

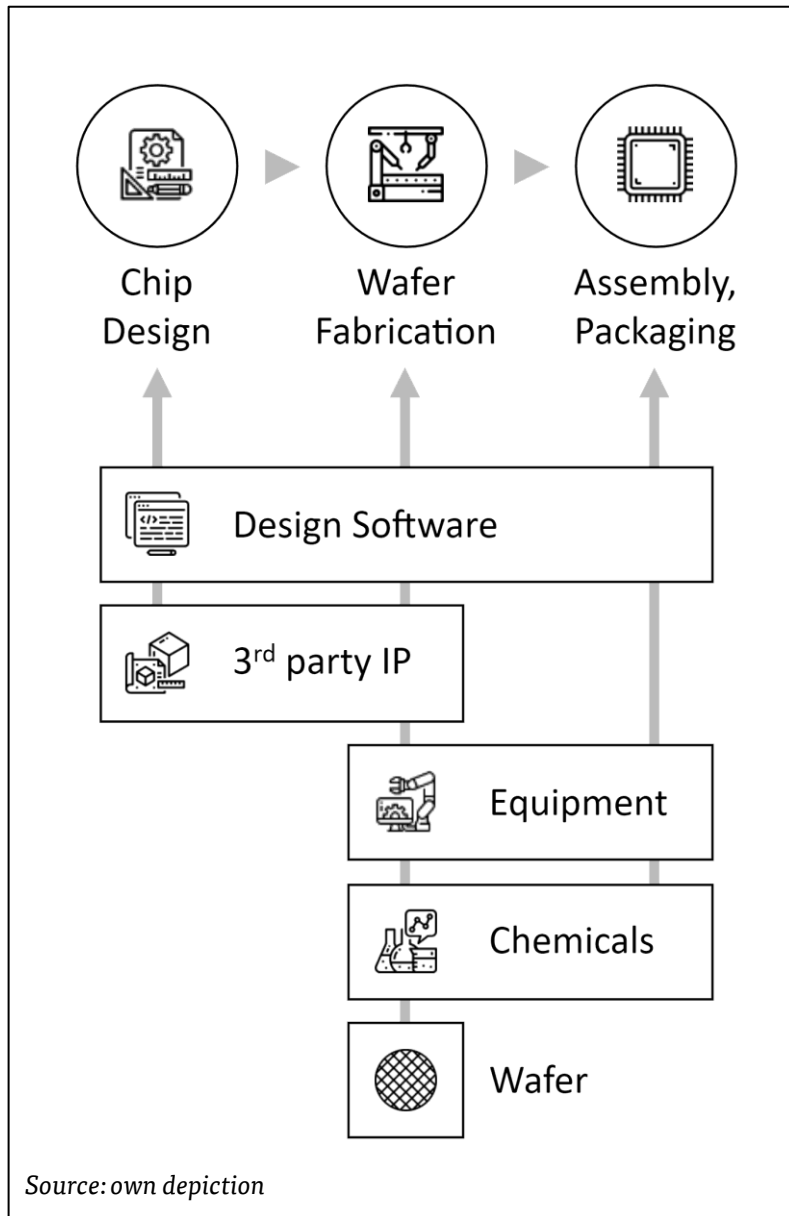
Mapping China's semiconductor sector

A value-chain centric approach

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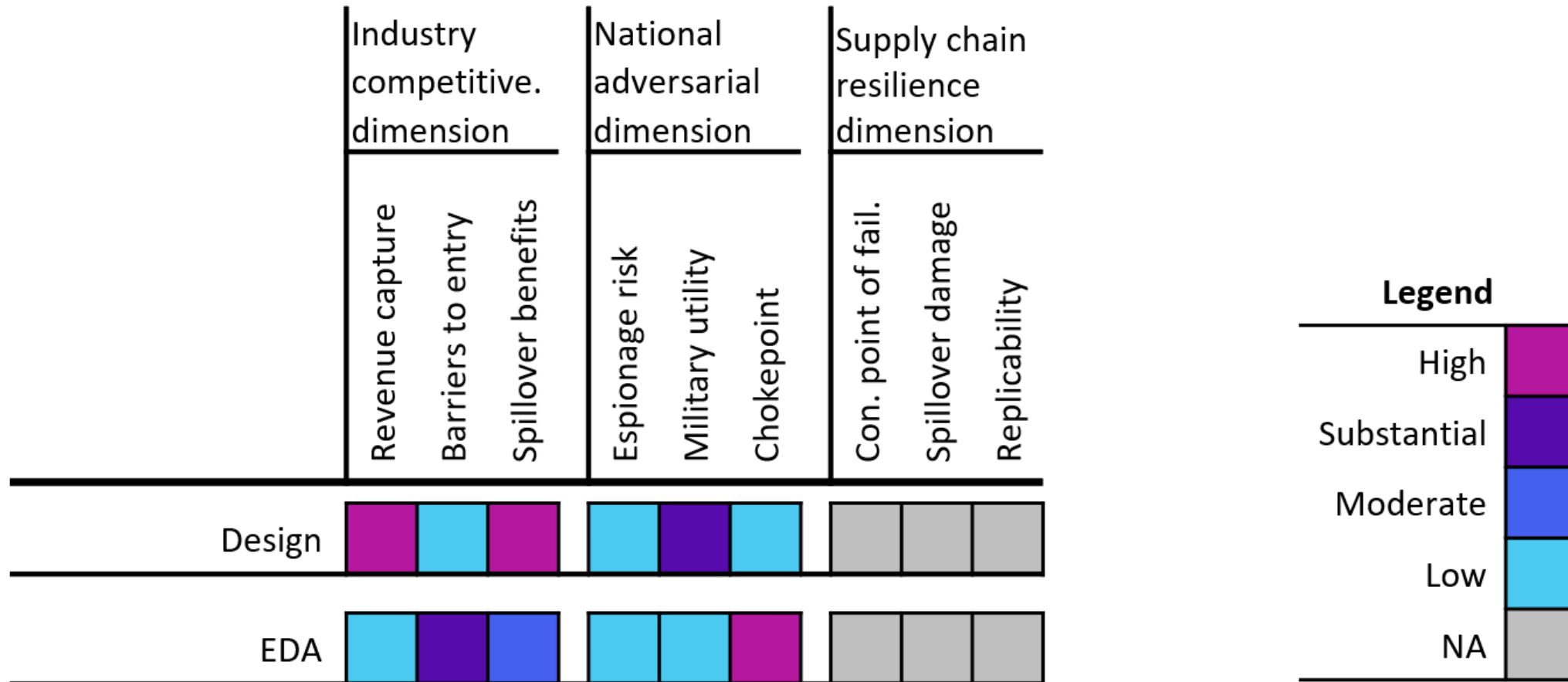
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Our analysis of each production step based on 8 questions.



