

Seagate - Scaling HAMR Without Losing the Ramp

Internal ID: S&F-STR-490

Topic: Operations Strategy, Capital Allocation, Customer Strategy

Industry: Technology Hardware, Storage & Peripherals

Source: Strategy & Finance

Publication date: 5 October 2026

License: Not specified

Setting: Start of fiscal 2027

Information cutoff: October 2, 2026, 4:00 p.m. ET

Case convention: The capital-allocation assignment is hypothetical. The public record does not establish a pending board decision or undisclosed customer commitment.

Decision assignment

Seagate Technology Holdings has entered a new phase in its transition to heat-assisted magnetic recording (HAMR). Its Mozaic 4+ platform can support drives of up to 44 terabytes (TB), and Seagate said in March 2026 that the product was qualified and in production with two hyperscale cloud providers. More qualifications were underway. In July, management said HAMR drives represented about 40% of nearline exabyte shipment run rate exiting fiscal 2026; the CFO said the 40% nearline-exabyte milestone had been reached by June. Management's next target was for Mozaic 4 to account for 50% of HAMR exabytes by calendar-year-end 2026. [S1, S2, S5]

At the start of FY2027, how should Seagate pace additional capacity commitments for the HAMR transition? Should it move quickly to expand capacity and support learning and customer demand, stage commitments against qualification and production evidence, or use a hybrid approach that preserves predecessor capacity while scaling Mozaic 4+? What milestones should release each next tranche of spending and supplier capacity?

The question asks for an investment policy and operating gates, not a dollar forecast. Seagate has not disclosed Mozaic-specific yields, unit economics, customer schedules, or incremental capacity needs. Any thresholds proposed in class should be identified as recommendations, not existing Seagate rules.

A growing business with a demanding transition

Seagate reported FY2026 revenue of \$12.195 billion, 34% above FY2025. Nearline shipments rose to 695 exabytes (EB), from 497 EB, a calculated increase of 39.84% (about 39.8%). Total HDD shipments were 789 EB, compared with 595 EB. Data Center represented 80% of revenue in FY2026, up from 75% in FY2025. FY2026 included 53 weeks versus 52 in FY2025.

Management attributed revenue growth primarily to higher nearline exabytes and favorable pricing actions, and margin expansion primarily to pricing and a shift toward higher-capacity drives; reported results do not isolate HAMR's contribution. [S1, S3]

The shipment measures describe exabytes, not drive counts, market share, utilization, or customer inventory. Nor does platform capacity establish that every shipped drive uses the maximum capacity. Seagate's release described Mozaic 4+ as capable of up to 44 TB and as its

only HAMR platform deployed at scale; those are company statements, not independent comparative measurements. [S1, S2]

Exhibit 1. Selected Seagate operating results

Measure	FY2025	FY2026
Revenue	\$9.097bn	\$12.195bn
Nearline HDD shipments	497 EB	695 EB
Total HDD shipments	595 EB	789 EB
Data Center share of revenue	75%	80%

Notes: Company-reported values; FY2026 had 53 weeks and FY2025 had 52. The calculated nearline exabyte growth is $(695 - 497) / 497 = 39.84\%$, about 39.8%; it is not adjusted for the extra week. Revenue growth and gross-margin change should not be attributed to HAMR alone. [S1, S3]

From qualification to scale

Seagate's March announcement said Mozaic 4+ was qualified and in production with two leading hyperscale cloud providers, with additional qualifications underway. The customers were not named. This establishes a meaningful production foothold, but not broad qualification, shipment volume, yield, order durability, or customer acceptance across the market. [S2]

Management's July call added two ramp markers with different denominators and timing. It described HAMR products as approximately 40% of nearline exabyte shipment run rate exiting FY2026; the CFO said the 40% nearline-exabyte milestone had been achieved by June. Management also targeted 50% of HAMR exabytes on Mozaic 4 by the end of calendar 2026. The second figure is a forward target and applies to HAMR exabytes, not to all nearline exabytes. [S5]

These milestones indicate scale and direction, but do not answer whether the next capacity tranche should be committed now. A shipment run rate does not reveal stable yields or the mix of individual drive capacities. A qualification does not disclose forecast quantities or cancellation terms. The Mozaic 4 target does not report actual customer acceptance or platform economics.

