SEMICONDUCTOR FABRICATION · PART 2-3

The silicon wafer industry
Why Japan’s leaders matter in the AI era

A handful of suppliers make the wafers on which much of the world’s chip industry depends. Japan’s two leading producers held a combined **53% share in the 2021 data published by METI**. Their position rests on years of crystal growth, precision processing and customer collaboration. Yet strong AI demand does not automatically produce strong profits. This lesson connects the technology to the business behind it.

Part 2 · Lesson 2-3 · Intermediate beginner level · Read Lessons 2-1 and 2-2 first · English edition: 4 November 2026

In this lesson

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How to read this lesson

Begin with the main text. The shaded physics boxes add optional detail and worked estimates. Figures are conceptual and not to scale. Numbered links lead to the supporting sources.

What you will learn

- Describe how concentrated the silicon wafer market is, without mixing figures from different years.
- Connect the strengths of Shin-Etsu and SUMCO to crystal growth, wafer processing and customer relationships.
- Explain why rising AI demand can coexist with weak profits, and what suppliers need to deliver next.

1. The industry in three ideas

- **A small group supports a large industry.** Worldwide silicon wafer revenue was US$11.4 billion in 2025. A separate estimate, based on January–September 2025 revenue, puts the five largest suppliers at about 75% of the market [1][5].
- **Japan's position has been built over decades.** Shin-Etsu Chemical, through Shin-Etsu Handotai, and SUMCO combine expertise in 300 mm wafers with close customer development, control of important inputs and long-term supply agreements.
- **Demand and profit follow different paths.** AI is increasing demand for advanced wafers, but SUMCO reported an operating loss for the first half of 2026. Depreciation and a slower recovery in traditional applications help explain the gap [10][11].

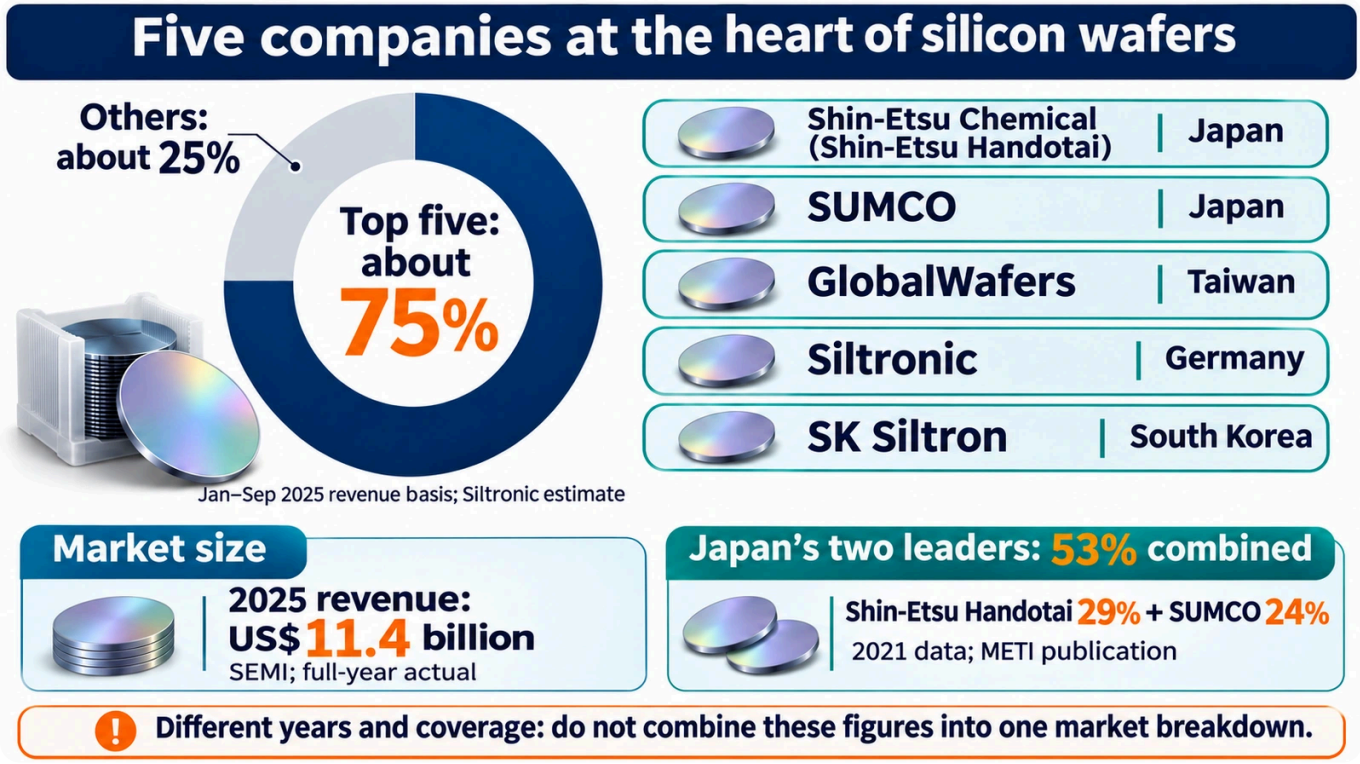

Figure 1 **Five major suppliers, with the dates kept in view** (schematic)

How to read the figure

The doughnut shows the five suppliers' combined share. The company labels are the same size for readability; their sizes do not represent individual market shares. The 53% figure for Japan's two leaders comes from 2021 data, whereas the top-five estimate uses January–September 2025 revenue [4][5]. Do not combine these into a single market breakdown. SEMI's statistics cover polished and epitaxial silicon wafers; they are not a total for every substrate material, such as SiC, or for reclaimed wafers [1][2].

