## India Semiconductor Journey: From Chip to Champion

**# FEATURE** 

By Dr. P.K. Purohit, Professor and Dean Science at NITTTR Bhopal

Addressing the presence of semiconductor experts from 40 to 50 countries across the world at the inauguration of 'Semicon India-2025', organised to accelerate the Indian semiconductor ecosystem at Yashobhoomi, New Delhi, Prime Minister Narendra Modi said that India's innovation and youth power are also clearly present at the event. He said that this unique combination sends a clear message that the world trusts India, the world believes in India and the world is ready to build the future of semiconductors with India. Welcoming all the distinguished guests present at Semicon India, the Prime Minister said that they are important partners in India's journey to-wards becoming a developed and self-reliant nation. This statement of PM Modi fills every Indian with pride. SEMICON India 2025 became the largest platform to discuss the latest advances, opportunities and challenges of the semiconductor and electronics industry in the presence of 20,000 participants from across the globe.

On this occasion, Union Minister Ashwini Vaishnav formally presented India's first indigenous chip'Vikram 32' developed at ISRO's Semiconductor Lab to the Hon'ble achievement is an important milestone towards the country's self-reliance and cutting-edge technologi-cal capability. Prime Minister Narendra Modi said that "the day is not far when India's smallest chip will bring the biggest change in the world. In the world of semiconductors, it is often said that oil is black gold, but chips are digital diamonds. India's approach is based on a visionary strategy aimed at making India self-

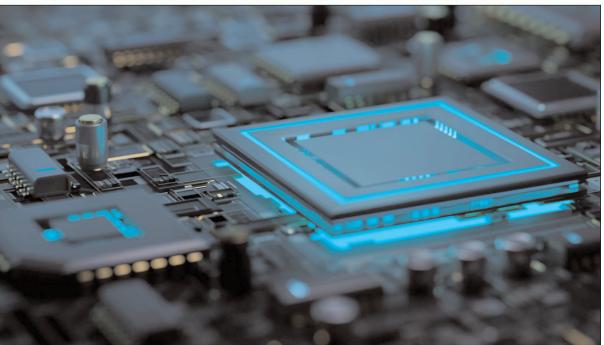
Microchips, often smaller than a fingernail, are used in everything from simple gadgets to advanced su-percomputers in the digital age. It is unimaginable to imagine any kind of electronic device without this chip today. The journey of a semiconductor chip from its concept to becoming a key component in all the latest technologies is a story of innovation, invention and global influence. The credit for the first semiconductor chip goes to Jack Kilby of Texas Instruments, who built the world's first integrated circuit (IC) using germanium in 1958. A few months later, in 1959, Robert Noyce of Fairchild Semiconductor built a more practical version of it using silicon, which laid the foundation of the modern semiconductor microchip.
Foundation of semiconductor

**industry** The foundation of the semiconductor industry in India was laid in the 1960s-70s. One of the early efforts was the establishment of Semiconductor Complex Limited (SCL) in Chandigarh, with the main objective of manufacturing chips for the country's defense and space programs. During this period, public sector undertakings like Electronics Corporation of India Limited (ECIL) also made significant contributions to the manufacture and research of semiconductor devices.

At that time, India lacked sufficient technical expertise, capital investment and the ability to compete globally. Countries like Taiwan and Šouth Korea made significant progress in the semiconductor industry through large-scale invest-ments and technical partnerships. India lagged behind in this race and could not make its presence felt on the global semiconductor map for several decades.

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cities like Bengaluru, Hyderabad, Noida have become major centres of global chip design. Major semiconductor companies have set up their large R&D centres in India, recognizing the deep expertise of Indian engineers in chip design, which is not limited to just coding but also Play an important role in the entire de-

PM's initiative

The initiative of Prime Minister Narendra Modi has given new direction and momentum to India's semiconductor industry. The Semiconductor Mission launched under his leadership is based on the 'From Backend to Full-Stack' approach, which aims to develop the entire chain of chip design, fabrication, packaging and testing in India. Also, under the concept of 'Make in India, Trusted by the World', chips manufactured in India should not only meet the requirements of the country, but also become trusted globally due to their excellent quality.

