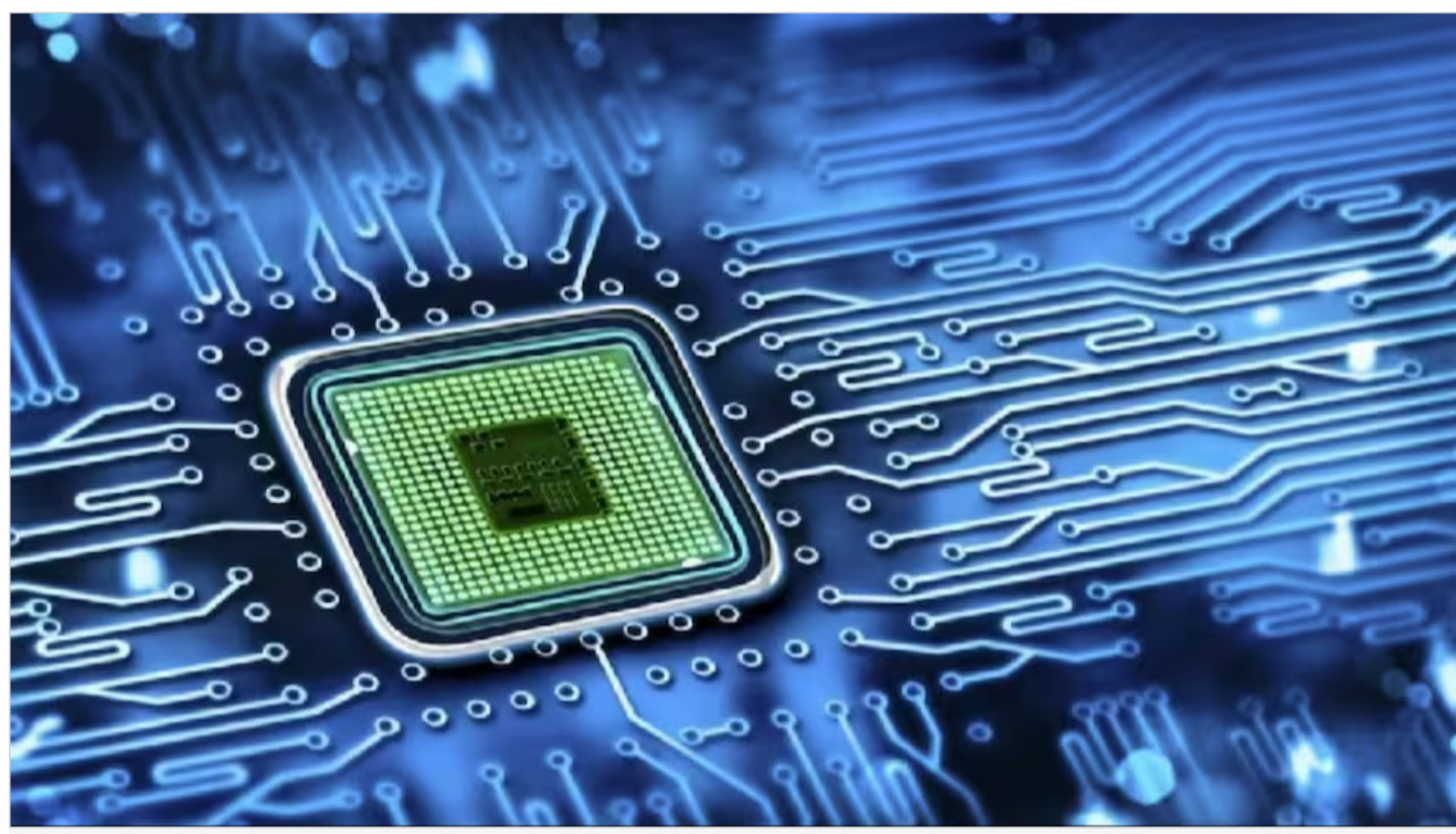# Key trends that are shaping the semiconductor industry

India's semiconductor industry stands on the brink of unprecedented growth amidst a global shift toward supply chain diversification from China to other countries. With rising competition in the semiconductor chip market, India has emerged as a promising player.

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Updated Apr 16, 2024, 6:17 PM IST

The semiconductor sector is poised for a transformative journey fueled by relentless innovation and strategic investments.

In the sprawling tapestry of global innovation, India's semiconductor industry is emerging as a vibrant hub of technological prowess and entrepreneurial spirit. The semiconductor sector is poised for a transformative journey fueled by relentless innovation and strategic investments.

In this article, we delve into the key trends shaping India's semiconductor industry and explore the implications for future innovation and investment opportunities.