2. How big is the wafer business?

SEMI recorded worldwide silicon wafer shipments of **12,973 million square inches**, usually abbreviated to **MSI**, in 2025. That was a 5.8% increase in shipped area. Revenue, however, fell 1.2% to **US$11.4 billion** [1]. More material shipped, but the industry earned less revenue from it overall.

The strongest demand came from advanced epitaxial wafers for logic and polished wafers for high-bandwidth memory, or HBM. Both benefited from AI investment. Traditional semiconductor applications recovered more slowly, with weaker demand and pricing holding back revenue [1]. The market therefore needs to be understood by product and application, rather than as one uniform boom.

In its **October 2026 forecast**, SEMI projected shipments of **14,420 MSI for 2026**, up 11.8%. It expected further annual records through 2029, reaching **17,034 MSI**. AI-related memory demand was broadening beyond HBM to server DRAM and enterprise NAND flash [2]. These are forecasts, not completed-year results.

The forecast implies about **31% more shipped area in 2029 than in 2025**: 17,034 ÷ 12,973 ≈ 1.31. This is a calculation using SEMI's actual and forecast figures. As in Lesson 2-1, the 2025 area would be roughly 120 million wafers if it were all expressed as 300 mm discs. That is a size-equivalent comparison, not a count of actual wafers sold.

3. Five major suppliers, spread across several countries

A concentrated market

Siltronic's September 2026 investor presentation estimates that the five largest suppliers served about **75% of the market**, using January–September 2025 revenue reports and its own estimates of wafer revenue [5]. They are:

Supplier	Home base	Name to recognise
Shin-Etsu Chemical	Japan	Its silicon wafer business includes Shin-Etsu Handotai, often called SEH
SUMCO	Japan	A major specialist silicon wafer producer
GlobalWafers	Taiwan	A supplier with manufacturing operations in several countries
Siltronic	Germany	A major supplier with production in Europe, Asia and the US
SK Siltron	South Korea	One of the five leading suppliers

The geography of the corporate headquarters is different from the geography of production. A company based in Japan or Europe can make wafers overseas, and a customer can obtain wafers from more than one manufacturing location.

Japan's Ministry of Economy, Trade and Industry, **METI**, has published several snapshots of the industry. A 2021 document described Japanese suppliers as holding around 60%, citing Nomura Securities data [3]. A July 2023 publication gave **2021 shares of 29% for Shin-Etsu Handotai and 24% for SUMCO**, based on Fuji Keizai research [4].

Those two figures add up to **53%**. They show the scale of Japan's position in that historical dataset; they should not be presented as measured 2026 shares. METI also identifies silicon wafers as an area in which Japanese suppliers have a significant responsibility to maintain global supply [4].

The US CHIPS programme makes a related point from a supply-security perspective: its GlobalWafers project description states that approximately **90% of silicon wafers were sourced from East Asia**, with five companies managing most supply [21]. This is the programme's stated context for supporting US production, rather than a new independent estimate made for this lesson.

What are the other major suppliers doing?

GlobalWafers opened its 300 mm wafer facility in Sherman, Texas, in May 2025. Its announcement described a US$3.5 billion commitment for the first two phases and plans for another US$4 billion, bringing its intended US investment to US$7.5 billion [22]. The US CHIPS award described by NIST provides up to **US$406 million** for the Texas and Missouri projects [21]. An investment plan and a fully completed investment are different things.

Siltronic inaugurated its new Singapore 300 mm fab in June 2024. Commissioning had begun earlier that year, and the company said the plant would reach full capacity over several years [23]. A ceremonial opening is therefore a milestone in a longer production ramp, rather than the moment at which every machine immediately runs at full output.

SK Siltron, based in South Korea, completes the group of five [5].

The deal that did not happen

In 2020, GlobalWafers proposed acquiring Siltronic. The offer price was subsequently raised from €125 to **€145 per share** [18]. Had it completed, two members of the top five would have become one group.

The required German foreign-investment approval did not arrive by **31 January 2022**. The offer lapsed, and GlobalWafers became liable for a **€50 million termination fee** under the agreement [17]. Press coverage reported the German ministry's explanation that confirmation of the Chinese approval had arrived only in the preceding week, leaving insufficient time to finish the review [19].

It is more accurate to say that the approval deadline was missed than to describe the outcome simply as a formal German rejection. The episode also illustrates why ownership of critical semiconductor inputs can raise strategic questions as well as commercial ones. That latter point is an interpretation of the event.