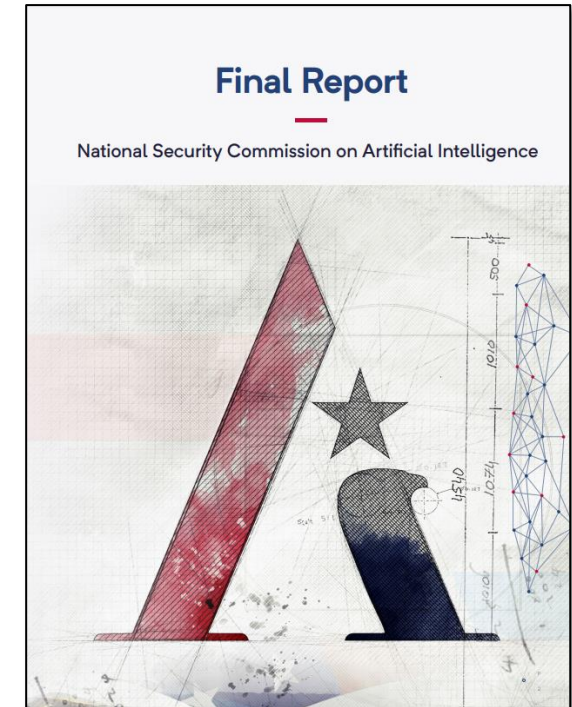
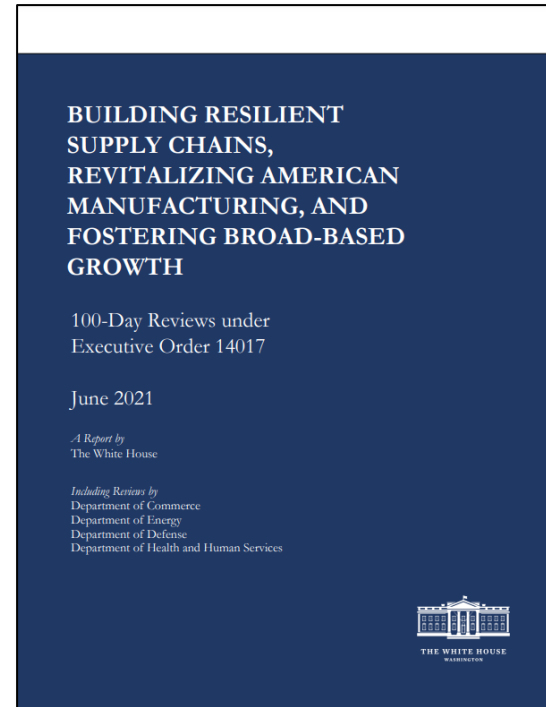
1. Overview
2. Market concentration
3. Market-entry barriers
4. National security impact / export restrictions
5. China's policy attention
6. Situation of Chinese industry
7. How likely will China catch up within 5/10 years?
8. Assessment: **Strategic dimensions**

