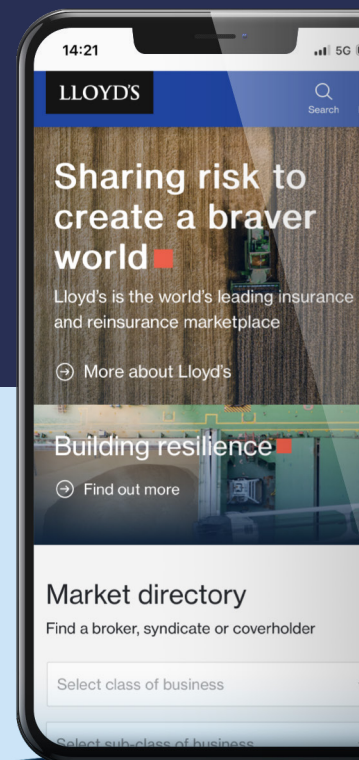
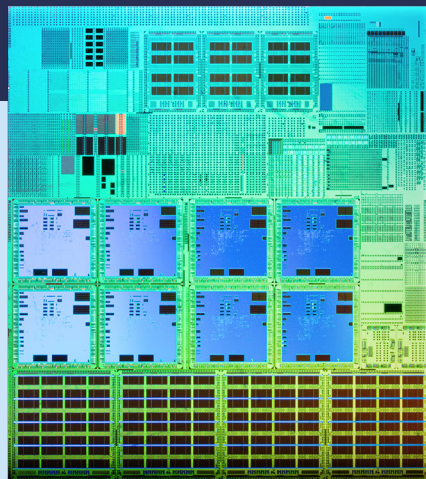
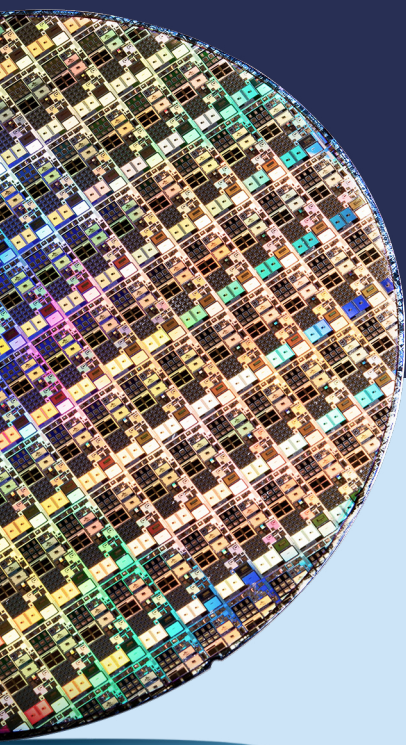


Loose connections: Rethinking semiconductor supply chains

Through a European lens



Overview

- The **semiconductor industry** has been a **key enabler of digitalisation** in recent decades
- Across the world, this precious chip has proven **essential for a range of global products and functions**
- In the last few decades, semiconductor chips have become a key component in the interconnected world of products and services. **Currently estimated to have a market value of \$596bn**, the industry supports a \$2.2trn electronics sector, which in turns drives \$89trn of global GDP
- As the **semiconductor industry has grown in size, volume, and complexity, so have supply chain risks**, particularly driven by heightened geopolitical tensions and rising national interests
- **Given the complex landscape they operate in, semiconductor suppliers take risk seriously:** investing heavily to ensure they have robust contingencies in place as well as embracing technology to support operational efficiencies. Importantly, this includes gaining better visibility of exposures and digitising supplier data, which helps insurers build a more detailed picture of an exposure
- **Entirely eliminating potential supply chain risks will never be possible for the sector**, but with increasingly abundant data to fuel modelling, and emerging and innovative insurance solutions becoming available, **the ability to analyse outcomes and the opportunity to mitigate impacts is growing**

Semiconductor businesses are not alone in these investments. Governments and regional blocs are actively rolling out new multi-billion-dollar policies and legislative packages to strengthen and onshore semiconductor activities, in what they see as a national security imperative; **in Europe this includes the EU Chips Acts, worth €43bn EUR in public and private investments.**

These investments will need protection, and global insurance markets are responding to new construction projects – relationships that are valued by the semiconductor industry, who are keen to understand where insurers can support supply chain innovation.

