Manulife Investment Management

Investment Note

20 May 2026

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Semiconductors sit behind almost every modern experience – from smartphones and cars to cloud computing and today's AI tools – yet they remain largely invisible to most people. They are more than chips only, and the demand is being supported by several long-term forces. We believe that today's semiconductor excitement is not a repeat of the dot-com bubble, as investment is tied to real infrastructure and revenue-generating services. And the opportunity is broader than a handful of headline AI names.

Not another bubble: How semiconductors are powering a real future

Key points:

- The market opportunity is large and expanding. The industry is projected to grow strongly through 2030.
- Unlike the dot.com bubble, this semi-conductor cycle has more tangible foundations than past technology manias. Spending is tied to physical infrastructure and monetisable services, not just hype.
- Semi cycles and sub-sectors differ and don't move together. An active, global value-chain approach is better positioned to capture broader opportunities than a couple of headline AI or semiconductor names.

A typical day now runs on semiconductors.

You wake up, check your phone, and the screen adjusts brightness automatically. You commute in a car filled with electronics that manage safety, power and navigation. At work, you open documents stored in the cloud. At night, you stream, game, or ask an artificial intelligence (AI) tool to help you learn something new.

Most of this feels like "apps" and "software." But under the surface, it's driven by an industrial-scale ecosystem that designs, builds and tests the electronic components that make the digital world function. That ecosystem is the global semiconductor industry.

Semiconductors isn't one product – it's a whole ecosystem

"Semiconductors" don't just mean one kind of chip. It includes different device types, each doing a different job:

- **Logic**: the "brain" that runs calculations such as central processing units (CPUs) and graphic processing units (GPUs) used in phones, personal computers (PCs), and data centres
- **Memory**: the "storage" and working space that keeps data available
- **Analog / power**: the "electricity manager" that manages power and signals which are important for electric vehicles (EVs) and renewable energy
- **Sensors**: the "five senses" that measure light, motion, temperature used in cars, industrial systems and consumer devices
- **Opto / lasers**: convert electricity to light or detect it, used in face recognition, security and optical communication

But the industry is also the supply chain that makes these devices possible – spanning design, raw materials, wafers, photomasks, manufacturing equipment, production, and back-end inspection, testing and packaging.

In other words, semiconductors are the backstage crew behind model life. The sector can mean a much wider set of businesses than just the most talked-about chip brands.

Why demand can be durable: three forces pulling in the same direction

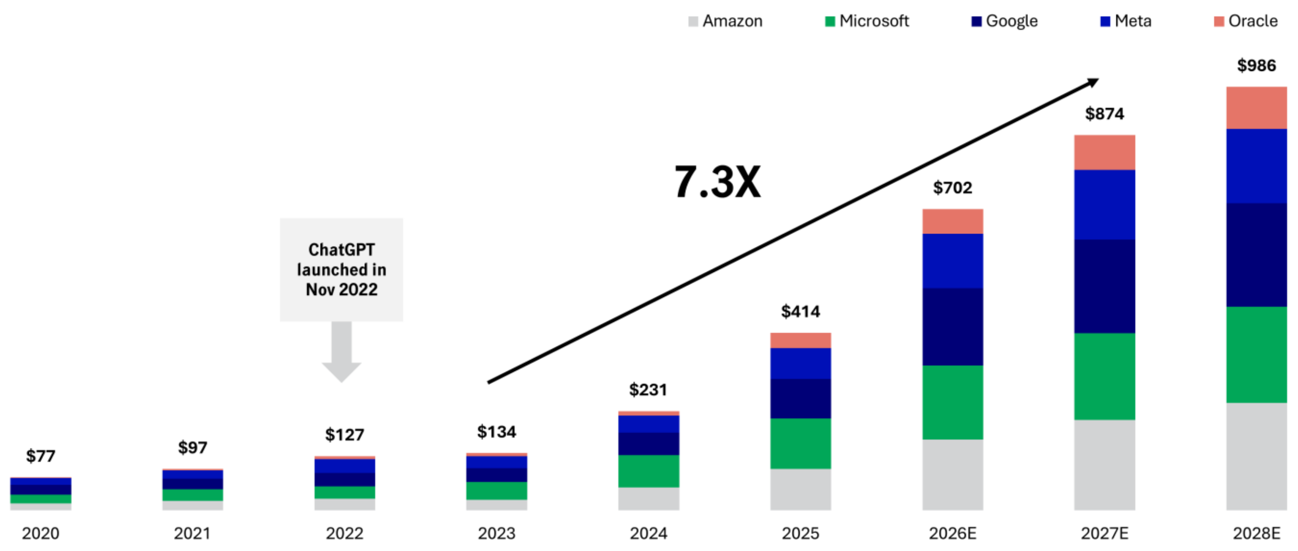
The world is being rebuilt around three forces that reinforce each other.