Analyzing a production step based on 3 strategic dimensions



Geopolitical tensions analyzed through the strategic dimensions

	Competitiveness			National Security			Resilience		
	Revenue capture	Barriers to entry	Spillover benefits	Espionage risk	Military utility	Chokepoint	Concentr. point of failure	Spillover damage	Replicability
SME*	█	█	█	█	█	█	█	█	█
EDA	█	█	█	█	█	█	█	█	█
ATP	█	█	█	█	█	█	█	█	█



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

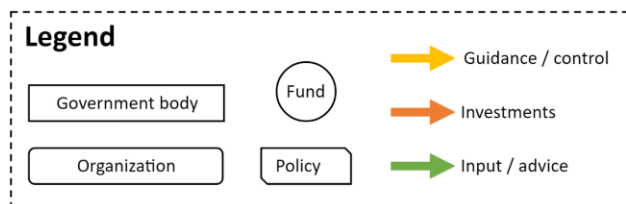
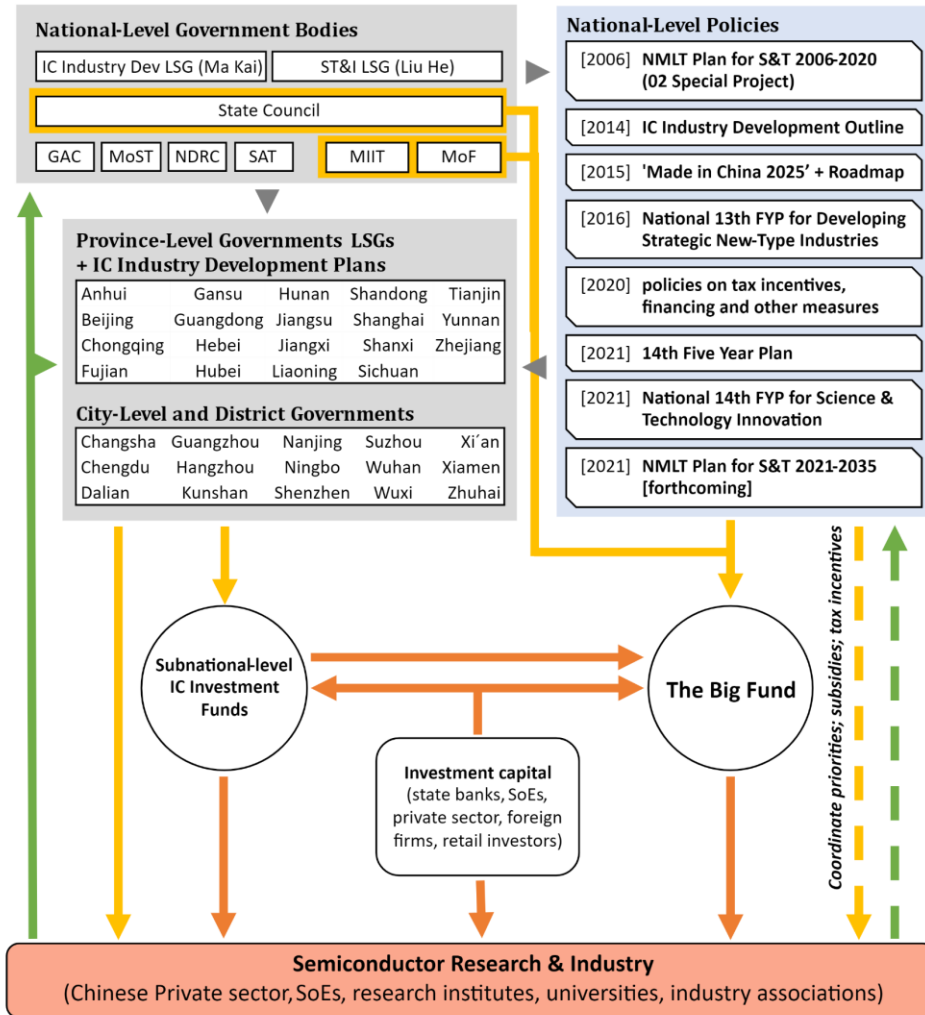
Industry

- Private sector incentives: risk mitigation, expansion into new sectors, capturing more value from the value chain
- Public-private partnerships (Huawei, SMIC - city govts 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)