

Lam Research: funding the next process inflection

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Lam Research has spent decades building expertise in deposition, etch, clean and related wafer-fabrication processes. On October 23, 2024, the company reported a second consecutive quarter of revenue growth and told investors it expected wafer-fabrication-equipment spending to rise in calendar 2025. It also described several technology shifts that could expand demand for its tools. But the public record does not show how much Lam should invest in each opportunity, what returns individual programs might earn, or how quickly customers will place and accept orders.

For this classroom exercise, assume you are an executive on Lam's senior leadership team preparing a **hypothetical resource-allocation recommendation** for the next planning period. The public sources do not establish that Lam's board or management posed this question, that a particular funding envelope exists, or that any option below was under consideration. Your task is to recommend how Lam should direct its next discretionary increments among technology and customer-facing R&D, manufacturing and service capability, and capital returned to shareholders. Required sustaining, safety, regulatory and contractual spending would first be protected; the company does not disclose its amount.

The decision

How should Lam prepare for a projected WFE recovery while preserving its ability to respond if customer ramps are delayed or uneven? Choose and adapt one of these approaches, or propose another:

1. **Accelerate selected technology programs.** Put more incremental effort into process and product development linked to GAA, backside power delivery, 3D NAND transitions, advanced packaging or other named inflections. Preserve the customer engineering needed to qualify those products.
2. **Emphasize the installed base and execution capacity.** Give greater incremental weight to upgrades, service, data-enabled customer support and the manufacturing capacity needed to deliver when customers are ready. Keep strategic technology programs funded, but limit broad expansion until customer timing is clearer.
3. **Stage commitments and preserve financial flexibility.** Fund near-term technical and customer milestones across several opportunities, then release additional resources as evidence on qualification, production ramp, repeat orders, utilization and value capture improves. Retain more cash for resilience or capital return until evidence improves.

The choices may overlap. A strong recommendation identifies what should be funded now, what should wait, which shared capabilities are necessary, and what evidence would cause Lam to change direction. Public materials disclose no project-level hurdle rate, customer commitment, program budget, product margin or R&D payback. Any numerical budget or hurdle you introduce is your own hypothetical assumption and should be labeled as such.

A recovery with more than one signal

Lam sells equipment and services to manufacturers of memory, foundry and integrated-device products. The company describes its core capability as integrating hardware, process, materials, software and process control. Chip fabrication requires many repeated steps; Lam's deposition, etch and clean systems address selected parts of that process. As device structures and materials change, demand may depend on the number and difficulty of process steps, Lam's ability to qualify a tool, and the customer's production schedule. These mechanisms do not establish that Lam will win any particular program. [S1, Item 1, pp. 4-8.]

The downturn had not affected all end markets equally. Lam reported FY2024 revenue of **\$14.905 billion**, down from **\$17.429 billion** in FY2023. Management said weaker non-volatile memory demand drove most of the decline, partly offset by DRAM strength and higher China revenue; WFE spending was roughly flat for FY2024. Systems revenue was **\$8.922 billion** and customer-support-related revenue was **\$5.984 billion**. That latter category includes service, spares, upgrades and non-leading-edge Reliant equipment; it is not a pure recurring-service measure. Lam reports one operating segment and does not disclose profit by product or end market. [S1, Item 7, pp. 29-32; Note 4, p. 47; Note 19, pp. 63-65.]

For the quarter ended September 29, Lam reported revenue of **\$4.168 billion**, up 8% sequentially. GAAP gross margin was 48.0%, operating margin was 30.3%, and diluted EPS was \$0.86 after the stock split. Management's December-quarter guidance was revenue of \$4.3 billion $\pm$ \$0.3 billion and non-GAAP gross margin of 47% $\pm$ 1 percentage point. The company also reported \$6.1 billion of cash, cash equivalents and restricted cash. These consolidated results show a near-term improvement; they do not identify which tools, customers or programs drove it or provide a longer-range project return. [S2, "Key Financial Data," "Balance Sheet and Cash Flow Results," and guidance; S3, slides 10-15.]

Lam's October presentation gave an early view of CY2025 WFE growth after estimating CY2024 spending in the mid-\$90 billions. Management said Lam was positioned to outgrow WFE, pointing to GAA, backside power delivery, more 3D NAND layers, tungsten-to-molybdenum material transitions, advanced packaging and dry EUV resist processing. It expected certain NAND production wins to scale first in 2025, with foundry/logic and DRAM ramps following. Lam also said SABRE 3D revenue would more than double in CY2024 and claimed significant market-share gains. These statements are management expectations and claims; the slides do not give customer names, project economics, share calculations or realized outcomes. [S3, slides 3-8.]

Customer and competitor evidence

Two pre-cutoff disclosures point to different aspects of demand. TSMC reported that Q3 2024 revenue increased 12.8% sequentially and said smartphone and AI-related demand supported its 3nm and 5nm technologies. It reported that 3nm, 5nm and 7nm contributed 20%, 32% and 17% of wafer revenue, respectively; technologies at 7nm and below were 69%.

High-performance computing was 51% and smartphones 34% of total net revenue. TSMC's consolidated capital expenditures were **US\$6.40 billion** in Q3 and **US\$18.53 billion** year to date. TSMC's process-mix percentages use wafer revenue, while platform mix uses total net revenue. Its capex does not disclose spending by equipment supplier or Lam tool content. [S6, pp. 1-2, 5.]