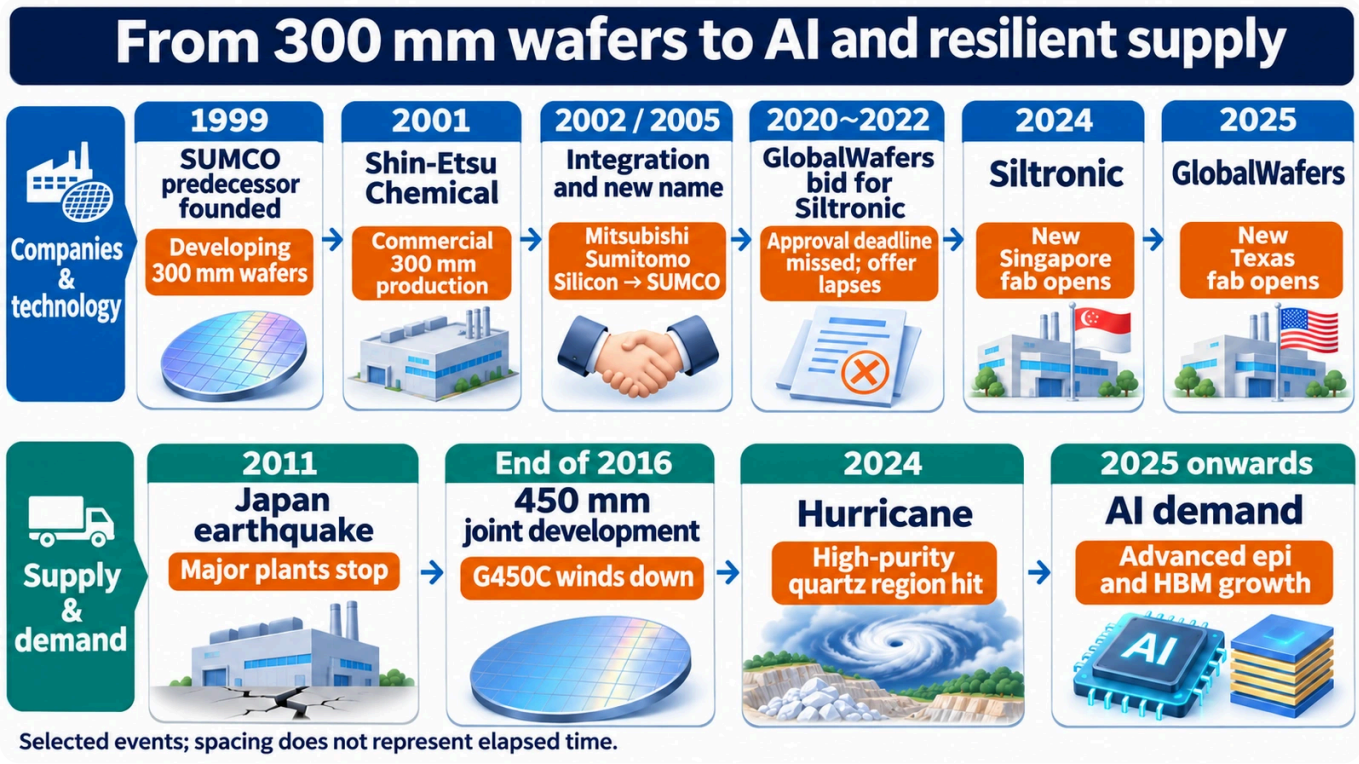

Figure 2 **From 300 mm development to AI demand and supply resilience** (schematic)

How to read the timeline

The upper row follows companies and technology; the lower row follows demand and supply disruptions. The G450C entry refers to reports that the 450 mm development programme did not continue as expected after its original term expired at the end of 2016 [27]. It does not mean that all research on larger wafers ended on one date.

4. Why have Japan’s two leaders stayed strong?

The public disclosures suggest four connected strengths. No single one explains the whole competitive position, and the two companies do not have identical business structures.

1. An early move into 300 mm production

Shin-Etsu began commercial production of **300 mm silicon wafers in 2001** [8]. SUMCO’s predecessor was established in 1999 to develop and manufacture 300 mm wafers. The silicon businesses were integrated into Mitsubishi Sumitomo Silicon in 2002, and the company adopted the SUMCO name in 2005 [7].

Larger crystals are harder to control thermally. As Lesson 2-1 explained, heat flow, crystal defects and oxygen content must be managed together. Lessons from early 300 mm production could therefore provide a foundation for later advanced products. This is a reasonable explanation of the advantage, rather than a measured claim that the early move alone caused today’s market position.

The scale of that transition is visible in the METI dataset: **300 mm represented 71% of wafer demand in 2021** [4].

2. Developing the next generation with customers

SUMCO states that it maintained a share of **more than 50% in wafers for leading-edge logic in 2025**. This is a company claim about a particular segment, not its share of all silicon wafers. Its sustainability report also says that all ten of the largest semiconductor companies by sales were customers, and that TSMC had recognised it with supplier awards for twelve consecutive years [6].

The important relationship begins before mass production. When a chipmaker develops a new process, it also needs to define what the starting wafer must deliver: local flatness, defect performance, oxygen control and electrical properties. A supplier involved at that stage can become part of the customer's qualified process.

Changing wafer suppliers later can require extensive evaluation. The inference is that technical collaboration and qualification help established suppliers retain business; they do not make switching impossible.

Shin-Etsu's October 2026 discussion also links advanced products to higher manufacturing and inspection costs and to more differentiated pricing [13]. An advanced wafer is not simply an ordinary wafer sold at a premium: the production and assurance work can be more demanding.

3. Controlling critical materials and components

SUMCO designs and manufactures quartz crucibles, and it acquired High-Purity Silicon Corporation as a subsidiary in 2023 [6][7]. Its process description shows high-purity polysilicon being melted in a quartz crucible to grow a single crystal [9].

These two inputs play different roles. The polysilicon supplies the silicon. The crucible contains the melt and influences its interaction with oxygen. Bringing important inputs under close control can support both consistent quality and continuity of supply.

Shin-Etsu's history records its 2006 tender offer for Mimasu Semiconductor Industry, a wafer-processing business [8]. The general lesson is control over important parts of the manufacturing chain. It does not follow that both groups manufacture every raw material and component themselves.

4. Using long-term agreements to support investment

A wafer plant requires a large commitment of money well before it reaches normal production. Customers and suppliers therefore use **long-term agreements**, or **LTAs**, to agree prices and volumes over several years.

SUMCO reported that LTA prices for both 300 mm and 200 mm wafers were maintained in 2025, even while demand was weak in some applications [10]. Contracts can give an investment a firmer commercial basis, but they cannot remove all market risk. Inventory changes, delivery timing and utilisation still matter.