Seagate's FY2026 Form 10-K describes the operational challenge. New-product success depends on timely qualification, sufficient production volume, yield, reliability, quality and acceptable margins. The filing warns that complexity can raise operating problems, rework, scrap, warranty costs and the risk of losing customers. Nearline sales are high-volume and concentrated among a small customer set; sales cycles can exceed a year, and orders depend on customer deployment timing. One customer represented about 14% of FY2026 consolidated revenue. These are disclosed risks, not evidence that a current yield, quality, or customer problem has occurred. [S1]

The same filing describes Seagate's vertically integrated manufacturing capabilities, including design and production of heads, media and other core components. That capability may help the company coordinate a technically demanding ramp. Public information does not show whether it gives Mozaic 4+ a yield or cost advantage over competing products. [S1]

Capital is already committed in part

Seagate's FY2026 capital spending was \$569 million in cash purchases of property, equipment and leasehold improvements. Management expected FY2027 capital spending to be higher, while remaining within a target range of 4%-6% of revenue, in support of the HAMR volume ramp. The company had \$465 million of unconditional capital-equipment commitments as of July 3, 2026, of which \$375 million was expected within one year. These figures have different timing and scope; they should not be added together as a single pool of new HAMR funding. [S1]

The company reported FY2026 operating cash flow of \$3.674 billion, cash of \$1.704 billion and total debt of \$3.565 billion. It also reported approximately \$2.1 billion in supplier purchase obligations, primarily for inventory components, with \$1.6 billion expected within a year. Not all commitments relate to HAMR, and the public record does not disclose which equipment orders can be delayed, repurposed, or cancelled. [S1, S3]

Exhibit 2. Capital and supplier context

Measure	Reported amount / description	Interpretation limit
FY2026 cash purchases of property/equipment/leasehold improvements	\$569m	Historical company-wide spending
FY2027 capex outlook	Higher than FY2026; within 4%-6% of revenue	Management range, not an approved point budget or HAMR-only allocation
Unconditional equipment commitments at July 3, 2026	\$465m; \$375m expected within one year	Existing contractual commitments; not all incremental or HAMR-specific
FY2026 operating cash flow	\$3.674bn	Company-wide historical cash flow
Cash / total debt at FY2026 year-end	\$1.704bn / \$3.565bn	Liquidity context, not project economics
Supplier purchase obligations at July 3, 2026	About \$2.1bn; \$1.6bn within one year	Primarily inventory components; scope includes more than HAMR

Source: Seagate FY2026 Form 10-K and earnings materials. Figures describe distinct company-wide measures and periods and must not be summed as a HAMR funding pool. [S1, S3]

Competitors offer more than one high-capacity path

Seagate is not choosing between HAMR and a static market. Western Digital (WD) said on August 5, 2026 that shipments of its 40 TB ePMR drives had begun in the June quarter and that it was entering volume production with two customers. This update superseded WD's February plan for 2H 2026 volume production. WD's statement does not disclose shipment volumes, customer identities, broad availability, yield, or customer acceptance. WD also said its own HAMR qualifications were underway with two hyperscalers and ramp production was planned for 2027. [S6, S8]

Toshiba said in October 2025 it had verified 12-disk stacking technology and aimed to introduce 40 TB-class MAMR drives in 2027. That is a technology milestone and announced target, not evidence of volume production or customer qualification. [S7]

These announcements show several plausible high-capacity paths. They do not establish equivalent reliability, economics, qualification breadth, production yield, or customer value. Seagate also competes with solid-state drives in some uses; its filing describes HDD and enterprise SSD as complementary for many data-center workloads, while competing in certain high-performance applications. [S1]

Exhibit 3. Publicly stated high-capacity status as of the cutoff

Company / path	Publicly reported status	What remains unknown
Seagate Mozaic 4+ / HAMR	Up to 44 TB; Seagate said qualified and in production with two hyperscalers in March 2026; further qualifications underway. In July, management described HAMR at ~40% of nearline EB shipment run rate exiting FY2026 and targeted 50% of HAMR EB on Mozaic 4 by CY2026-end.	Product-specific units, yields, customer names, reliability, margins, and 2026 target attainment
WD 40 TB ePMR	WD said shipments began in its June 2026 quarter and it was entering volume production with two customers as of August 5.	Volumes, duration, yield, broad availability, customer acceptance, comparative economics
WD HAMR	Qualifications underway with two hyperscalers; ramp production planned for 2027, per WD.	Qualification outcome, schedule realization, yields, and shipments
Toshiba MAMR	Toshiba said 12-disk stacking was verified and targeted 40 TB-class drives for 2027.	Customer qualification, volume timing, economics, and actual product performance

Sources and limits: Issuer statements and plans from Seagate, WD, and Toshiba. Their performance claims are not independently verified or directly comparable. WD's August ePMR update replaces its February 2H production plan as the latest status. [S2, S5-S8]

How should a company time a technology transition?