Key Findings

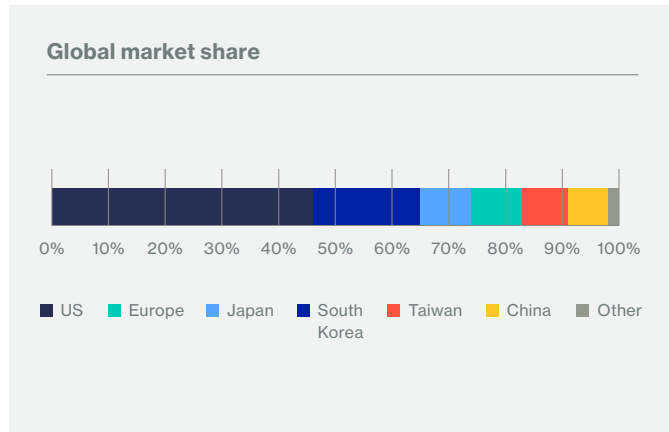
Lloyd’s Futureset’s *Rethinking supply chains* series, created in collaboration with global broker WTW highlights **three key findings to increase awareness, availability, and uptake of supply chain insurance in the semiconductor industry:**

1. There is room to **explore closer synergies between semiconductor businesses and insurers**
2. Semiconductor businesses expect insurers to **develop innovative products to meet a growing demand**
3. **Accessing supply chain real-time data and analytics models** is of utmost importance

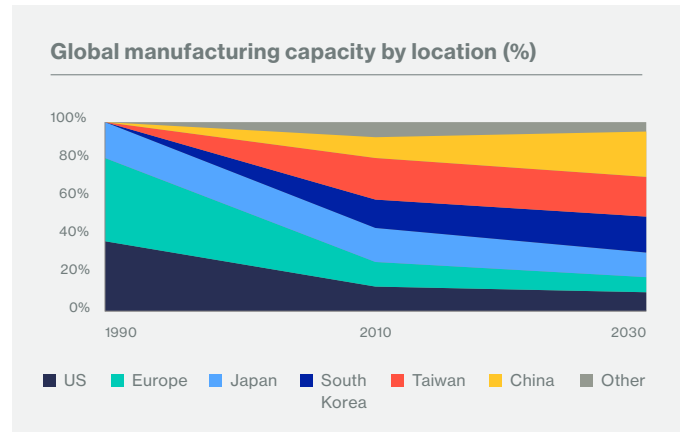
Scale of innovation required for each risk		
Least		Most
Wording improvements and further specified cover <i>(Indemnity periods; earthquake cover; power supply interruption; cyber in the supply chain; ESG; intellectual property)</i>	Supply chain cover aimed at Tier 2 and below suppliers	Contingent business interruption innovation
	Disruption caused by key bottlenecks	New market support for the construction of new fabrication sites (including in Europe)
	Adverse weather and access to power and water	



