



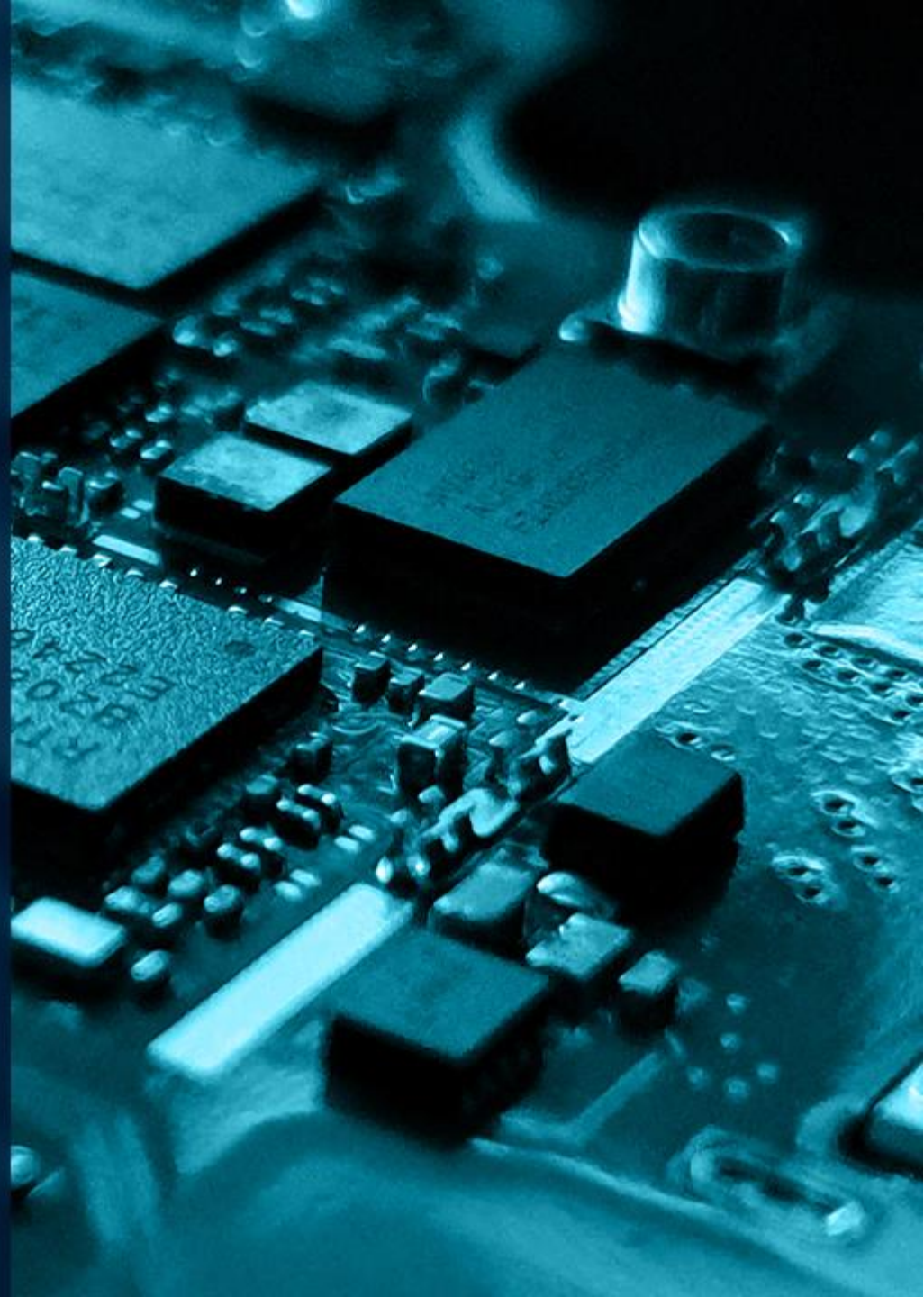
ecosystem

THE FUTURE OF INDUSTRIES

The Global Semiconductor Industry Disruption

IMPACT & INITIATIVES

MARCH 2022





Introduction



The semiconductor industry is 70-years old and has a prominent – and sometimes inconspicuous – presence in our daily lives. Many of us, however, have become more aware of the industry and the ramifications of its disruption, because of recent events. The pandemic, natural disasters, power outages, geo-political conflicts, and accelerated digital transformation have all combined to disrupt the semiconductor sector, leaving no organisation immune to the impacts of the continuing global chip crisis.