1. **AI and data centres are scaling fast**

   AI is pushing data centre demand higher – and not only for raw computing, but also for the connectivity that links processors, memory, and networks. Compute capacity is a bottleneck and can be "consumed as soon as it is installed," which is another way of saying demand is pressing hard on supply.

And the spend is no longer theoretical. The capital expenditure (CapEx) of the major U.S. hyper-scalers is projected to rise from US$77 billion (2020) to US$986 billion (2028E) – a 7.3x increase.

CapEx* for U.S. cloud computing hyper-scalers is rising (Billion USD)



* CapEx refers to Capital Expenditure.
Source: Bloomberg, Manulife Investment Management, as of 21 April 2026. Past performance does not guarantee future result. The above information may contain projections or other forward-looking statements regarding future events, targets, management discipline or other expectations. There is no assurance that such events will occur, and the future course may be significantly different from that shown here.

2. **The world is electrifying**

   From electric vehicles (EVs), charging to renewables to modern data centres, energy is increasingly a constraint. That puts a spotlight on power efficient chips – exactly the kind of challenge that power-related semiconductors help solve.

3. **Technology is moving into the physical world**

   Robotics and automation are long-term themes, including humanoid robots, which require multiple types of semiconductors: sensors to perceive, logic to decide, and power management to operate. All of these are not 'one-quarter' trends, they are multi-year shifts.

Spending is real, and when pullbacks create openings

When markets pull back, it's easy to assume the story is over. But in semiconductors, the long-term story is tied to real budgets and long-lived infrastructure.

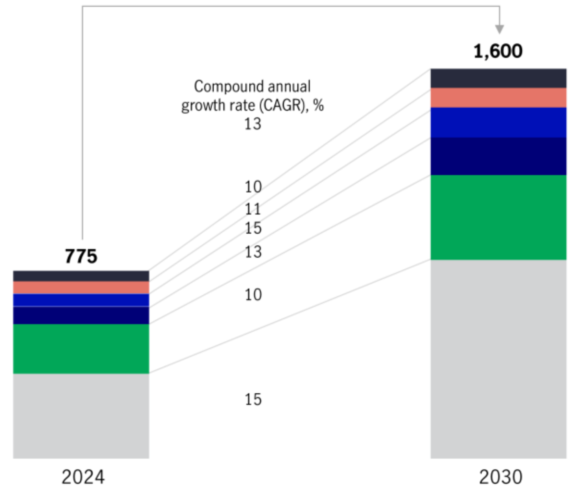
The global semiconductor market is projected to reach US$1.6 trillion by 2030, up from US$775 billion in 2024 – at 13% compound annual growth rate (CAGR).

These underline the direction of travel that huge amounts of investments are being committed to build capacity.

And this is where today's environment starts to look different from the dot-com era.

