GREATEST COMPANIES · RESEARCH SHEET · The Monopoly Moat

ASML

The One Machine the Whole World Runs On

NASDAQ: ASML · Semiconductor Equipment · Founded 1984 · Veldhoven, Netherlands

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There is a machine that costs roughly $400 million, among the most complex objects ever built, and without it the most advanced chips on Earth, the ones inside the AI revolution, cannot be made. Exactly one company in the world can build it: not the best, the only. ASML, born in a leaky Dutch shed and nearly bankrupt more than once, holds a true 100% monopoly on the most important tool in the most important industry of the age.

Key Facts

Origin	A 1984 Philips / ASM International joint venture; began in a shed in Veldhoven
Sector	Semiconductor equipment — photolithography machines
Moat	A literal 100% monopoly on EUV: technology + supplier ecosystem + capital/time + co-development
Founder Archetype	The enduring underdog — conviction to suffer an impossible bet longer than anyone
The Bet	A ~20-year, €6B+ moonshot to industrialize extreme ultraviolet (EUV) light
Customers	TSMC, Samsung, Intel, SK Hynix, Micron
Status	Public (NASDAQ: ASML)

By the Numbers

A true 100% monopoly on EUV lithography machines — no second place

~20 years and over €6 billion invested to make EUV work; rivals Nikon and Canon quit

Each High-NA EUV machine costs on the order of $370–400 million

Market value ~$345 billion (2025), Europe's most valuable technology company

R&D ran at ~15–20% of revenue for decades, funding the bet others abandoned

Nearly bankrupt in 1992, rescued by a ~36-million-guilder Philips emergency loan

The Moat

A Monopoly Built From Other People's Surrender

ASML's moat may be the deepest anywhere, and it is worth being precise about why no rival can simply build a competing EUV machine. First, the technology: two decades of accumulated know-how in industrializing the hardest optical process ever attempted, earned only through years of failure and existing in no manual. Second, the ecosystem: a vast, deeply integrated network of thousands of specialized suppliers that took decades to assemble. Third, capital and time: even a rival with unlimited money would need many years and billions, with no guarantee, all while ASML moves further ahead. And fourth, customer co-development: machines built in deep partnership with the handful of chipmakers who use them. Stack these together and you get something almost unique, not a wide moat but a complete one: a literal monopoly on a product the entire world economy depends on.

The Twenty-Year Bet & The Chokepoint

The Moonshot Everyone Else Abandoned

ASML's danger was not a crash but the slow, grinding, decades-long risk that its moonshot would simply never work. Beginning seriously in the 1990s, it committed to industrializing EUV, a technology many believed was physically impossible to make work. The early prototypes were catastrophes; the company had nearly gone bankrupt in 1992 and poured 15–20% of revenue into R&D year after year. The decisive fact is that the competitors quit: the problem was so hard, expensive and slow that Nikon and Canon abandoned the EUV race as a rational short-term call. ASML made the opposite decision and held it for twenty years. When EUV finally became production-ready around 2017, ASML was the only company left that could build the machines, transforming from a supplier into an absolute chokepoint beneath TSMC, Samsung and Intel alike.

> *" The very difficulty that made everyone else quit was the source of the prize. ASML's moat is made of other people's surrender. "*

The Legendary Scorecard

Category	Score	Notes
Founder Vision	9	Saw EUV as the future when most thought it impossible
Innovation	10	Industrialized the hardest optical process ever attempted
Execution	10	Twenty years of endurance through breakdowns and near-bankruptcy
Moat	10	A literal 100% monopoly; perhaps the deepest moat anywhere
Capital Allocation	9	15–20% of revenue into R&D for decades; strategic acquisitions
Wealth Creation	9	From a shed to Europe's most valuable tech company
Durability	9	Near-unassailable; the risks are geopolitical and cyclical
Historical Importance	10	The chokepoint that makes all advanced chips possible
Overall Legendary	**9.5 / 10**	The monopoly built from other people's surrender

Scores are an editorial verdict on the standard eight-category Greatest Companies scale. The overall is a judgment, not a weighted average.

Timeline

1984	Founded as ASM Lithography, a Philips/ASM International JV in Veldhoven; starts in a shed
1980s	Scrappy underdog to the Japanese giants Nikon and Canon
1992	Nearly bankrupt; rescued by a ~36-million-guilder Philips emergency loan
1996	IPO on NASDAQ and Euronext Amsterdam
1998	First major production tool; independent of Philips
2000s	TWINSCAN dual-stage system and immersion lithography
1990s–2010s	The ~20-year, €6B+ EUV moonshot; Nikon and Canon drop out
2017	Production-ready EUV
2023	First High-NA EUV shipped to Intel
2024–25	High-NA to TSMC; sole EUV supplier; market cap ~$345B

Lessons — What This Means for You

THE MOVE · Own the chokepoint
ASML does not compete for share in a crowded market; it is the single point the entire industry must pass through. The trader's analogue is seeking the irreplaceable position in a value chain, the node that captures value no matter who else wins around it.

THE MONEY · Endure the long, expensive bet that others abandon
ASML spent twenty years and billions on a technology that might have failed, funding it when rivals quit. The investor's version is the willingness to hold a high-conviction position through a long, uncomfortable period when it is not yet working and everyone else has given up.

THE MIND · The difficulty is the moat
ASML's deepest insight, lived rather than spoken, is that the very hardness of the problem is what protects the prize, because hardness is what makes competitors quit. The most durable edges are usually the uncomfortable, patience-demanding ones, precisely because comfort and ease attract crowds that compete the edge away.

Related Reading

The same endurance lesson: SpaceX: The Company That Bet Everything on Its Last Rocket

At the end of ASML's chain: Apple: Ninety Days From Death to the World's Most Valuable Company

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Read the Full Story

Read the full company story: ASML: The One Machine the Whole World Runs On

Sources & Further Reading

ASML Holding N.V. annual reports and investor materials

Contemporary reporting on ASML and the EUV lithography program

Greatest Companies (ASML chapter), The Complete Trader's Edge

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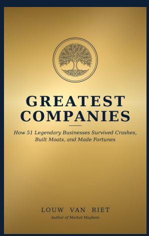

FROM THE BOOK

This company is one of **51** in **Greatest Companies** — every legendary business read through one lens: **Moat, Meltdown, Machine**. Eight kinds of moat, from Standard Oil to SpaceX.

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