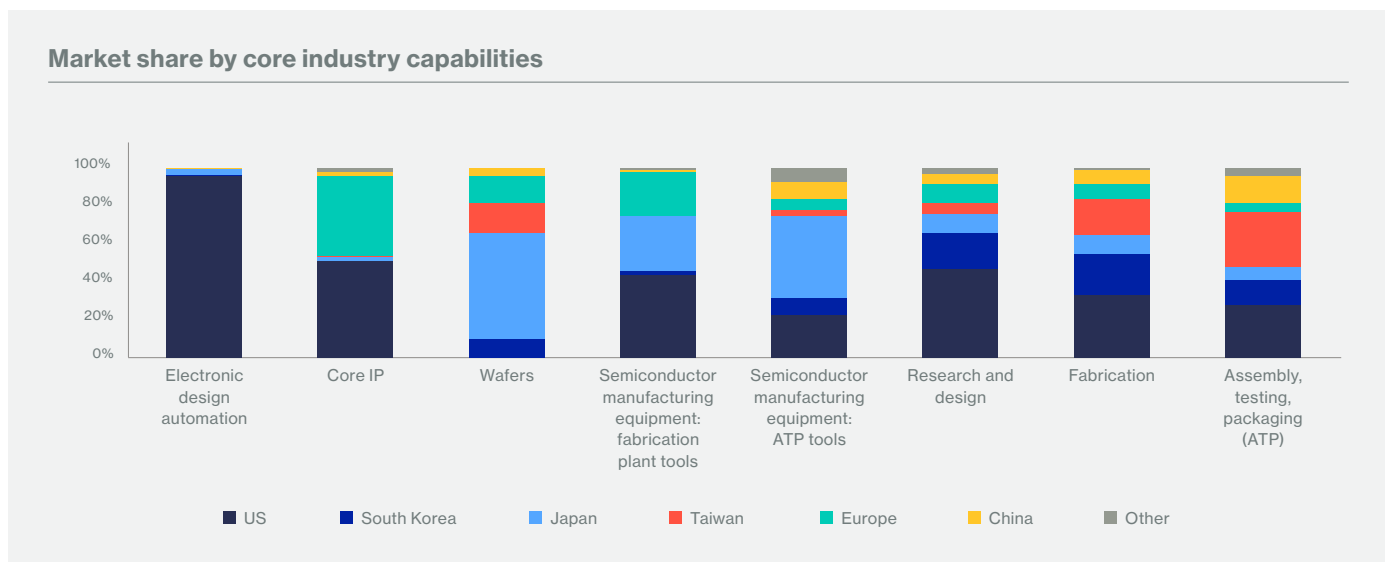
Understanding market dynamics



Source: Adapted from Centre for Security and Emerging Technology¹; SIA²



Source: Adapted from SIA and BCG³



Source: Adapted from Centre for Security and Emerging Technology¹; SIA²

- **Looking forward, industry research estimates that while the U.S. and Europe will look to hold on to expertise in certain fields**, the rise of investment and manufacturing centres in South Korea, Taiwan and mainland China since the 1990s will continue to shift the market
- **Geopolitical dynamics are increasing the stresses** on an industry that relies on segmenting an incredibly complex process

1 <https://cset.georgetown.edu/wp-content/uploads/The-Semiconductor-Supply-Chain-Issue-Brief.pdf>

2 https://www.semiconductors.org/wp-content/uploads/2022/11/SIA_State-of-Industry-Report_Nov-2022.pdf

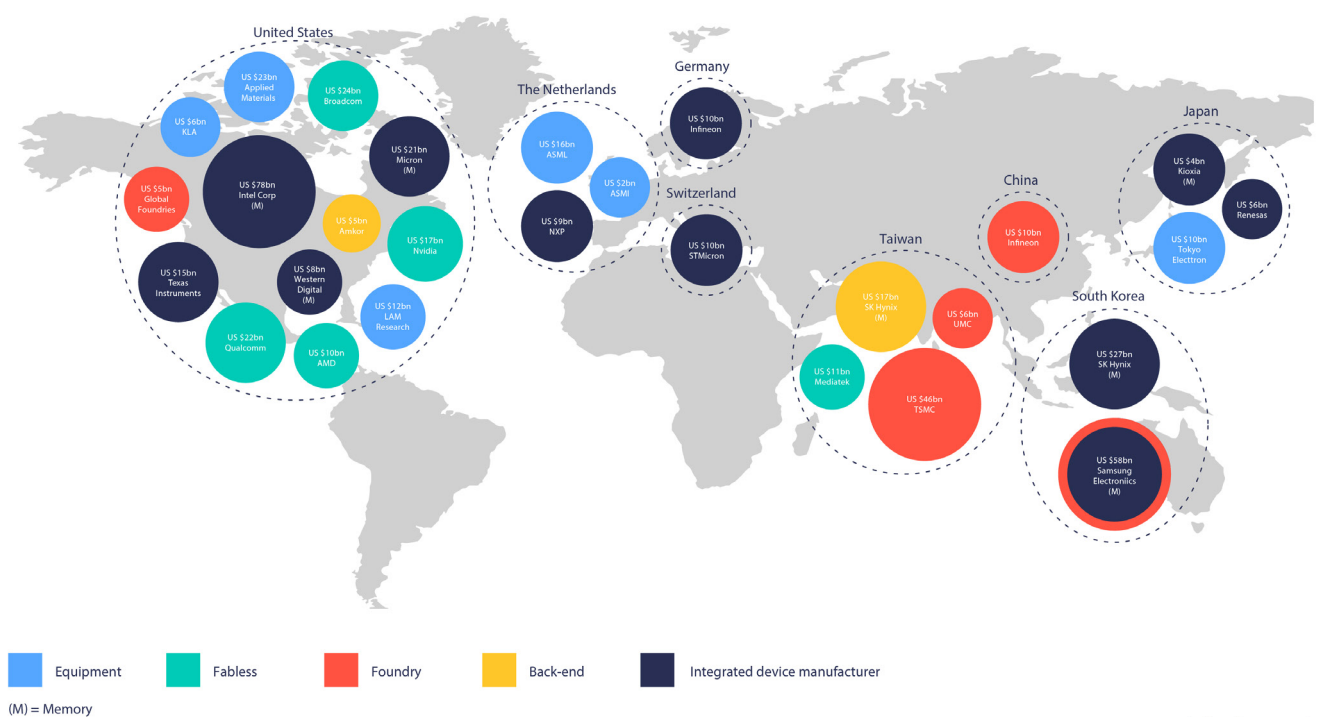
3 <https://www.semiconductors.org/wp-content/uploads/2020/09/Government-Incentives-and-US-Competitiveness-in-Semiconductor-Manufacturing-Sep-2020.pdf>