The semiconductors industry could reach US$1.6 trillion by 2030

Global semiconductor market (base case), $ billion



Growth contribution per vertical,
$ billion (share of industry growth)

Consumer	35	(4%)
Industrial	40	(5%)
Wired	70	(8%)
Automotive	70	(9%)
Wireless	150	(18%)
Computing and data storage	460	(55%)

Source: Omdia, McKinsey Analysis, as of January 2026.
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The semiconductor hype is unlikely to be the dot.com bubble

Why the semiconductor hype may be different to the dot.com bubble

Today: Semiconductors		Dot.com bubble (1999)
Real demand, orders and growth Demand is linked to identifiable buildouts (AI, cloud, data centres, electrification) that show up in hardware orders and capex visibility.	Demand	**Hype ahead of demand and eyeball-led** Adoption was real, but demand capture was often unclear; many models leaned on traffic rather than durable demand/profits.
Tangible and hardware buildout Physical compute infrastructure: chips enabling AI, data-centre expansion and broader chip content across use cases.	Products	**Intangible ideas and web frontage** Mostly digital front ends/intermediaries riding early internet adoption, often without proven monetisation mechanics.
Constrained supply Advanced products supply is constrained (leading-edge nodes, high bandwidth memory, advanced packaging), which may support pricing and margins.	Supply dynamics	**Easy scale** Many models were asset-light and could scale quickly, which contributed to overcrowding in similar business models.
Priced on profits Elevated in parts, but larger sector remains tied to earnings/cash flow – "elevated" isn't automatically "anything goes." Valuations supported by accelerating revenue and profitability growth, with certain areas of the market "re-rating" higher on better than historical fundamentals	Valuations	**'Story-only' valuation** Multiples stretched very high (often approx. 100 times), and many names had no meaningful earnings.
Strong earnings and cash-generation Leading constituents of the semiconductor sector index (SOX) are in the 25-50%+ operating margin range, and show strong cash flow (free cash flow per share nearly doubling), and pricing power (notably in scarce advanced areas)[1], making outcomes less binary than in 1999.	Earnings quality & profitability	**Negative earnings and no profits** Many internet companies spent more on marketing, had negative earnings and weak cash generation; revenue growth didn't always come with durable margins.
High barriers and scarce capability High barriers (fabs, electronic design automation, intellectual property, packaging, advanced manufacturing), plus differentiated niches (power/analog/sensors/industrial, etc.) and scarcity at the cutting edge.	Industry barriers and differentiation	**Copycat and commoditisation** Low barriers to entry; offerings were often easy to replicate, differentiation was thin, and competition commoditised many models.
Strategic and national priority Semiconductors are critical to economic and national security, and technological leadership.	Strategic importance	**Nice to have, not mission critical** The internet was important, but most .com businesses were not essential.
Today Built on real demand, products, applications and economic value. This is a foundation, not a fantasy.	**The takeaway** Semiconductors are building the future – not just narrating it.	**The Dot.com era** Built on hype, speculation and wishful thinkings. It was a story – without substance.

1. Factset, Manulife Investment Management, 30th April 2026.

Don’t bet on one horse – own the track

Parts of the market can get overheated; drawdowns happen. But the direction is hard to ignore: a larger chip market by 2030, accelerating infrastructure spend, a widening set of real-world applications, and tightness in advanced supply.

If AI is a race, semiconductors are the track, the timing system, the stables and the supplies. You don’t need to know exactly which runner wins to believe that the race itself is getting bigger.

Buying a couple of headline AI or semiconductor names may feel simple, but it may also make your portfolio fragile. Semiconductor sub-sectors don’t move together; different parts of the chain may peak at different times. And what’s popular today may not be the leader tomorrow.

That’s exactly why an early pure player, with an active management approach may matter and help:

- spread exposure across the value chain (chips, equipment, connectivity, and selective “AI beneficiaries”);
- balance large established leaders with small-mid under-followed niche players;
- adjust as the cycle and valuations shift across segments;
- build a truly global portfolio across regions and company sizes to capture larger opportunity set as the value chain is global;

For investors, the opportunity may be less about guessing the next headline winner – and more about owning the ecosystem that makes the digital world work.

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