

Decoding the global semiconductor shortage conundrum

April 2021

By Neeraj Bansal, Partner and COO - India Global; National Leader - Supply Chain Re-alignment, KPMG in India

(6 min read)

History repeats itself! More than a decade ago, as the global economy was resurrecting itself from the clutches of the financial crisis and the Fukushima earthquake, the auto and technology sectors faced severe shortage of semiconductors and other high-tech components. The sector's manufacturing capacity contracted substantially with closure of older fabrication facilities (FABs) and slower than expected ramp-up of new ones, resulting in a record reduction of total wafer capacity and silicon allocation.

Fast forward to 2021, and we seem to find ourselves in a similar situation. As the pandemic moved from China to other parts of the world, the sector issue went from one of limited sales capacity for chip-dependent industries to one of halted demand. This supply chain shock came at the back of auto manufacturers underestimating the upsurge in demand amid the pandemic. Add to that, while the wafer foundries were fully booked, they couldn't scale up production quick enough, given the long lead times required to add wafer capacity.

So, what's causing the shortage?

While production seems to be back to pre-pandemic levels, the crisis point is characterised by a new surge in demand, driven by changing habits, emerging from the pandemic. Car manufacturers have gone full throttle, investing in tech-heavy electric vehicles. Add to this, the upsurge in sales of TVs, laptops, PCs, games consoles and 5G-enabled mobile phones, which have all added to the skyrocketing demand jamboree.

As expected, this shortage of chips has created ripple effects across the board, with several companies revisiting their plans and profits. If reports are to be believed, leading U.S.-based electronics manufacturers may face production issues due to an impact on production of Organic Light Emitting Diode (OLED) displays. In the auto world, a U.S.-based automaker giant has cancelled shifts at two car plants, taking more than a billion-dollar profit hit, this year. Far east, and perhaps the most telling stories seem to come from a company – one of the world's largest sellers and consumers of chips – that finds itself in a rather precarious situation of having to delay the launch of one of its own products. Indian industries too are reeling under this shock, with several automakers facing the heat.

India's tryst with semiconductors

The semiconductor consumption in India is growing at the rate of 15 per cent at the back of the country's burgeoning electronics manufacturing industry.¹ Electronics production, which stood at around USD70 billion in 2018-19², is expected to grow at the rate of 30 per cent annually until 2025.³ This projected growth further amplifies the domestic semiconductor market's potential, both from a sourcing and global manufacturing perspective.⁴ Although the semiconductor demand trajectory in India is no different from what is seen globally, its manufacturing footprint has long been negligible.

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

Of the two broad aspects of chip system domain – chip designing and chip manufacturing – India has developed expertise in the former. The country has world-class chip design talent in areas including microprocessors, memory subsystems and analog chip design. Over the past couple of decades, many foreign semiconductor companies have set up design and software development infrastructure in the country. Although the country has made some progress in creating a homegrown semiconductor design ecosystem, it still lacks fabrication facilities (FAB) that could manufacture chips locally.

While India has tried to setup fabrication units in the past, the initiatives failed to see the light of the day due to numerous roadblocks, including the huge set-up cost. To put things into perspective, setting up a display fabrication unit needs an initial investment of around USD2.5 billion, while setting up a semiconductor digital fab (wafer size of 300mm) requires an investment in the range of USD6-8 billion, depending on the technology nodes.⁵

Why let a crisis go waste?

The expected stabilisation in this sector over the course of the next few months, will likely focus on onshoring greater chipmaking capacity. Efforts could be underway with governments doling out grants and tax incentives to encourage global chipmakers to increase domestic capacity.

Closer home, the Atmanirbhar Bharat Abhiyan lays down the government's clear intent of revamping the manufacturing sector as part of the post COVID-19 narrative. The recently announced Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) and Production Linked Incentive (PLI) schemes are a shot in the arm to help improve manufacturing competitiveness. In December 2020, the government released an Expression of Interest for setting up/expansion of existing semiconductor wafer/device fab facilities locally or through overseas acquisition, to reduce import dependencies.

While these efforts are in the right direction, to expedite the process, the government can look at acquiring existing foundries, which could jumpstart semiconductor manufacturing and lay the foundation for subsequent fab facilities in the country. In addition, the government could explore the possibility of setting up compound semiconductor fabs. Though not widely used, compound semiconductors are less capital intensive and expected to witness a surge in demand with new emerging technologies.

As global companies are evaluating supply chain alternatives as part of their regionalisation and replication strategies, the time is right for the Government of India to work alongside the private sector in building the manufacturing sector. It will have to play a much larger role in spearheading the manufacturing journey through co-investment by setting up facilities that will go a long way in boosting investor confidence, both locally and globally. This collaboration model has been successful in countries like Taiwan and South Korea and the results are there for us to see!

¹ India's electronic exports can rise 16-fold to \$180 billion by 2025, Business Today, 31 August 2020

² Centre launches three new schemes to promote electronics manufacturing in India, Business Today, 3 June 2020

³ Electronics manufacturing in India to grow 30% annually for next 5 years: IT Secy, Financial Express, 6 August 2020

⁴ Electronics manufacturing in India to grow 30% annually for next 5 years: IT Secretary, Economic Times, 7 August 2020

⁵ Atmanirbhar Tracker, Elara Capital, 24 December 2020

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.