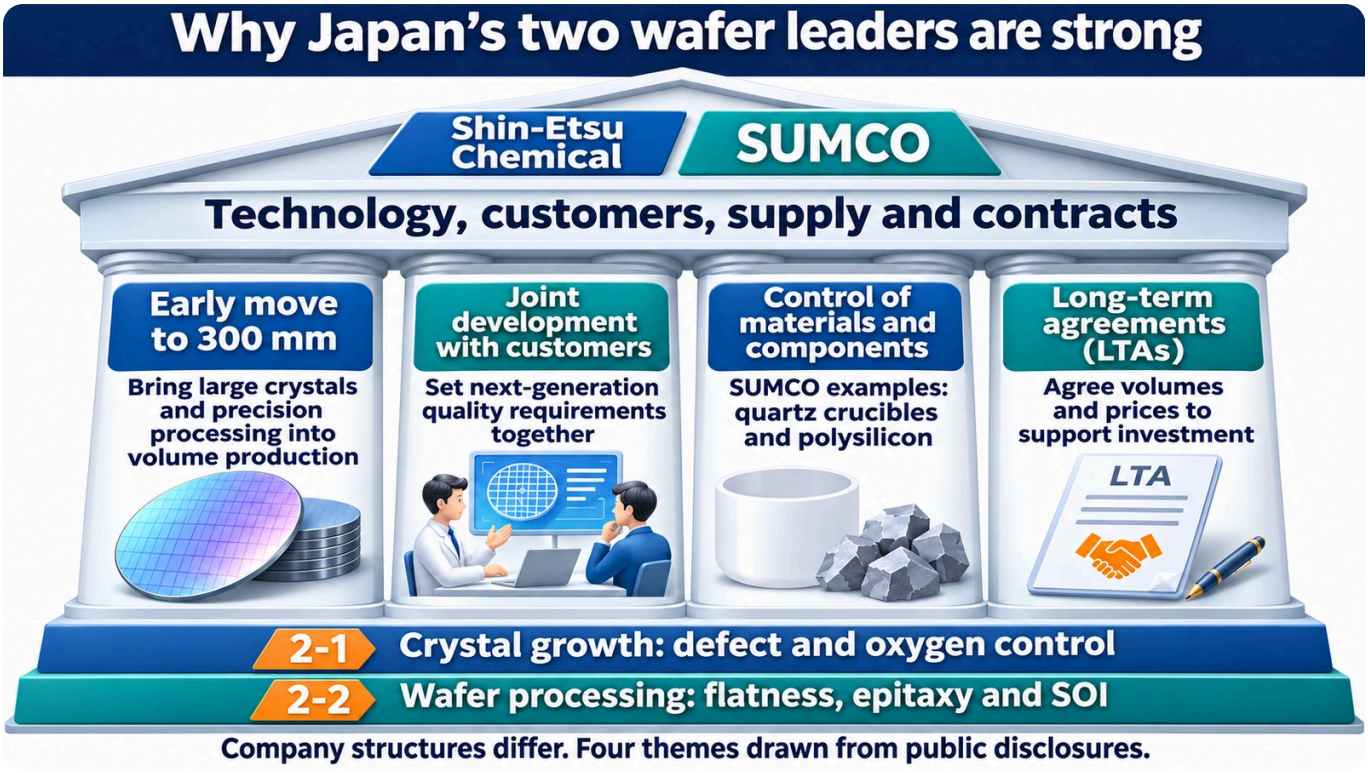

Figure 3 **Four connected strengths, built on crystal and processing technology** (schematic)

Read the foundations as well as the pillars

Crystal growth and precision processing support the whole structure. The commercial relationships help those technical capabilities become repeat business. The figure summarises themes from company disclosures; it does not imply that each supplier has the same internal organisation or that an LTA guarantees a profit.

5. Why can an AI boom coexist with an operating loss?

SUMCO's results make the distinction between demand and profitability tangible [11].

SUMCO, consolidated	2024 full year	2025 full year	January–June 2026
Revenue	¥396.6 billion	¥409.6 billion	¥215.0 billion
Operating profit / loss	¥36.9 billion	¥1.3 billion	**¥6.3 billion loss**

The first two columns cover twelve months; the third covers six. They should not be compared as though they were equal periods. The comparable half-year figures below show a different aspect of the business [11] (pp.17–18).

Depreciation	January–June 2025	January–June 2026
Total depreciation	¥49.4 billion	¥64.4 billion
Depreciation included in operating results	¥48.7 billion	¥60.3 billion

First, the cost of the installed equipment increased. Total depreciation rose by ¥15.0 billion between those two half-years. Within operating results, depreciation rose by ¥11.6 billion. Separating those measures avoids attributing the whole increase in total depreciation directly to operating profit [11].

Second, recovery was uneven. Strong AI-related products did not mean that every customer needed more of every wafer. SUMCO described slow recovery in conventional products in its 2025 results [10]. Shin-Etsu said demand for 200 mm wafers was still about three-quarters of its 2021–2022 peak [13].

Inventory can prolong that mismatch. In March 2024, GlobalWafers' chair was reported as saying that customer stocks were falling more slowly than expected and that customers were prioritising their use over signing new LTAs [20]. This is a dated account of inventory behaviour, not a claim that the same conditions apply unchanged in every later quarter.

The economics: fixed costs make utilisation matter

A simplified operating model is:

Revenue = selling price × quantity sold

Operating profit = revenue − variable costs − fixed costs

Variable costs tend to increase with production; materials and part of electricity consumption are examples. Fixed costs, including much depreciation and staffing expense, remain even when output falls. Actual factory costs contain both fixed and variable elements.

When a new plant becomes available for use, depreciation normally begins. If sales have not caught up, fewer wafers must carry the fixed-cost burden. A long-term increase in market demand can therefore coexist with pressure on near-term profits.

Why expand an existing site before building a new one?

SUMCO had obtained approval in 2023 for new crystal and wafer facilities in Imari and Yoshinogari, Saga Prefecture. The plan involved **¥225 billion** of investment, with government support capped at **¥75 billion** [4].

