Mapping China’s semiconductor sector

A value-chain centric approach

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Our analysis of each production step based on 8 questions.

1. Overview
2. Market concentration
3. Market-entry barriers
4. National security impact / export restrictions
5. China’s policy attention
6. Situation of Chinese industry
7. How likely will China catch up within 5/10 years?
8. Assessment: Strategic dimensions
Analyzing a production step based on **3 strategic dimensions**

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<thead>
<tr>
<th>Industry competitive dimension</th>
<th>National adversarial dimension</th>
<th>Supply chain resilience dimension</th>
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<tbody>
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<td>Revenue capture</td>
<td>Espionage risk</td>
<td>Con. point of fail.</td>
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<td>Military utility</td>
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<td>Spillover benefits</td>
<td>Chokepoint</td>
<td>Replicability</td>
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**Legend**
- High
- Substantial
- Moderate
- Low
- NA
Geopolitical tensions analyzed through the strategic dimensions

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China’s semiconductor policies

State-led policy

- Larger frameworks: CCP Centenary Goals, national ‘Informatization’, cybersecurity (‘secure and controllable’)
- Overarching plans: Five Year Plan (basic research, talent generation, innovation ecosystem), National S&T Plan
- Sector-specific policies/targets: National IC Sector Guidelines (2014), MiC 2025, MIIT plans, tax incentives
- Regional govt plans, e.g. Beijing IC Industry Development Fund, Shanghai IC Industry Plan 2021-25
- Growing focus on ‘post-Moore’ and leapfrog chances: advanced packaging, compound semiconductors

Industry

- Private sector incentives: risk mitigation, expansion into new sectors, capturing more value from the value chain
- Public-private partnerships (Huawei, SMIC - city govs on foundries), industry associations / alliances
- Investment: National IC (‘Big’) Fund (Phase II), provincial government funds, equity/VC finance, STAR market

Interactions with the outside world

- Larger context: remaining open while import substituting (‘dual circulation’), intl markets & techl. standardisation
- Talent attraction, international exchanges (e.g. CSIA-SIA), R&D abroad and foreign industry partnerships
- Corporate acquisitions, espionage (incl talent poaching), regulatory clout (NXP, Qualcomm, Apl. Mat., Nvidia)
Key takeaways: China’s semiconductor ecosystem mid-2021

- Latest ‘phase’ of semiconductor industrial policy (centered on the Big Fund) can be traced to 2014, aiming to be more market-driven and to upgrade along the whole value chain

- Long-term R&D projects have delivered some results, but still far to go to meet basic import substitution requirements and unrealistic to reach global technological frontier in many areas

- Use of ‘government guidance funds’, a relatively new type of investment-centric industrial policy instrument

- Growing focus on most promising niches and potential ‘leapfrog’ approaches (memory; advanced packaging; ‘post-Moore’/next-generation semiconductors, e.g. SiC/GaN)

- More realistic chance of achieving desired results than before, but still a) high-level of state involvement b) potential for wastage c) uncertain impact of export controls by US and allies.

- Increased top-level focus (x2 SLGs led at Vice-premier level)