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India Semiconductor Market Assessment, By Type [Intrinsic, Extrinsic], By Node [180 nm, 130 nm, 90 nm, 65 nm, 45/40 nm, 32/28 nm, less than 30 nm], By Components [Memory Devices, Logic Device, Analog IC, MPU, Discrete Power Devices, MCU Sensors, and Others], By End-User Industry [Networking and Communications, Consumer Electronics, Automotive, Data Processing, Aerospace, Medical, Military & Defence, and Others], By Region, Opportunities, and Forecast, FY2017-FY2031F

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Abstracts

India semiconductor market size was valued at USD 29.84 billion in FY2023, which is expected to grow to USD 79.20 billion in FY2031, with a CAGR of 13.55% during the forecast period between, FY2024 and FY2031. The demand for semiconductors is anticipated to increase due expenditures in the development of several smart cities. Additionally, the market is expanding as electric vehicles are gaining popularity and acceptance among the Indian population.

Significant use of semiconductors in a variety of end-use applications, including electronics, industrial equipment, networking and communications, and data processing is driving the India semiconductor market. Additionally, development of artificial intelligence (AI), the Internet of Things (IoT), and machine learning (ML) technologies are expected to benefit the India semiconductor market. These innovations enable memory chips to process huge volumes of data more quickly. Furthermore, the rising need for faster and more sophisticated memory chips in industrial applications is

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anticipated to drive the India semiconductor market during the forecasted period.

Rising Demand for Consumer Electronics

The growing middle-class population in India, coupled with increasing disposable income, is fueling the demand for consumer electronics such as smartphones, laptops, and smart TVs, driving the need for advanced semiconductor components. Increased reliance on laptops, tablets, and smart TVs for remote work, learning, and entertainment contributes to semiconductor market growth. Growing interest in gaming consoles, wearables, and smart home appliances fuel demand for specialized semiconductor components. E-commerce platforms facilitate accessibility, driving higher sales of consumer electronics and, consequently, semiconductor components. o Constant innovation and frequent product cycles in the consumer electronics sector maintain a steady demand for advanced semiconductor solutions.

Automotive Industry Growth

The automotive industry's shift to electric vehicles and the adoption of advanced driver-assistance systems drives substantial demand for semiconductors in India. Connectivity features, infotainment systems, and the Internet of Things integration in vehicles contribute to semiconductor demand in the automotive sector. Semiconductors play a pivotal role in engine management for energy efficiency, emission control, and compliance with environmental regulations. Telematics and fleet management solutions in commercial vehicles rely on semiconductors for real-time tracking and optimization of fuel efficiency. Government regulations mandating safety features further drive the integration of semiconductor components in vehicles to meet compliance standards.

For example, Renesas Electronics Corporation acquired Bengaluru-based fabless semiconductor company Steradian Semiconductors Private Limited, specializing in 4D imaging radar solutions. The acquisition, completed on October 17, 2022, which enhance Renesas' automotive radar market position by integrating Steradian's radar technology with Renesas' existing products, simplifying radar system design, and accelerating product development.

Digital Transformation and IoT Adoption

The increasing adoption of digital technologies and Internet of Things (IoT) across various industries is driving the demand for semiconductor components in India. The

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proliferation of IoT devices across industries, including healthcare, manufacturing, agriculture, and smart cities, require advanced semiconductor components for connectivity, data processing, and communication. Sensors, microcontrollers, and communication chips being integral to the functioning of IoT devices. Moreover, India's smart cities initiatives involve the integration of digital technologies for efficient urban management. It includes the deployment of IoT sensors and devices for monitoring and optimizing various city functions, such as traffic management, waste management, and energy consumption. These applications drive the demand for semiconductor solutions. Additionally, the adoption of Industry 4.0 practices, including automation and data exchange in manufacturing, relies heavily on semiconductor components. Sensors, microprocessors, and communication modules enabling machines to communicate and operate seamlessly in smart factories.

Government Initiatives and Policies

Government initiatives such as the Production Linked Incentive (PLI) Scheme and Make in India are spurring semiconductor market growth in India by facilitating production of electronic items, analytical systems, automation, etc. Electronics Manufacturing Clusters and the National Policy on Electronics contribute by providing infrastructure and policy frameworks for the semiconductor industry. The Technology Upgradation Fund Scheme supports technology modernization, enhancing semiconductor manufacturing capabilities. Skill development programs address workforce shortages in semiconductor design, manufacturing, and research. The National Digital Communications Policy and global collaborations promote connectivity and innovation in IoT, boosting semiconductor demand. Incentives for R&D and ease of doing business reforms further establish India as a competitive player in the global semiconductor market.

For example, India's Union Cabinet has approved a Memorandum of Cooperation (MoC) between India and Japan on the Japan-India Semiconductor Supply Chain Partnership, signed in July 2023. The MoC aims to strengthen cooperation between the two countries and enhance the semiconductor supply chain.