In April 2026, industry reporting said the timing of new construction would depend on market conditions, with upgrading existing equipment taking priority. The expected support had reportedly fallen to **¥19.3 billion**. The report connected the revised approach to stricter wafer requirements beyond the 2 nm generation [14]. These are reported developments, distinct from the original government-approved plan.

Shin-Etsu similarly said in October 2026 that it would prioritise **brownfield expansion**, meaning additions or upgrades at existing sites. Building an entirely new facility, a **greenfield investment**, had become expensive. The company also pointed to the risk of customer ordering plans proving too ambitious [13].

The decision is therefore about timing and product capability as well as total capacity.

6. What is AI changing for wafer suppliers?

More than GPUs and HBM

SUMCO's August 2026 presentation describes a shift from generative AI towards **agentic AI**: systems that plan tasks, use tools and repeat steps towards a goal. The company expects this to increase CPU activity and memory needs, extending AI-related demand into **CPUs, DRAM and NAND**, alongside GPUs and HBM. It revised its server-related wafer outlook upwards and described upgrading capability through conversion of existing equipment [11]. These are the company's views and projections.

Several disclosures point to tighter conditions in advanced products:

- Shin-Etsu's October 2026 results describe a strong AI-investment environment and supply constraints in some product groups [12].
- In its accompanying discussion, Shin-Etsu said the wafer market had grown by a little over 10% year on year in July–September 2026. Some customers were already discussing their next contracts before existing ones expired [13].
- Shin-Etsu also described price negotiations for volumes beyond existing contracts and for customers without contracts, with higher prices taking effect for some customers from October 2026 [13].
- Industry reporting described May 2026 increases of roughly 5–8% for standard 300 mm wafers and 18–22% for higher-grade AI/HPC products [15]. These reported ranges are not a universal price list or a claim that every supplier and customer saw the same increase.
- SUMCO reported that LTA prices held in April–June 2026 and that discussions on spot prices had begun [11].

Different chips ask different things of the wafer

Application	What connects it to the starting wafer?
Leading-edge logic	Advanced epitaxial wafers and tighter control of flatness, defects and consistency support demanding device processes [1][14].
HBM and DRAM	HBM uses stacks of tested DRAM chips. Wafer quality affects the supply of usable chips, while failures discovered after stacking can affect the finished product's yield.
Backside power delivery	Some flows bond the device wafer to a support wafer before thinning it. Surface quality and geometry matter to those steps, as introduced in Lesson 2-2.
Optical links in data centres	Photonics-SOI supports silicon photonics. Soitec reported that Photonics-SOI revenue exceeded US$100 million in its financial year ended March 2026 [25].

The HBM and bonding connections are explanations of why wafer quality matters, rather than measurements of the extra wafer sales caused by those applications. HBM stacks individual chips cut from wafers; it does not stack whole production wafers in the finished memory package.

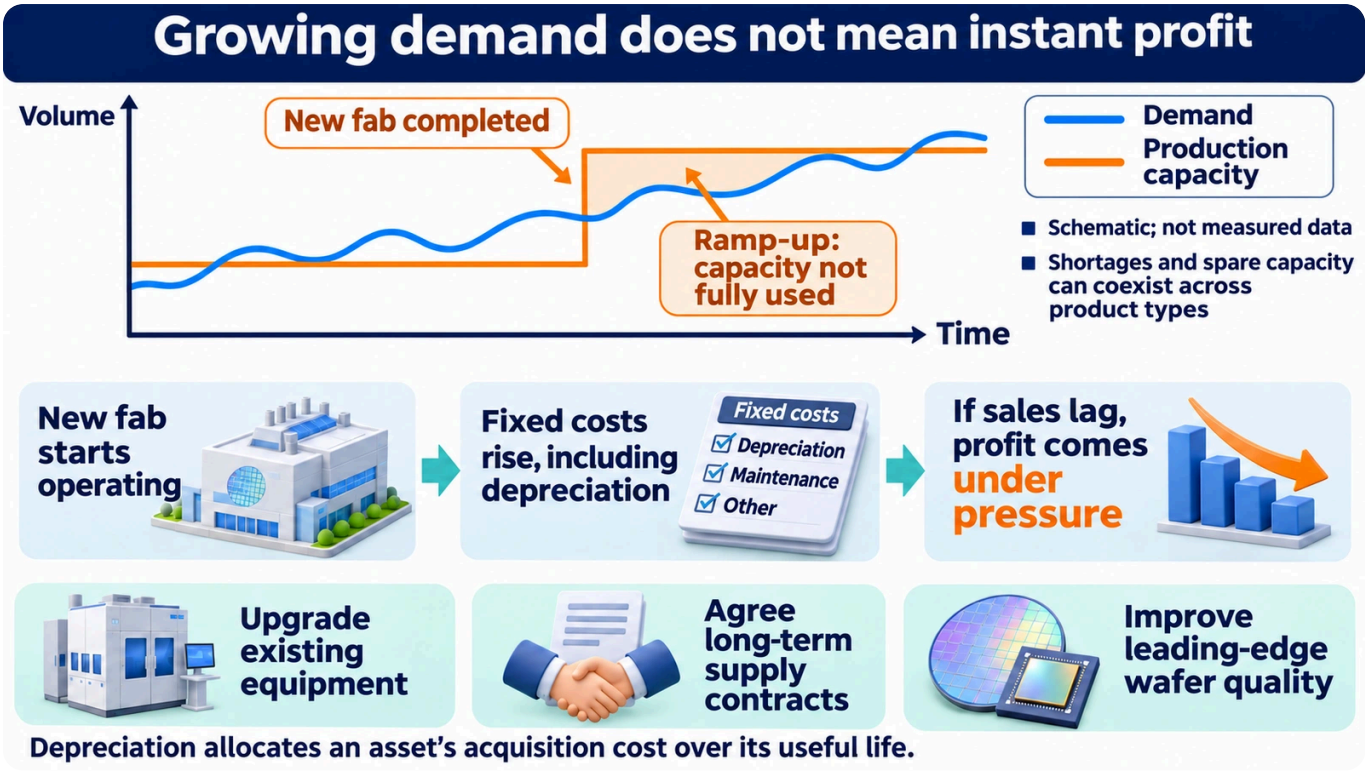

Figure 4 **Why demand growth does not immediately become profit** (schematic)