It is estimated that 200 downstream industries have failed to fulfill customer demands owing to the silicon scarcity, ranging from automotive, consumer electronics, utilities and even the supply of light fixtures.

This Ecosystem Bytes discusses the impact of the crisis and highlights major initiatives that chip manufacturers and governments are taking to combat it.



Factors Leading to the Shortage



INCREASED DEMAND

Remote working and education suddenly made devices and gaming consoles more significant in people's lives; leading to an increased demand for chips in consumer electronics manufacturers.



GEO-POLITICAL FACTORS

Ahead of the US sanctions, [Chinese companies](#) purchased an estimated USD 32 billion worth of chip manufacturing equipment, causing supply chain disruption.



NATURAL DISASTERS

Natural calamities such as the [drought in Taiwan](#), the [Texas winter storm](#), and three consecutive [plant fires in Japan](#) between 2019 and 2021 disrupted operations and led to a shortage of raw material.



Industry Impact: Automotive



Limited supply has not only resulted in increased costs of new vehicles but has also severely affected the used car market. For example, [car prices in 2021 saw an increase](#) of about 14% in UK and more than 40% in the US from the previous year.

Many automobile manufacturers have issued production curtailment alerts. For instance, [Toyota reported disruption in 14 of their plants in Japan](#), affecting production of models ranging from the RAV4 to the Corolla, Prius, Camry, and Lexus RX. Similarly, [Ford had to downsize the production capacity](#) of their highly profitable truck and SUV segments at two of their US facilities.

OEMs are dealing with the shortage by shifting chips to high-demand areas such as utility and premium vehicles. Some manufacturers are even removing features and functionalities from specific models in order to minimise chip consumption.



Industry Impact: Consumer Electronics

The global chip shortage continues to drive up the price of electronic goods, such as laptops, printers, and smartphones. For instance, the price of a [videogaming laptop from ASUS](#) increased by 6% and that of HP Chromebook increased by 14% in 2021.

The Ecosystem Voice of the Employee Study finds that only 18% of knowledge workers today are satisfied with whatever devices or technology their company provides for them.

In a world where the Great Resignation is looming large, there is a huge demand for enhanced automation, collaboration tools, IT infrastructure upgrades and new devices.

Vendors are keeping up with the demand, driving up prices. [HP Inc. witnessed a surge](#) in the last quarter of 2021 and this demand came equally from their SME, large corporation, and commercial clients.



Industry Impact: MedTech



The global disruption in chip supply has caused a price hike for several medical devices, with some facing global stock depletion. Healthcare depends heavily on chip-powered critical care and intensive care unit equipment, such as ventilators, defibrillators, imaging machines, monitors (blood glucose, ECG, blood pressure), and implanted pacemakers.

The ongoing healthcare crisis has also seen a surge in the use of remote medical equipment for clinical support and diagnosis.

Medtech companies are struggling to meet this demand due to the shortage of chips. For instance, last year [Philips was unable to meet the demand](#), as the orders for their products increased by 17% between July and September.



Chip Makers Are Expanding their Capacities

Existing global leaders in the semiconductor industry have all announced their plans to increase their manufacturing capacity.

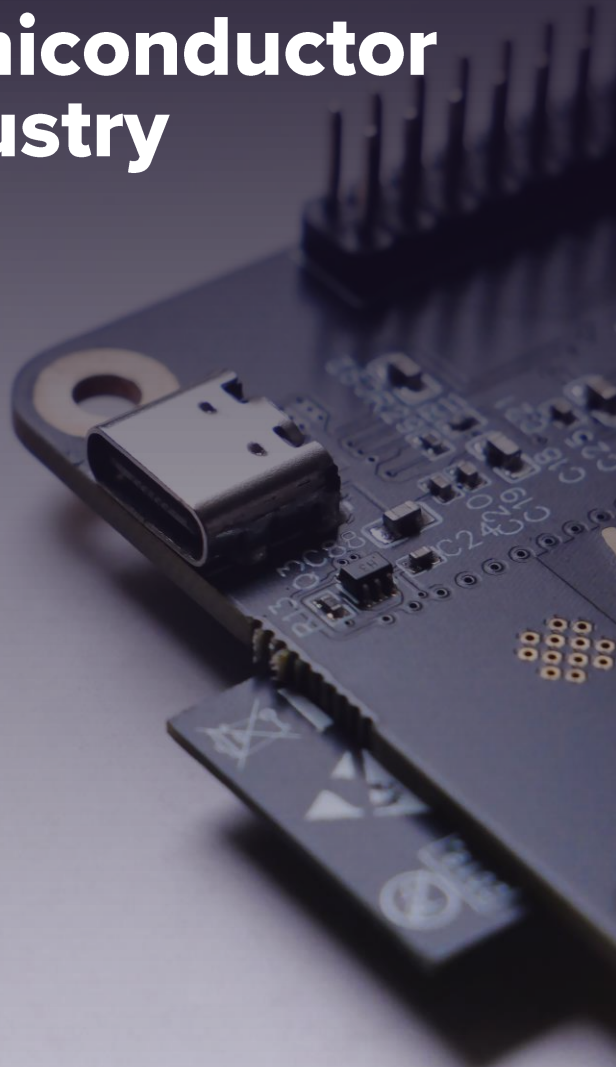
TSMC plans to increase investments by 47%, up from USD 30 billion in 2021 to USD 44 billion this year, in order to increase chip production capacity. This puts the company on track to meet their three-year investment target of USD 100 billion by 2023.