ASML, a major semiconductor-equipment supplier whose primary product category is lithography, reported Q3 net bookings of **€2.633 billion**, down from **€5.567 billion** in Q2. ASML defined bookings as system orders with accepted written authorizations, including inflation-related adjustments. Its CEO said recovery outside AI was more gradual than previously expected, some new-node ramps and fabs had been pushed out, and memory capacity additions remained limited while customers pursued HBM and DDR5 technology transitions. ASML's bookings and lithography demand are not comparable to Lam's revenue, WFE estimate or etch/deposition demand. Its comments nevertheless raise a timing question: customer technology investment can continue while equipment demand remains uneven across processes and periods. [S5, release table and CEO statement.]

An October 3 announcement from TSMC and Amkor described a memorandum of understanding to develop advanced packaging and test capacity in Arizona. TSMC said it would contract turnkey services at Amkor's planned Peoria facility; the companies expected to define technologies including InFO and CoWoS. This is a prospective front-end/back-end ecosystem route, not operational capacity, disclosed tool content, a Lam commitment or a quantified alternative to Lam's products. [S7, paragraphs 1-5; S6, p. 6.]

The evidence can support several interpretations. Advanced-node demand and TSMC's Q3 capex may point to technology-led investment. ASML's comments may point to slower or staggered ramps. The Amkor-TSMC plan may expand an outsourced packaging path while also depending on front-end fab investment. None of these sources measures Lam's market share, customer wins, tool utilization or incremental returns.

Funding choices and exposure

Lam reported FY2024 R&D expense of **\$1.902 billion**, compared with \$1.727 billion in FY2023 and \$1.604 billion in FY2022. This expense covers the company's R&D activity; the filing does not separate discretionary projects, sustaining work, or returns by program. FY2024 operating cash flow was \$4.7 billion. The company reported \$2.8 billion of treasury-stock purchases and \$1.0 billion of dividends for the year, as well as \$397 million of capital expenditures. These historical amounts illustrate competing uses of cash; they do not establish a pool that can be moved wholesale into a new program. [S1, Item 7, pp. 29-31 and financial statements, p. 38.]

Revenue geography adds another uncertainty. China represented 42% of FY2024 revenue and 37% of the September quarter's revenue. Lam's regional disclosure includes both global customers with facilities in China and domestic Chinese customers with facilities there. Export restrictions can affect particular products, customers, end uses and services, but Lam does not disclose the revenue exposed by each rule. The regional totals therefore cannot be treated as restricted revenue or multiplied by a hypothetical ban rate. [S1, Item 1A, pp. 21-22 and Item 7, p. 30; S2, "Revenue."]

Lam also describes customer-support-related revenue as a substantial part of its business, and it reported 500 additional chambers subscribed to Equipment Intelligence in the September quarter. It says customer upgrades can improve the value of installed tools compared with buying new equipment. Those points make installed-base investments a plausible alternative, but the company does not report upgrade margins, subscription revenue, renewal, eligible-tool totals or a separate service cycle. The claim about comparative value is management's, not an independent competitor study. [S1, Note 4, p. 47; S3, slide 7.]

Investment with a customer can create learning and product differentiation, but it can also require customer-specific work or expose knowledge to reuse by other parties. One semiconductor-industry study of chipmakers finds that integrated firms held a greater share of patents combining design and manufacturing than fabless firms, while finding no significant ROIC difference between the two groups. It studies chip firms, not equipment suppliers. A separate stated-choice experiment on supplier-developed innovations found that respondents' stated economic-benefit weight could fall when positive buyer-supplier relationships and high innovation intensity were stipulated. The study used hypothetical choices by managers in a German B2B sample; it does not predict Lam's customer decisions. Together, the research suggests questions about complementary capabilities, reuse and disciplined value assessment, but it does not provide a numerical return for Lam. [A1; A5.]

Your recommendation

Prepare a short executive memorandum that:

- states how you would direct the next discretionary increments and what capabilities you would preserve;
- compares at least two alternatives and makes the strongest case against your preferred approach;
- distinguishes reported results from management forecasts and claims, GAAP from non-GAAP guidance, and historical facts from your assumptions;
- explains how customer ramp timing, installed-base economics, export exposure and capital return affect your choice;
- identifies the evidence needed to judge qualification, production adoption, customer value and Lam's ability to capture value; and
- names the milestones or new information that would cause you to accelerate, stage, reallocate or pause spending.

There is no single answer supported by the available data. A persuasive recommendation must make its uncertainty and decision rule clear.

Selected sources

- **S1.** Lam Research, FY2024 Form 10-K, filed August 29, 2024. [SEC filing](#).
- **S2.** Lam Research, September 2024 quarter results release, furnished October 23, 2024. [SEC Exhibit 99.1](#).
- **S3.** Lam Research, September 2024 quarter investor slides, October 23, 2024, 24 slides. [Presentation](#).
- **S5.** ASML, Q3 2024 results release, October 15, 2024. [Company release](#).

- **S6.** TSMC, 3Q24 Quarterly Management Report, October 17, 2024, six pages. [Company report](#).
- **S7.** Amkor and TSMC, Arizona advanced-packaging MOU announcement, October 3, 2024. [Amkor release](#).
- **A1.** Rahul Kapoor (2013), "Persistence of Integration in the Face of Specialization," *Organization Science* 24(4):1195-1213. [Full text](#).
- **A5.** Daniel Wäldchen, Andreas H. Glas and Michael Essig (2021), "Choice Behavior in Innovation Exchange Between Buyers and Sellers," *Schmalenbach Journal of Business Research* 73:273-305. [Full text](#).

The cutoff excludes Lam's October 23 earnings call, the October 24 Form 10-Q, and later results or announcements.