Profit, capacity and cash are different measures

The plotted lines illustrate a mechanism; they are not measured market data. Shortages in advanced products can coexist with spare capacity in other product types. Depreciation is the allocation of an asset's cost over its useful life, not a payment of the same amount in cash during that period. Distinguishing the original investment from the subsequent accounting expense helps explain the results.

7. Where is the supply chain vulnerable?

A concentrated industry can be exposed both to particular production locations and to materials with specialised sources.

Earthquakes. After the 2011 earthquake in Japan, Shin-Etsu's Shirakawa plant and MEMC's Utsunomiya plant stopped operating. Contemporary reporting, citing IHS iSuppli, put their combined share at about **25% of global wafer production** [24]. That is a historical estimate of the affected plants, not today's share. MEMC's former wafer operations are now part of GlobalWafers.

High-purity quartz. Spruce Pine, North Carolina, is an important source of the high-purity quartz used for crucibles. In 2024, Hurricane Helene disrupted the area and the two producers stopped operations, according to the cited reporting [26]. A specialised material can be a bottleneck even when the wafer factories themselves remain intact.

Geographical concentration. The NIST description's roughly 90% East Asian sourcing figure explains part of the policy interest in additional US capacity [21]. New facilities in Texas and Singapore also change the distribution of production. More locations can reduce exposure to one disruption, although they may still depend on common inputs, utilities or transport routes.

Competition from China is changing too

NSIG's regulatory disclosure says its 300 mm wafer capacity increased from **650,000 wafers per month in 2024 to 850,000 in 2025**. It describes rising domestic substitution alongside continuing structural shortages in mid- and high-end products [16]. Capacity is the amount a plant can potentially make; it is not automatically the quantity sold.

The same disclosure cites a SEMI projection that mainland China would account for about **one-third of global 300 mm chip-fab capacity in 2026** [16]. That concerns capacity to process wafers into chips, not the market share of Chinese wafer suppliers. It is also a projection cited by NSIG.

Industry reporting says ESWIN's monthly production and sales of 300 mm wafers had passed **one million**, with a future target of **1.8 million per month** [15]. The achieved figure and the target should remain distinct.

As chip production expands within China, there is a commercial incentive to source more materials locally. An implication for established suppliers is that standard products may face greater price competition, while demanding products continue to compete on qualification and performance. This is an interpretation of the direction of competition, not a forecast of any company's eventual share.

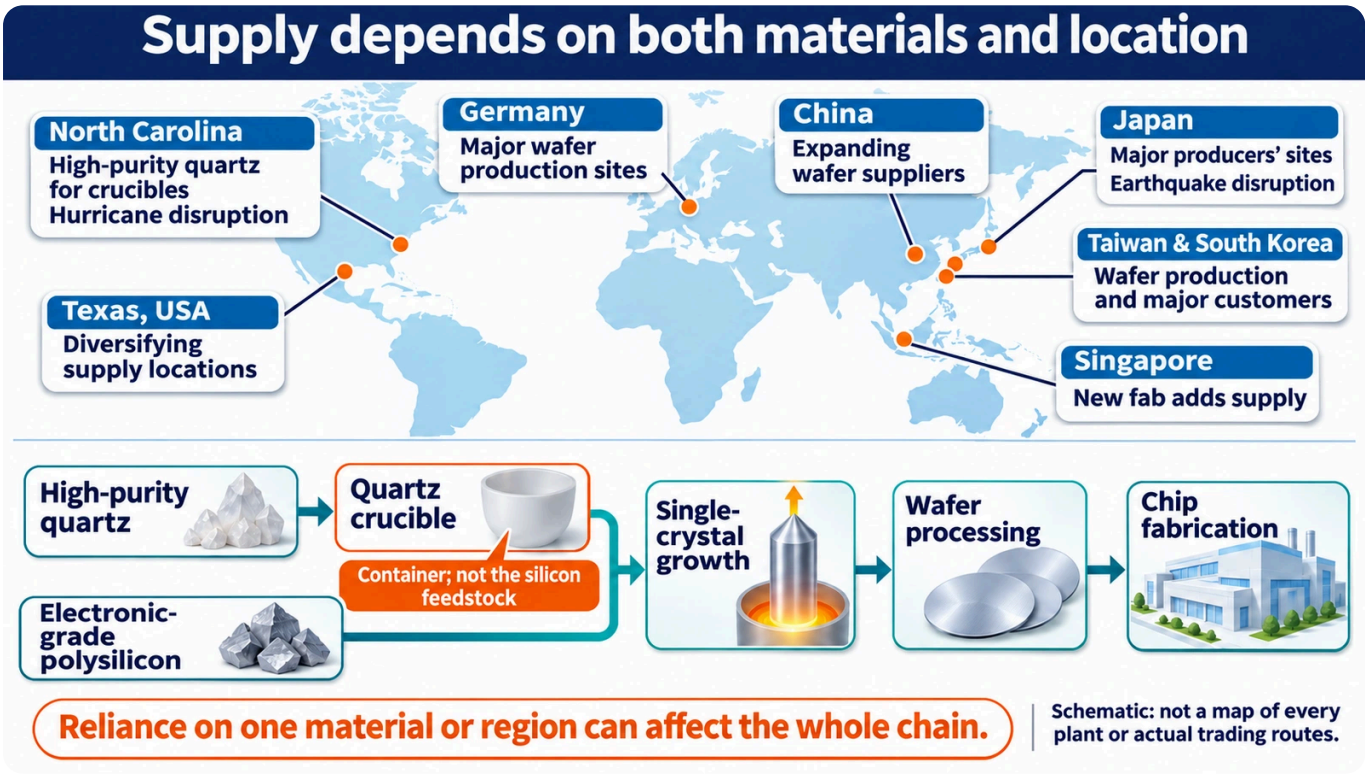

Figure 5 **Materials and locations connect the whole supply chain** (schematic)

