronics’ chip fabrication

facility in Dholera, Gujarat – to harness advanced 28nm technology and pursuing high-performance computing chips. Another one was Renesas Electronics, partnering with CG Power in Sanand, Gujarat, with a ₹7,600 crore investment.

Recently, the India Electronics and Semiconductors Association (IESA) celebrated a new office where a quick recap of the progress covered was done. Dr V Veerappan, Chairman, IESA, here captured some recent momentum in the ESDM sector, and cited approval of PLI schemes for members like Tata, Micron, Renesas, and Kaynes, along with state governments’ consent for Tower (Israel Semiconductor company)-Adani Group (Maharashtra), Foxconn (Karnataka), RRP Electronics (Maharashtra), ASIP (Telangana) RIR Power (Odisha), Suchi Semicon (Gujarat), and others.

Close somewhere was an example like Lam Research Corp. beginning a new systems lab in Bengaluru where Sesha Varadarajan, senior vice president at Lam’s Global Products Group had highlighted that as chipmaking becomes ever-more complex, there is a growing need for greater collaboration and global engagement of expertise, intellectual property and materials.

At a recent industry event, the Honourable PM quipped well- “In 21st-century India, the chips are never down.” With the government’s 50 per cent financial support for setting up semiconductor manufacturing facilities and other such fast lanes, India has attracted investments worth more than ₹1.5 trillion already- with many more projects in the pipeline. Incidentally, we were one of the largest importers of mobile phones a decade ago while today, we stand as the world’s second-largest producer and exporter of mobile phones. In fact, as PM Modi sketched clearly at the event- India’s electronics sector is now valued at over \$150 billion, and there is a larger goal to grow the country’s electronics sector to \$500 billion and create 6 million jobs by the end of this decade.

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Notably, in efforts to solidify India's position in the global semiconductor value chain, SEMI, the global industry association that connects the semiconductor and electronics design and manufacturing value chain, also announced a strategic agreement with the India Electronics and Semiconductor Association (IESA). The idea is that the associations will enhance domestic manufacturing in line with India's 'Make in India' initiative, support workforce development, improve global competitiveness, and foster greater technological self-reliance.

THAT ONE-CHIP DARE

Fabs are still that golden apple that lies on a high-hanging branch. If we can grab that, then a lot would fall in place.

Fabs are a strategic necessity for the long-term growth of a country and reduce dependence on imports, reasons Verma. “However, there are years of technical expertise that are required in the semiconductor industry along with the capital investment and specific infrastructure. So, it is not easy to cover the gaps- given we are yet on the foothills.”

Fab manufacturing and backend activities such as assembly, testing and packaging would remain an area of focus in the near term for India, echoes Dhar. “This would become our strong point in the near term, though the scale would be much lesser than countries such as Taiwan, China and South Korea.”

However, with the significant consumption market for chips in India, more and more companies would look at expanding their footprint in India in the near term. Dhar also observes how with the enactment of CHIPS and Science Act in the USA in 2022, a large amount of manufacturing is expected to move back to USA in the near future.

MASHED NOT MISH-MASH

Yes. It won't be that easy to scoop out deep-footed giants and Semicon manufacturers but looks like,

we are fighting with smart forks- and sustainable ones at that.

However, the concentration of the industry would be around fab manufacturing and the backend areas such as assembly, testing and packaging, Dhar stresses. “These comprise about 30 per cent of the overall value chain in the semiconductor industry, with nearly 70 per cent of the value-add happening in areas of research and design. Therefore, while India would leapfrog from the present scenario, however, it will be some time before it becomes a leader in this space.”

Verma adds that there are a lot of challenges to be tackled currently. “Apart from infrastructure, the core talent needs to be imported as well, as the know-how would exist with the existing foundries. The upstream and downstream partners need to exist in the vicinity. There are steps by the government in this regard, however developing a well-rounded ecosystem will take at least five-seven years- provided the momentum continues as in 2024.”

“While India has the second largest pool of chip designers globally, chip design would continue to be dominated by US firms, with certain outsourcing happening from India. It may be difficult to see Indian fabless firms coming up soon.” Dhar highlights.

Some ways like targeting specific industries such as Automotive or Smartphones, can be focused, which has a good end-market demand in India, Verma suggests. “Or India can also focus on sustainable ways of chip manufacturing and develop a unique case for the world to follow. We have established unique positioning in the Space or even some specific pockets in the IT industry.”

Being inside and invisible in the future recipes of technologies would not be a cake-walk. But the good news is we have got our kitchens up and running. It's not long before we master the 'meat and potatoes' of tomorrow's technology parties. Especially, the potatoes. ¹⁰

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India's Chip Dreams Take Shape

India's semiconductor industry is on the brink of transformation, poised to redefine its role in the global landscape. With a determined focus on bridging the technological divide with powerhouses like Taiwan and South Korea, India is embracing a pivotal moment in its journey toward semiconductor self-reliance.

By Aanchal Ghatak