Academic work on HDD history cautions against treating a technology curve as a complete investment rule. Christensen's study of component technologies found substantial differences among firms in their ability to improve existing technologies; early switchers did not show a consistent advantage. His evidence concerns historical disk-drive technologies, not HAMR returns or Seagate's present capabilities. His companion Part II is available here only at abstract level; it distinguishes component transitions from architectural ones. Students should not assume HAMR is an architectural disruption simply because the recording technology is new. [A1, A2]

Igami's structural study of the HDD industry's 1981-98 transition from 5.25-inch to 3.5-inch drives models innovation choices alongside entry, exit, demand and cost. Its counterfactuals show competing incentives: preemption can favor early investment, while cannibalization of an incumbent product can delay it. In a no-cannibalization simulation, the estimated entrant-incumbent innovation gap narrowed by 57%, from 6.45 to 2.80 firms by 1998. Those are model-based firm counts in a past market transition, not a Seagate forecast or capital-budget input. [A3]

Manufacturing research also frames yield as economically important when capacity is constrained, and product transfer as a time-to-volume challenge. The cited studies were read only at abstract level in this research. They support questions about good output, process learning and ramp time, but do not provide a Seagate yield curve, qualification sequence, or numerical threshold. [A4, A5]

The choice

Assume Seagate's leadership asks a hypothetical cross-functional strategy team to recommend an FY2027 capacity policy for Mozaic 4+. The team should decide how to balance early capacity and learning against the risk of installing or reserving capacity ahead of stable production and durable demand.

Consider three approaches, or propose a well-supported alternative:

1. **Accelerate capacity commitments.** Reserve or install capacity early to support customer demand, move toward the Mozaic 4 mix target, and learn at scale. Explain what evidence would make expected demand durable enough to justify this exposure.
2. **Stage commitments against operating and customer milestones.** Release additional tranches as qualification, accepted shipments, yield, reliability, supplier readiness, and economics become more visible. Explain how to avoid losing scarce lead time or customer opportunity while waiting.
3. **Use a hybrid transition.** Commit selectively to long-lead capacity while preserving predecessor-generation production and gating later installation or supplier commitments. Explain what can be flexed and what must be decided early.

For your recommendation:

- Define the evidence that would release the next capacity tranche. Distinguish existing disclosures from your proposed thresholds.
- Specify how Seagate should track customer qualification, accepted volume, good-drive yield, quality/reliability, supplier readiness, demand commitments and contribution per exabyte.
- Explain how predecessor capacity should be managed during the transition and what would trigger a change in its role.
- Identify the strongest argument against your recommendation and the missing internal information most likely to change it.

Do not infer customer identities, contractual gates, platform-specific margins, yields, reliability results, or the attainment of management's future targets. The public evidence does not support a precise incremental capex amount or a standalone HAMR return calculation.

Sources

- **[S1]** Seagate Technology Holdings plc, FY2026 Form 10-K, fiscal year ended July 3, 2026, filed August 4, 2026. [SEC filing](#).
- **[S2]** Seagate, “Seagate Delivers Industry’s Highest Capacity Hard Drives with Next-Generation Mozaic 4+,” March 3, 2026. [Company release](#).
- **[S3]** Seagate, FY2026 financial results, July 28, 2026. [Company release](#).
- **[S5]** Seagate FY2026 Q4/FY2026 earnings call, July 28, 2026. [Event listing](#); transcript used in the research register. The mix and target statements are attributed management remarks.
- **[S6]** Western Digital, February 3, 2026, high-capacity HDD roadmap. [Company release](#).
- **[S7]** Toshiba, October 14, 2025, 12-disk stacking verification and 40 TB-class MAMR target. [Company release](#).
- **[S8]** Western Digital, FY2026 results and August 5, 2026 call. [Earnings release](#); [earnings presentation](#).
- **[A1]** Christensen, Clayton M. 1992. “Exploring the Limits of the Technology S-Curve. Part I: Component Technologies.” *Production and Operations Management* 1(4): 334-357. [DOI](#).
- **[A2]** Christensen, Clayton M. 1992. “Exploring the Limits of the Technology S-Curve. Part II: Architectural Technologies.” *Production and Operations Management* 1(4): 358-366. [DOI](#). Abstract-level use only.
- **[A3]** Igami, Mitsuru. 2017. “Estimating the Innovator’s Dilemma: Structural Analysis of Creative Destruction in the Hard Disk Drive Industry, 1981-1998.” *Journal of Political Economy* 125(3): 798-847. [DOI](#).
- **[A4]** Bohn, Roger E., and Christian Terwiesch. 1999. “The Economics of Yield-Driven Processes.” *Journal of Operations Management* 18(1): 41-59. [DOI](#). Abstract-level use only.
- **[A5]** Terwiesch, Christian, Roger E. Bohn, and Kuong Chea. 2001. “International Product Transfer and Production Ramp-Up: A Case Study from the Data Storage Industry.” *R&D Management* 31(4): 435-451. [DOI](#). Abstract-level use only.

All information is limited to sources available by October 2, 2026, 4:00 p.m. ET. Company and competitor statements are attributed; forecasts are not treated as outcomes.