The crucible is the container

High-purity quartz becomes a quartz crucible. Electronic-grade polysilicon goes into that crucible, melts and supplies the growing single crystal. The two branches in the figure deliberately stay separate until crystal growth. The map shows representative regions, not every plant or actual trading routes. Spreading factories across countries does not remove a shared dependency on the same upstream material.

8. Put the industry picture together

Question	Main point
How big is the market?	US$11.4 billion of revenue in 2025; further shipment growth was forecast through 2029.
Who supplies it?	Five leaders held about 75% in one 2025 estimate. The Japanese pair held 53% in a separate 2021 dataset.
Why are Japan’s leaders strong?	Early 300 mm experience, customer development, control of important inputs and long-term contracts build on crystal and processing expertise.
Why can profits lag demand?	Depreciation, uneven product demand and slow factory ramp-up can offset sales growth.
What does AI require?	Advanced epitaxy and memory wafers, consistent quality, surfaces suitable for bonding, and specialised products such as Photonics-SOI.
What could change the balance?	Disruptions, concentrated upstream sources, geographical exposure and expanding competitors.

Next, **Lesson 2-4: Wafers beyond silicon** looks at materials chosen for capabilities that ordinary silicon cannot provide: SiC for power devices in electric vehicles, InP for optical communications, and emerging substrates such as gallium oxide and diamond.

9. Check your understanding

1. Which five suppliers make up the leading group, and what does the 75% estimate refer to?

▼ **Show answer**

Shin-Etsu Chemical / Shin-Etsu Handotai, SUMCO, GlobalWafers, Siltronic and SK Siltron. The approximately 75% figure is Siltronic's combined-share estimate based on January–September 2025 revenue, not five individual shares or measured 2026 data.

2. What four strengths help explain the position of Japan's two leaders?

▼ **Show answer**

Early experience in 300 mm production; development with advanced customers; control of important materials and components; and long-term supply agreements. These rest on expertise in crystal growth and wafer processing. The companies' internal arrangements differ.

3. Why did stronger AI-related demand not prevent SUMCO's first-half 2026 operating loss?

▼ **Show answer**

Depreciation and other fixed costs weighed on results while conventional products recovered more slowly. Demand for advanced wafers did not fill every type of installed capacity.

4. Why might a wafer producer prefer a brownfield upgrade to a greenfield project?

▼ **Show answer**

A new site is expensive and takes years to reach production. If demand, product requirements or customer ordering plans change during that time, the company can face a heavy fixed-cost burden. An existing site may offer a more suitable route to extra capability.

5. Why did GlobalWafers' proposed acquisition of Siltronic lapse?

▼ **Show answer**

The required German approval had not arrived by 31 January 2022. The offer conditions were therefore not met by the deadline, and GlobalWafers became liable for a €50 million termination fee.

6. Give three examples of supply-chain exposure, and explain the quartz branch in Figure 5.

▼ **Show answer**

A major plant can stop after an earthquake; a specialised quartz source can be disrupted by a hurricane; and production can be concentrated in one region. Quartz makes the crucible. The silicon crystal is supplied by the separate electronic-grade polysilicon input.

10. A short glossary

Shin-Etsu Handotai (SEH)
A Shin-Etsu Chemical subsidiary that produces silicon wafers.

SUMCO
A Japanese wafer producer formed through the integration of silicon businesses; it adopted its current name in 2005.

GlobalWafers
A Taiwan-based supplier with an international manufacturing network, including a Texas 300 mm facility.

Siltronic
A Germany-based silicon wafer supplier with production in Europe, Asia and the US.

SK Siltron
A South Korean wafer supplier in the SK group.

METI
Japan's Ministry of Economy, Trade and Industry.

MSI
Million square inches, a unit used to report total wafer shipment area.

Long-term agreement (LTA)
A multi-year agreement setting commercial terms such as wafer volumes and prices.

Spot price
A price agreed outside a long-term contract, reflecting the conditions of a particular transaction.

Depreciation
Allocation of an asset's cost over its useful life as an accounting expense.

Fixed costs
Costs that do not fall in direct proportion when output falls, such as much depreciation and staffing expense.

Variable costs
Costs that tend to increase with output; some factory cost categories contain both variable and fixed elements.

Utilisation
The extent to which available production capacity is being used.

Silicon cycle
Repeated rises and falls in semiconductor demand, inventory, pricing and investment; the timing is not perfectly regular.

Greenfield investment
Building a new facility on a new site.

Brownfield investment
Expanding or upgrading an existing industrial site.

Agentic AI
AI systems that plan and carry out linked tasks, often using tools and evaluating intermediate results.

Foreign-investment screening
Government review of foreign ownership transactions, including security considerations.

Domestic substitution
Replacing imported products with products supplied by domestic producers.

CHIPS Act
US legislation enacted in 2022 to support domestic semiconductor capability.

11. Sources and reading notes

Source numbers follow the completed Japanese edition. Japanese and Chinese documents are identified below; their titles are described in English. Company estimates, management views and press accounts retain their original context.