Europe plans to boost semiconductor resilience

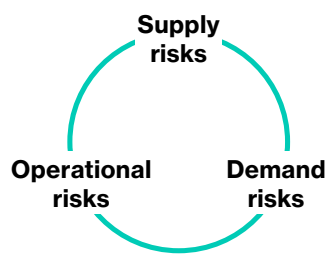
- In February 2022, the European Commission began formal consideration of the “EU Chips Act,” which includes up to 43 billion in targeted support for Europe’s semiconductor sector
- This includes incentives aimed at bolstering the EU’s front-end manufacturing for “first-of-a-kind” technologies and new investments in cutting-edge research and development
- In May 2022, Intel announced it was investing up to 80 billion in chip manufacturing across Europe, including the construction of a new 17 billion “megafab” production plant in Germany for high-end chips

Key global semiconductor business model companies by country



- State-backed funding of China’s semiconductor industry has emerged as a focus of the trade tensions between China and the U.S.. **Both the U.S. and Europe have expressed concerns about the loss of intellectual property (IP) to China and are exploring further legislative options**
- Semiconductor materials vary in price and availability, from abundant silicon to difficult-to-source rare-earth elements like scandium. **Raw materials are supplied from Europe, the U.S., Russia, Japan, and Mexico, as well as many other countries. Without raw materials chips cannot move off the drawing board into production**

Supply chain risks and drivers



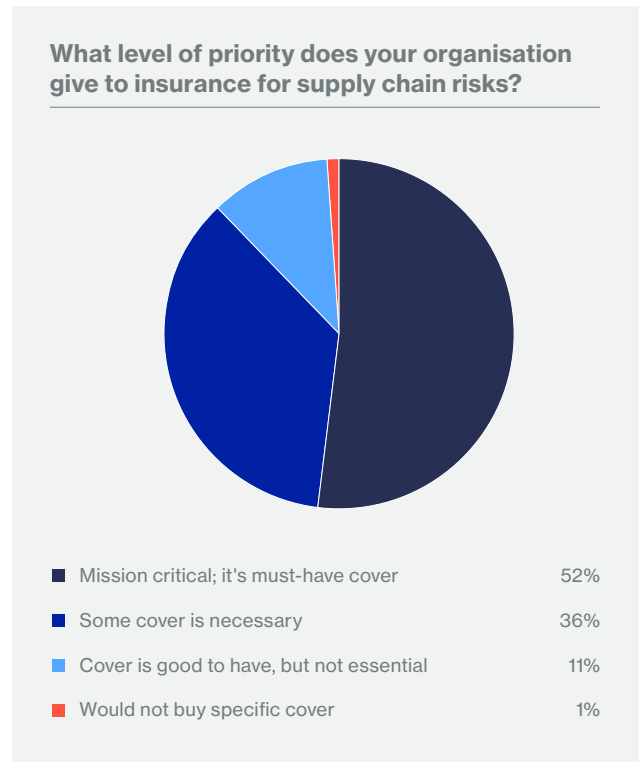
Environmental	Geopolitical	Economic	Technological
<ul style="list-style-type: none"> - Natural disasters - Extreme weather - Pandemics and epidemics 	<ul style="list-style-type: none"> - Political instability - Trade restrictions - Terrorism - Theft and illicit trade - Piracy 	<ul style="list-style-type: none"> - Demand shocks - Price volatility - Border delays - Currency fluctuations - Energy shortages 	<ul style="list-style-type: none"> - ICT disruptions - Infrastructure failures

Client quotes

“ Inflation is impacting our risk and has added substantial cost to our insurance as well as production process.
 Group Insurance & Risk Manager
 – European semiconductor company

“ ... [we see] that firms have now stocked up on neon and other important chip-making materials, and now typically have a six-week to three-month reserve.
 Managing Partner, semiconductor industry advisor

“ Semiconductor firms, prompted by political and regulatory requirements, are increasingly looking for their suppliers (and suppliers' suppliers) to manufacture components on their own shores to reduce their supply chain exposure.
 Sector Expert at a law firm