Impact of COVID-19

Due to the poor demand, some of the semiconductor factories closed their operations during the COVID-19 outbreak. A dip in the growth of the market occurred when chip orders were being cancelled by the automotive firms due to the less demand for vehicles. However, the widespread adoption of the work-from-home trend has increased

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consumer demand for PCs and laptops, leading to a huge demand for semiconductors production.

Notably, the 95% demand for semiconductors in India is met through imports, hence, the on-set of COVID-19 pandemic induced lockdown in countries like China, Taiwan severely disrupted supply chain resulting in reduced supply and increased shortage of semiconductors in India in 2020 which lasted till early 2022. Thus, shortages of semiconductors resulted in halted production of consumer electronics, automotive vehicles, and other industrial products mostly within the country. However, on the contrary, this also resulted in realization for the need of supply chain diversification and thereby improving local production landscape. Government of India, in line with this objective to boost domestic manufacturing of semiconductors launched India Semiconductor Mission in 2021 aimed at incentivizing local companies and startups with domestic semiconductor manufacturing to meet the local demand.

Impact of Russia-Ukraine War

The Russia-Ukraine war exacerbated the semiconductor supply chain issues which further led to chip shortage that impacted the industry since February 2022. The war resulted in affecting the supply of specific raw materials used in semiconductor manufacturing, such as neon and palladium. This affected the global semiconductor market, including India. Ukraine and Russia play crucial roles as major suppliers of valuable resources essential for chip manufacturing, such as noble gases and precious metals. These resources include neon, argon, xenon, and krypton from Ukraine, and hexafluorobutadiene (C4F6) and palladium from Russia. Notably, Ukraine holds a significant 70% share in the global supply of Neon.

These gases and metals are integral in various stages of chip production. Neon is utilized in lithography, a critical process in chip manufacturing, while argon is employed in etching, another essential step in the production of semiconductors and chips. Despite geopolitical challenges arising from the Russia-Ukraine conflict, major semiconductor manufacturers like UMC and SK Hynix managed to maintain ample raw material inventory. They have also proactively diversified their supply chains to mitigate potential disruptions caused by the ongoing conflict. To ensure a steady supply of inert gases, which are essential for chip production, leading gas suppliers such as Air Products, Linde (U.S.), and Air Liquide (France) engaged in the purchase, purification, and liquefaction of these gases. These suppliers then distribute the gases to global semiconductor giants like Intel, TSMC, and Samsung, as well as smaller players in the industry.

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Recent Development

For example, In November 2023, Broadcom India introduced AI features to a new version of its flagship networking chip, the Trident 5-X12. This innovation improves the chip's efficiency and its ability to handle other tasks such as network security. The new chip offers typical performance boosts like reduced power consumption and increased network bandwidth. Additionally, the Trident 5-X12 can help alleviate network traffic congestion. The chip's AI capabilities enhance performance, efficiency, and improved network throughput. Specific networked computing tasks, such as AI, can only be improved by adding additional capabilities to a chip because the software is too slow.

For example, In July 2023, Mahindra & Mahindra Ltd. declared that it has signed an MoU with NXP Semiconductors with an aim to provide secure connectivity solutions for embedded applications to jointly explore the electric and connected vehicle platforms, covering a wide range of vehicles including utility vehicles, light commercial vehicles, farm equipment, and tractors.

Key Players Landscape and Outlook

Due to the existence of several local businesses, the market is fragmented. These market players work on strategies including investments, collaborations, acquisitions, and mergers to increase their market share.

For instance, in November 2023, Broadcom acquired VMware for USD 61 billion in November 2023. Broadcom's focus lies in VMware Cloud Foundation, supporting private and hybrid cloud environments. Key aspects include application networking, modern applications through VMware Tanzu, and software-enabled innovations from the data center to the edge. The overarching goal is to simplify the IT environment while delivering increased value. The company emphasizes a commitment to innovation, with significant investments planned for VMware's advancement. These investments will split between R&D and accelerating solution deployment through VMware and partner services.

For instance, in July 2023, Vedanta Group gained full control of its joint venture, Vedanta Foxconn Semiconductors Private Limited, previously owned by Twin Star Technologies Limited. Additionally, Vedanta intends to acquire a display glass manufacturing venture from Volcan Investments. In line with India's electronics industry ambitions, a commitment of USD 19.5 billion was made by Volcan Investments and

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Foxconn last year to establish semiconductor and display production facilities in Gujarat. The CEO of Vedanta’s Semiconductor Business highlighted the goal of affordable Made in India semiconductor and display glass for various electronic devices.

For instance, in February 2022, AMD acquired Xilinx to strengthen its high-performance and adaptive computing portfolio. The strategic move aims to capture a significant share of USD 135 billion market opportunity and increased AMD's presence in India, where Xilinx has its largest employee base outside North America. The acquisition strengthens AMD's portfolio across cloud, edge, and intelligent devices.

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