The vision of the Prime Minister is clear; the day is not far when the world will say - Design in India, Made in India, Trusted by the World

Govt's priorities The government has three major priorities in this direction. The first priority is to reduce bureaucratic delays by simplifying administrative processes in the speed of "file to factory". The process from file to factory is being accelerated for investors and industries, because time plays an important role in the semiconductor industry. Second, the creation of a skilled workforce in which India's biggest strength is It has a young population. The government's focus is to create a huge and skilled workforce to meet the requirements of the semiconductor industry. The third priority of the government is programs like 'Chips to Startups' in which students and startups are being trained in chip design and related areas. This will promote innovation and self-reliance in

In 'plug-and-play' infrastructure, the government is providing ready infrastructure such as land, electricity and water to investors through semiconductor parks, so that they can start their work immediately. The Semiconductor India program was launched in India in 2021. Under this, the country's first semiconductor plant was approved by 2023, while several other plants were also approved in 2024. With this, five additional projects were approved in ditional projects were approved in 2025, taking the total number of semiconductor projects currently in progress to 10, involving investments of over \$ 18 billion. Several major initiatives have been taken to realize this vision, the central program of which is the India Semiconductor Mission, which was launched with a total budget of Rs 76,000 crore. The government's Production Linked Incentive Scheme (PLI) provides financial assistance for setting up chip fabrication, packaging and

testing units, thereby attracting large investments to India. Due to these initiatives, many indigenous chip design startups have emerged in India. Some of these companies are developing specialized chips for sectors such as defense, aerospace, electric vehicles, and energy sys-

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pected to be created

The global semiconductor market has currently reached \$600 billion, and India is planning to gain a significant share in this fast-growing sector. It is estimated that by 2030 sector. It is estimated that by 2030 this market will reach US\$ 01 trillion in which India's role will also be quite influential. About 1 million new jobs are expected to be created in the semiconductor sector in India by 2026, for which preparing a skilled workforce will be an important responsibility of educational interface. stitutions. Currently, countries like Taiwan, America, China, South Korea, and Malaysia mainly manufacture chips. But now India has also developed indigenous chips, which is a big step towards the goal of 'Atmanirbhar Bharat'. Soon commercial production of chips will start in India, due to which chips used in household and electronic products like cars, refrigerators, TVs will be manufactured in the country itself This move will make the Indian electronics industry self-reliant and establish it as a credible player in global competition. Today, India's semiconductor history is not just one of challenges and setbacks, but of per-

severance and revival. A strong semiconductor ecosys tem will not only strengthen India's digital economy and national security, but will also make India a leader in the global technological land-scape by ensuring self-reliance in every technology like mobile, computer, telecommunications, space vehicles, home appliances, healthcare sector, industrial automation, energy sector, and defense equip-

## Not capitalist but economically, socially and ecologically just order can deliver on SDGs

A collage of women with text overlay AI-generated con-

text overlay Ar-generated content may be incorrect.

"Anti-rights and anti-gender pushes are driven by political, patriarchal, conservative, and religious bodies that frame wrong understandings of gender are "threat to the content of gender as a 'threat to the social good'. They make it (wrongly) seem that any progressive position on justice-whether it is social, racial, gender, sexual, economic, disability, climate, or ecological- is threatening and destructive to the so-called 'dominant global order.' But we, particularly those of us in the Global South, have to understand it very clearly that this global order is white supremacist, capitalist, and patriarchal, that sustains itself through division, fear mongering, and the wrong beliefs that 'a market will fix anything and will fix everything." And we know that it does not", said Dr Angelique V Nixon.