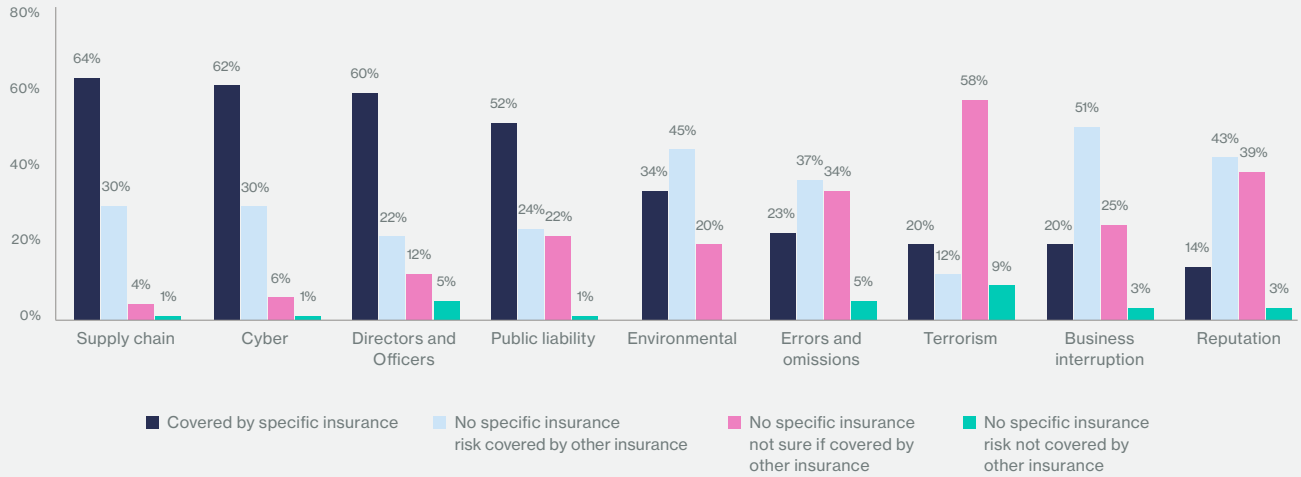
Source: WTW Global Supply Chain Survey 2023, semiconductor companies⁴

- **Insurers have a unique opportunity** to partner with an industry deeply exploring its supply chain risks, learn from their risk management actions and join their mapping and modelling efforts
- **This is a two-way partnership;** insurers can encourage the semiconductor industry to continue building resilience into their supply chain, while the semiconductor companies can give insurers data and information to help them gain the comfort needed around aggregations and understanding downside exposure to provide innovative risk transfer solutions

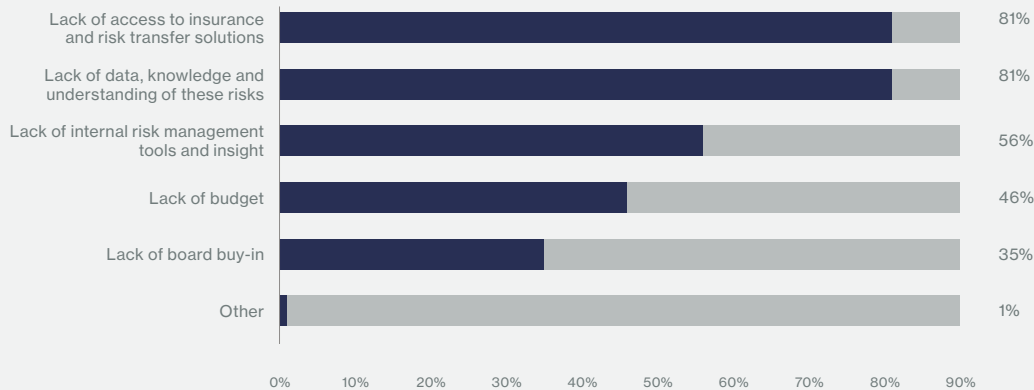
⁴ <https://www.wtwco.com/en-gb/insights/2023/02/2023-global-supply-chain-risk-report>



WTW Global Supply Chain Survey 2023



What are the three greatest challenges to addressing your risks over the next 3 to 5 years?



Source: WTW Global Supply Chain Survey 2023, semiconductor companies⁴

Examples of European companies involved in the semiconductor supply chain:

- ASML (Netherlands)
- Codasip (Germany)
- DHL (Germany)
- Infineon (Germany)
- Nordic Semiconductor (Norway)
- SAP (Germany)

Want to learn more?

Please contact our Lloyd's Europe Innovation Lead David.Franco@lloyds.com for further information

⁴ <https://www.wtwco.com/en-gb/insights/2023/02/2023-global-supply-chain-risk-report>



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