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The "semiconductor crisis" as a result of the Covid-19 pandemic and impacts on the automotive industry and its supply chains

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The semiconductor crisis has been forcing companies in the automotive industry to halt production since the end of 2020, with almost all manufacturers and major suppliers affected. Specific strategic measures and options can help improve the supply chain resilience in short and long term.

Semiconductor Supply Chain

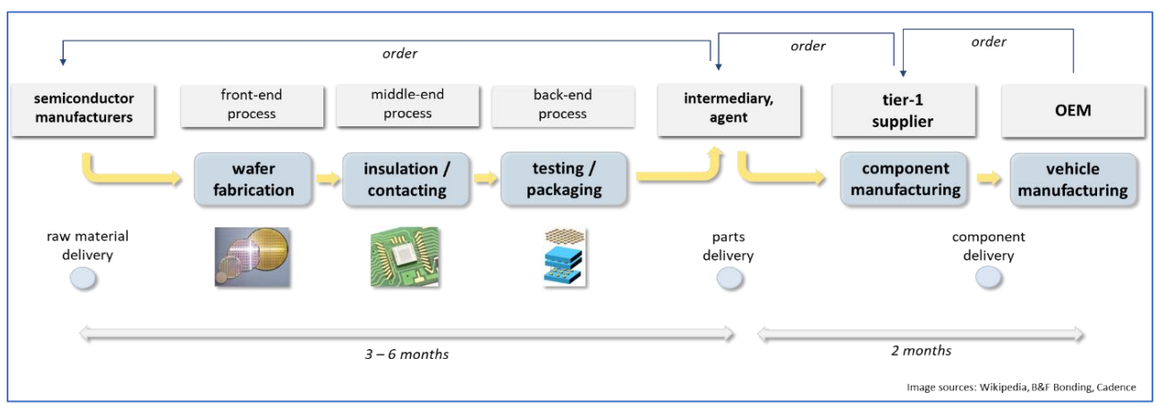

Figure 1: Illustration of a semiconductor supply chain

The manufacture of semiconductor components is subject to a complex production process, which counteracts the rapid easing of the supply situation in the automotive industry. A total of around 5 to 8 months elapse between the order and the delivery of the component. The wafer production alone takes 3 months on average.

Structure of the Semiconductor Market and Automotive Share

The automotive industry represents only a small share of semiconductor sales. In 2020, it accounted for only around 11%, while the communications and data technology segments accounted for almost 65% of total sales amounting to EUR 352 billion. China today is the world's largest sales market for semiconductor applications, with a market share of 35% (see figure 2). Europe and Japan have an overall market share of less than 10% worldwide.

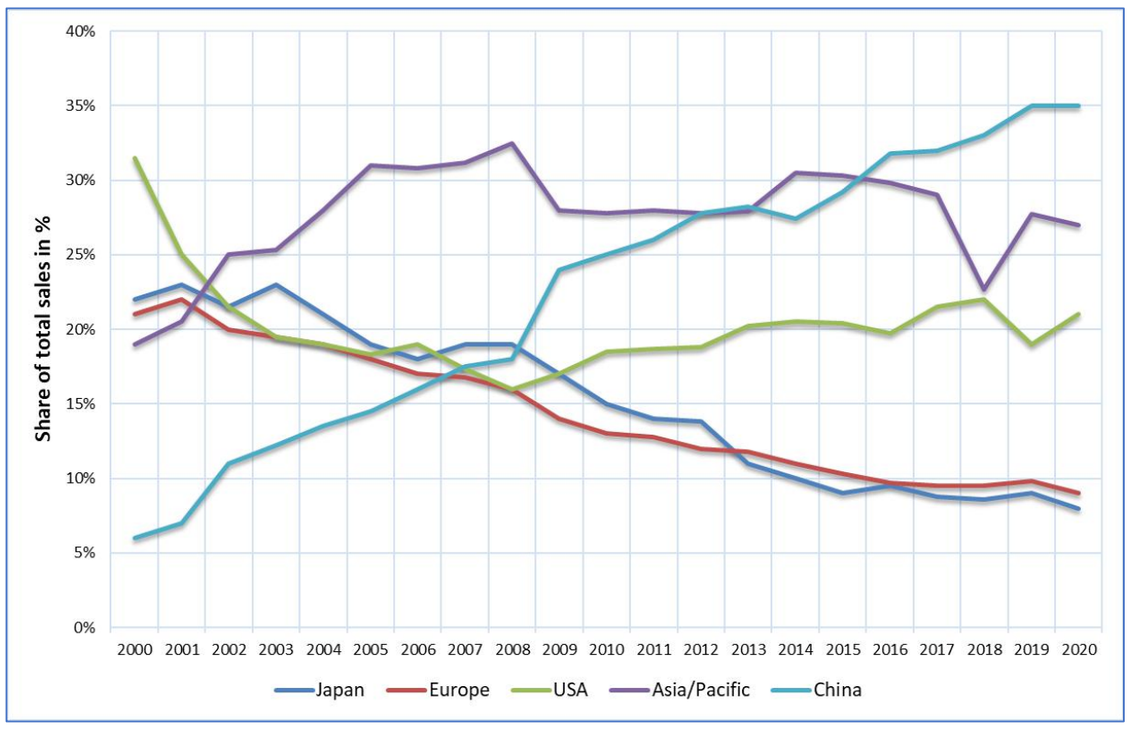

Figure 2: Market shares in semiconductor sales, 2000-2020

Strategies and Options

German OEMs and suppliers used different strategies to cope with the Covid-19 pandemic and the following semiconductor shortage. Results shown below are based on 26 expert interviews with executives in the German automotive industry, divided into short-term operational measures and long-term strategic options.

Operational measures (short-term)

- Use of short-time work and closure of production plants
- Adaptation of production processes
- Adjustment of inventories
- Installation of emergency response teams and task forces
- Search for alternative suppliers

Strategic options (long-term)

- Increase inventory levels for critical components
- Strengthen dual sourcing and flexible shares
- Supporting local supply chains
- Monitoring the reliability of political action

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