1. **SEMI** — 2025 worldwide silicon wafer shipments and revenue (10 February 2026) — Read source
2. **SEMI** — Silicon shipment forecast for 2026–2029 (21 October 2026) — Read source
3. **METI** — Direction of Japan's semiconductor strategy (24 March 2021), p.20 [Japanese] — Read source
4. **METI** — Semiconductor and digital industry strategy (July 2023), pp.6, 8, 17 [Japanese] — Read source
5. **Siltronic** — Investor presentation (September 2026), p.6 — Read source
6. **SUMCO** — Sustainability Report 2026, pp.6, 14 [Japanese] — Read source
7. **SUMCO** — Corporate history [Japanese] — Read source
8. **Shin-Etsu Chemical** — Corporate history [Japanese] — Read source
9. **SUMCO** — Silicon wafer manufacturing process [Japanese] — Read source
10. **SUMCO** — Results for Fiscal Year 2025 (10 February 2026), p.9 — Read source
11. **SUMCO** — Second-quarter 2026 results presentation (6 August 2026), particularly pp.17–18 [Japanese] — Read source
12. **Shin-Etsu Chemical** — Interim financial results, year ending March 2027 (27 October 2026), p.4 [Japanese] — Read source
13. **Shin-Etsu Chemical** — Second-quarter results conference-call summary (27 October 2026) [Japanese] — Read source
14. **TrendForce** — SUMCO delays construction of two silicon wafer fabs amid market shift (6 April 2026) [Press report] — Read source
15. **TrendForce** — China's 12-inch silicon wafers: new capacity investments (12 August 2026) [Press report] — Read source
16. **NSIG** — Response to regulatory questions on the 2025 annual report, notice 2026-039 (29 July 2026), pp.5, 8 [Chinese] — Read source
17. **Siltronic** — Public tender offer by GlobalWafers will not be completed (1 February 2022) — Read source
18. **Siltronic** — Increase of offer price under GlobalWafers' tender offer — Read source
19. **Taipei Times** — GlobalWafers' bid for Siltronic fails (2 February 2022) [Press report] — Read source
20. **Taipei Times** — GlobalWafers chair on inventories and long-term contracts (7 March 2024) [Press report] — Read source
21. **NIST / CHIPS** — GlobalWafers: Sherman, Texas project description — Read source
22. **GlobalWafers** — GlobalWafers America officially opens for business (16 May 2025) — Read source
23. **Siltronic** — Inauguration of the new Singapore fab (12 June 2024) — Read source
24. **InformationWeek** — 25% of global silicon wafer production suspended (21 March 2011) [Press report] — Read source
25. **Soitec** — Fiscal 2026 full-year results (27 May 2026) — Read source
26. **NBC News** — How a town hit by Helene could disrupt the chip industry (3 October 2024) [Press report] — Read source
27. **Times Union** — NY: Demise of G450C wasn't over money (January 2017) [Press report] — Read source

12. Evidence map and calculation notes

Topic	Sources	How to interpret it
2025 shipments, revenue and AI-related product mix	SEMI [1]	Completed-year industry figures; different from a forecast.
2026–2029 shipment outlook	SEMI [2]	October 2026 projection. The 1.31 ratio compares 2029 forecast area with 2025 actual area.
Japan's market position	METI [3][4]	Different dated datasets. The 53% is 29% + 24% in the 2021 company data.
Five major suppliers and approximately 75%	Siltronic [5]	Company estimate using January–September 2025 revenue.
Leading-edge logic share, customer relationships and crucibles	SUMCO [6]	Company disclosures; segment share is not total-market share.
Corporate development and control of inputs	SUMCO [7]; Shin-Etsu [8]; process [9]	Company structures differ. Quartz and silicon have different roles.
LTA prices and conventional-product recovery	SUMCO [10]	Statements in the 2025 results presentation.
Revenue, operating results and depreciation	SUMCO [11], pp.17–18	Annual and half-year periods separated; total and operating depreciation distinguished. Japanese amounts converted to billions of yen.
AI development and server-related demand	SUMCO [11]	Management's views and projections; not guaranteed demand.
AI investment, market growth, pricing and expansion	Shin-Etsu [12][13]	Company statements from October 2026.
SUMCO's revised construction approach and subsidies	TrendForce [14]; original plan [4]	A press account of changes compared with the earlier approved plan.
Reported price increases and ESWIN growth	TrendForce [15]	Reported ranges and company developments, not a universal price schedule.
NSIG capacity and domestic substitution	NSIG [16]	Wafer capacity differs from sales; chip-fab capacity differs from supplier market share.
GlobalWafers–Siltronic offer and lapse	Siltronic [17][18]; report [19]	Approval deadline missed; €50 million termination fee. Strategic interpretation identified as such.
Customer inventory behaviour	Taipei Times [20]	Dated March 2024 account.
CHIPS support and East Asian sourcing	NIST [21]	Programme description and its stated supply-security context.
Texas and Singapore openings	GlobalWafers [22]; Siltronic [23]	Opening, planned investment and full-capacity production are distinct milestones.
Earthquake, quartz disruption and 450 mm programme	Reports [24][26][27]	Historical events; reported 2011 production share is not a current share.
Photonics-SOI revenue	Soitec [25]	More than US$100 million in the financial year ended March 2026.
Competitive advantages and next-generation requirements	Author's interpretation, linked to Lessons 2-1 and 2-2	Technical and economic explanations, not quantified forecasts of market share.

English edition: 4 November 2026. Fresh English text based on the completed Japanese edition. Sources retain their original reporting periods. Forecasts, company statements, press reports and the author's interpretation are distinguished in the text. Five educational diagrams created with OpenAI Image Gen.

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