"Anti-gender and antirights pushes are attacking social justice movements and fuelling a backlash against progressive social and environmental justice movements. Such anti-rights and anti-gender pushes are perpetuating false and misleading narratives about gender, sex, sexuality, human rights, and climate change. They are promoting transphobia, anti-LGBTQIA+ sentiments, homophobic and







### Not capitalist but economically, socially and ecologically just order can deliver on SDGs

transphobic attitudes and discourses globally. This has negatively impacted public understandings of gender and sexuality, LGBTQIA+ identities, and sexual and reproductive health and rights and justice," added Dr Angelique Nixon, who serves as the Director, CAISO: Sex and Gender Justice, Trinidad and Tobago, and Senior Lecturer and researcher, Institute for Gender and Development Studies, University of West Indies, Trinidad and Tobago.

Progress on SDGs is off the track: It is time for account-

Only 5 years are left to deliver on the Sustainable Development Goals (SDGs). But

progress on the right to health, gender equality and human rights is off the track by miles in fact it is receding in certain aspects. Gender disparities significantly impact health outcomes and evidence shows that SDG-3 goal of ensuring healthy lives and promoting well-being for all - at all ages cannot be realised without addressing SDG-5 on gender equality.

Essential health services must include sexual and reproductive health services - including safe abortion and post-abortion care, menstrual health hygiene, and mental health services, with particular attention to women, adolescent girls, persons with disability, indigenous peoples, gender diverse communities, older people, young people, migrant workers, refugees, people living with HIV, sex workers, people who use drugs, among others. They must also include all health and social support services for survivors of sexual and other forms of gender-based vio-

However, the rise of antirights and anti-gender ideologies, including threat posed by regressive Geneva Consensus Declaration, and poor domestic resource allocation on health and gender, are contributing to reversal in progress.

Angelique Nixon was speak-

ing in a SHE & Rights (Sexual Health with Equity & Rights) session co-hosted by Global Center for Health Diplomacy and Inclusion (CeHDI), International Conference on Family Planning (ICFP 2025), Family Planning News Network (FPNN), International Planned Parenthood Federation (IPPF), Asian-Pacific Resource and Research Centre for Women (AR-ROW), Women's Global Network for Reproductive Rights (WGNRR), Asia Pacific Media Alliance for Health and Development (APCAT Media) and

Connecting the dots

Dr Angelique Nixon rightly remarked that these antirights and anti-gender pushes have influenced public discourse and legislation and restricted human rights and spread fear-based narratives. This anti-rights push is being escalated by the government actions in the United States that have global impacts. We are seeing more of far-right leaning politics that is antirights, anti-migrants, antigender, and in climate change

These anti-rights and antigender forces maintain social and political power and obstruct any attempts that challenge their stance. It is important to connect these dots because they have direct impacts on health systems.

# Dr Vinay Mishra's

Question-I have chosen to do BA after passing my 12th class this year. I had science in my 12th class and got good marks in all science subjects. Everyone tells me I havé made a mistake by opting for Arts. How do



It's great that you're thinking carefully about your choice. Here's some advice to help you deal with this situation and feel confident about your decision to pursue a BA after a science background: Own Your Choice: Remember that your education is for your growth and interests. If you feel more passionate about Arts subjects, that's a valid reason to follow this path. Explore Your Interests: Use your BA to discover and deepen your understanding of subjects you enjoy This can lead to new opportunities and career paths that align better with your skills and passions. Ignore Negative Opinions: People may have different expectations, but it's ultimately your life and career. Politely listen but don't let others' doubts undermine your confidence.

Leverage Your Science Background: Your science education is a strength. It shows you have discipline, analytical skills, and a strong academic foundation that can complement your Arts studies and make you stand out. Seek Guidance: Talk to your teachers and senior students who have pursued a similar switch. They can offer insights and encouragement. Focus on Long-Term Goals: Think bout where you want to be in 5 to 10 years. Your current choice is a step toward those goals, and many successful people take un-conventional paths. Stay Open to Learning:

Arts and Science are both valuable. Your diverse knowledge can open up interdisciplinary opportunities like science communication, policy, teaching, or research. Remember, the best degree is the one that suits your interests and goals—not just the one others think is best. You've made a thoughtful choice by following what genuinely interests you!