Intel is focusing on expansion to resolve the crisis and the supply chain disruption. They have plans to invest up to USD 88 billion in Europe. Other major expansions of the company include an investment of USD 20 billion in the US and more than USD 7 billion in a chip manufacturing and testing facility in Malaysia.

Samsung aims to become a global leader in the logic chips market within this decade. To realise their aim the company has announced that they will invest USD 151 billion in the semiconductor industry until 2030. This excludes memory chips that manage storage for devices such as smartphones.



Asia Leads the Semiconductor Industry



Asia accounts for nearly 73% of the global semiconductor market, led by Taiwan; and followed by South Korea and Japan.

Taiwan accounts for more than 60% of chip manufacturing. Their leading chip manufacturer, TSMC alone accounts for about 54% of global chip manufacturing.

South Korea is focused on establishing themselves as a prominent global IT hub with cutting-edge infrastructure and the fastest internet connections. The fact that the country is home to world-class electronics and tech businesses such as Samsung Electronics, LG Electronics, SK Hynix, and Naver, gives them an edge in the future global market.

Although it trails well behind Taiwan and South Korea in sophisticated semiconductors such as logic chips, Japan's strengths lie in power semiconductors and NAND flash memory.



The Need for Self-Sufficiency Drives Governments

This crisis has made it very apparent to governments across the world that there is a need to build self-sufficiency in the semiconductor industry.

The world's reliance on hi-tech is expected to grow exponentially with talks about interconnected digital reality and the Metaverse.

Many governments have reassessed their positions in the semiconductor value chain and are preparing to act – through their national economic policies and investments in building internal capabilities in semiconductor production and R&D. [China](#), [Korea](#), and [the European Union](#) – all significant players in the semiconductor sector – have announced plans that can potentially take the government investments in the industry up to USD 250 billion by the end of the decade.



Government Initiatives: Malaysia

Malaysia is focusing on collaborations to build capabilities and is investing in R&D.

Malaysia already has a significant presence in the global semiconductor value chain, accounting for approximately 7% of the trade flows.

Considering Malaysia's significant role in global semiconductor supply chains, the US Department of Commerce and the Malaysian Ministry of International Trade and Industry intend to work closely to improve semiconductor supply chain transparency, security, and resilience. Industry partners from both countries will contribute to strengthen manufacturing and associated supply chains.

Additionally, the government is also focusing on R&D in the industry and is offering grants worth USD 100 million to companies who undertake R&D activities.



Government Initiatives: India

India aims for self-sufficiency by incentivising overseas manufacturers to grow their presence in the country.

An USD 760 billion [mega project was launched in December 2021](#) to enhance semiconductor and display manufacturing with the aim to make India a global hub for hi-tech production and attract large chip manufacturers.

Following the launch of this project, [India has received investment offers](#) worth more than USD 20 billion from five companies that manufacture semiconductor and display fabs. Companies such as Vedanta, in a joint venture with Foxconn, Singapore-based IGSS Venture, and ISMC have proposed investments of USD 14 billion in chip production with the government backing of nearly USD 6 billion.

[Vedanta and Elest](#) have made investment bids worth more than USD 6 billion for manufacturing display fabs, seeking government subsidies of nearly USD 3 billion.



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info@ecosystem360.com



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