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India's semiconductor industry stands on the brink of unprecedented growth amidst a global shift toward supply chain diversification from China to other countries. With rising competition in the semiconductor chip market, India has emerged as a promising player. The nation's strategic focus on talent development and investment in semiconductor manufacturing, exemplified by initiatives like the Indian Semiconductor Mission (ISM), positions it as a key contender in the global semiconductor landscape.

India's abundant engineering talent, coupled with a favorable business environment and government incentives, attracts significant global interest and investment in chip manufacturing and related infrastructure. The ISM's subsidies and policy framework have stimulated the growth of semiconductor enterprises, aiming to reduce reliance on imports and bolster domestic capabilities.

Studies predict India's semiconductor market to soar, potentially reaching $60+ billion by 2026 and $100+ billion by 2030, capturing 10% of global consumption. However, much of the prospects for growth stem from chip design innovations, so the future success hinges on India's ability to transition from manufacturing-centric to design-centric innovation, nurturing a robust ecosystem of chip design talent.

By fostering a customer-supplier relationship and emphasizing export-led growth, India can solidify its position as a semiconductor powerhouse while fueling the growth of its domestic technology market.

Smaller Process Nodes, Fab & India's Bet

India's semiconductor firms are dedicating substantial resources to research and development endeavors aimed at smaller process nodes to improve performance and energy efficiency across various sectors. The adoption of smaller process nodes, such as 45nm, holds the promise of delivering more potent and energy-efficient chips tailored for use in smartphones, consumer electronics, and automotive applications within India.

The approval of three new semiconductor fabs, valued at $11 billion, underscores India's commitment to becoming a major chip-making hub. These fabs, equipped with advanced technology capable of producing chips with nodes ranging from 28-, 40-, 55-, to 110-nanometer, will significantly boost India's semiconductor manufacturing capabilities.
Furthermore, investments in assembly, testing, and packaging facilities further strengthen India's semiconductor ecosystem. Advancements in technologies such as EUV lithography and materials like gallium nitride (GaN) and silicon carbide (SiC) are going to be key to the acceleration of infrastructure development.

The establishment of Global Capability Centers (GCCs) by international chip companies in India, including Qualcomm and AMD, with its largest global design center in Bengaluru, reflects India's growing importance in the global semiconductor landscape.

AI/ML, IoT & Talent Pool

The rise of AI is reshaping the chip industry, spurring demand for innovative chip types, and revolutionizing design and production methodologies and India is actively partaking in this growing market. With the launch of the National Mission on Quantum Technology and Scientific Computing, India is advancing efforts to develop indigenous AI chips.
Investors are avidly seeking opportunities to invest in Indian startups spearheading AI and ML hardware solutions, recognizing the potential for disruptive innovation and market expansion. From specialized processors to edge AI platforms, Indian semiconductor startups are poised to redefine global AI-driven technologies.

There is a growing demand for energy-efficient, high-performance chips tailored to edge computing and IoT applications across sectors like healthcare, agriculture, and smart cities. As the proliferation of edge computing and Internet of Things (IoT) devices reshapes chip architectures, Indian semiconductor companies stand to facilitate this transformation. Indian startups are leveraging their expertise in system-on-chip (SoC) design and sensor integration to develop innovative solutions for edge computing and IoT applications. The world is closely monitoring investments in startups positioned to capitalize on this trend, recognizing the vast market potential of edge computing and IoT technologies.

India boasts a significant pool of semiconductor design engineers, and efforts are underway to address challenges such as cost competitiveness and talent shortages. The country's talent pool excels in areas such as system-on-chip (SoC) design, embedded systems, and semiconductor fabrication. Partnerships, like the one between the India Electronics and Semiconductor Association (IESA) and SEMI, further propel India's aspirations to emerge as a global semiconductor manufacturing and design hub, facilitating collaboration among stakeholders and fostering talent development in the semiconductor domain.

Security, Sustainability, and Growth

Amidst the rapid pace of innovation, Indian semiconductor companies must address critical considerations such as security, sustainability, and supply chain resilience. As technologies become increasingly interconnected and data-centric, ensuring robust cybersecurity measures and sustainable practices is paramount to maintaining trust and credibility in the marketplace.

Furthermore, building resilient supply chains and reducing dependencies on foreign sources of critical components are essential for safeguarding against geopolitical uncertainties and disruptions. India's semiconductor industry is on the cusp of a transformative journey driven by relentless innovation, strategic investments, and a thriving ecosystem of startups and entrepreneurs.

By embracing key trends such as smaller process nodes, AI and machine learning acceleration, and edge computing, Indian semiconductor companies are poised to carve out a significant niche in the global market, driving economic growth and technological advancement for years to come.