## Ganpati Visarjan: Saying Goodbye with Devotion and Care for Nature

What is Ganpati Visarjan?

Visarjan literally means immersion. It symbolizes the idea that what is created must eventually dissolve — a reminder of life's impermanence and renewal. Traditionally, families perform visarjan after 1.5, 3, 5, 7, or 10 days of worship. Some communities celebrate with grand processions, while others choose a quiet immersion at home, each carrying the same devotion in their hearts.

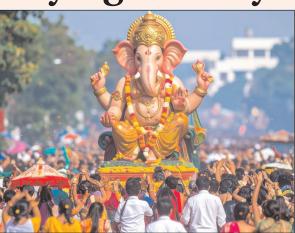
Before starting the visarjan, families prepare a simple set of items for the puja and farewell. Keeping these ready helps the ritual flow smoothly:

Fruits like bananas, coconuts, and seasonal offerings Sweets, especially Modaks, the favorite of Lord Gane-

Incense sticks and dhoop for fragrance, Camphor and diva for the final aarti, Kumkum, haldi, and rice grains for tilak, Water or immersion tank for visarjan, Puja thali prepared for Ganpati visarjan with flowers, diya,

#### **Traditional Visarjan Rituals**

Puja before visarjan: Families perform a final aarti and offer sweets, flowers, and prayers. Procession: Idols are carried to the immersion site with chants, music,



and dhol. Farewell: With folded hands, devotees pray for Bappa's return next year. Family doing Ganpati aarti be-

**Eco-Friendly Visarjan Options** As awareness about water pollution grows, many

families now adopt eco-friendly visarjan practices. These choices ensure that devotion continues without harming rivers, lakes, or marine life.

Choosing natural clay idols that dissolve cleanly in water. Using municipality-provided eco-friendly tanks instead of rivers or lakes. Performing visarjan at home in a tub or bucket and later using the water for plants. Opting for symbolic non-immersive visarjan with reusable metal or stone idols.

Eco-friendly Ganesh idol dissolving in water How to Perform Ganpati Visarjan in Europe, In Europe, where traditional ponds or community visarjan sites are not always available, many families wonder how to respectfully complete the ritual. With our ecofriendly Ganesh idols made from natural clay, paper, and organic glue, visarjan can be beautifully done at home.

Home immersion: Use a clean tub, bucket, or large vessel filled with water. Place the idol gently inside while chanting the visarjan prayers.

Natural dissolution: Since our idols are crafted from clay, paper, and natural glue, they gradually soften and dissolve in water. Depending on the size, this may take a few hours to a couple of days — a slow, respectful farewell. After visarjan: Once dissolved, the remaining clay and paper pulp can be safely used in the garden, added to potted plants, or returned to natural soil.

Symbolic visarjan: If you prefer, some families abroad also perform a symbolic visarjan — immersing flowers or performing prayers without full immersion keeping the spirit of the ritual intact.

**Balancing Devotion and Responsibility** 

Ganpati Visarjan is about emotion, but also responsibility. By choosing eco-friendly practices, families not only honor Lord Ganesha but also respect the environment. Children especially learn that faith and nature go hand in hand. And there is a quiet joy in knowing that your devotion has left no harm behind.

Children watching Ganesh idol visarjan with folded

Conclusion Ganpati Bappa comes home with joy and leaves with blessings. Whether through a grand procession or a simple home visarjan, what matters most is the love behind the ritual. By choosing eco-friendly practices and preparing with devotion — from flowers to modaks we keep alive both tradition and responsibility. Ganpati Bappa Morya, Pudhchya Varshi Lavkar Ya!