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Beansprout 

Advanced Manufacturing

An Industry Primer

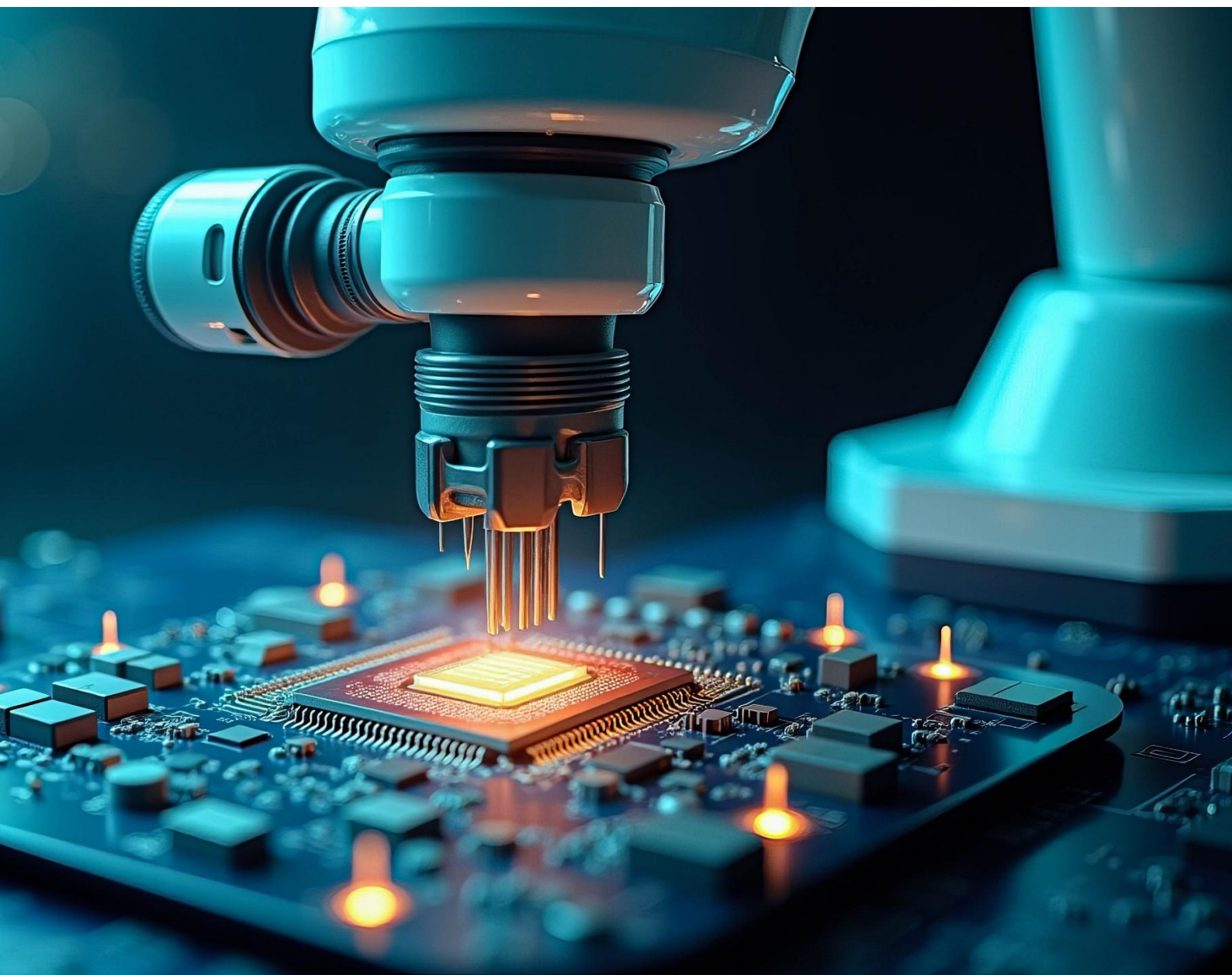




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Author

Gerald Wong, CFA
gerald@growbeansprout.com



Introduction to Advanced Manufacturing

Advanced manufacturing is becoming an increasingly important part of the global economy.

Artificial intelligence, robotics and precision engineering are helping manufacturers produce goods more efficiently, with greater complexity and higher value-added content.

The sector plays a key role in supply chains for products such as smartphones, data centre chips, electric vehicles and medical devices.

This gives advanced manufacturing relevance across many industries, rather than just one end market.

After a downturn in 2022 and 2023, conditions have started to improve as semiconductor demand recovers.

This suggests the sector may benefit from both a cyclical recovery and longer-term structural growth.

In this primer, we focus on two important areas of advanced manufacturing.

The first is semiconductors, which sit at the heart of the AI and electronics supply chain.

The second is aerospace and space, a smaller but fast-growing area that builds on Singapore's strengths in precision engineering and electronics.

Why advanced manufacturing matters

Advanced manufacturing matters because it helps solve some of the most important bottlenecks in the technology supply chain.

These include slowing chip miniaturisation, rising demand for lower-power AI devices, and the need for smaller and more advanced optical components.

The sector is also becoming more strategically important as companies diversify supply chains and invest more in semiconductors, electric vehicles, communications and automation.

This creates opportunities not only for companies making the final products, but also for businesses supplying the tools, components and technologies that enable them.

For investors, the appeal lies in companies that are helping to make these structural shifts possible.

Long-term industry growth drivers

Advanced manufacturing is supported by several long-term growth drivers.

These include AI and data centre buildout, chiplet adoption, electric vehicles, autonomous driving, 5G networks, supply chain diversification, smart factories and the growing global space economy.

Demand for wearables, smart devices and AI infrastructure in Southeast Asia could also create new opportunities across the value chain.

This makes the investment case broader than a single semiconductor cycle.

Instead, the sector could benefit from several reinforcing trends over the long run.

Singapore's role and strategic positioning

Singapore has become an important node in the global semiconductor supply chain.

Despite its small size, the country has meaningful capabilities in chip production, semiconductor equipment and wafer capacity.

This position has been built over decades through deliberate investment, a deep ecosystem of global industry players, and strong public-private support for higher-value manufacturing.

Singapore is also moving into newer growth areas such as advanced packaging, photonics, chip design and space technologies.

These areas could help the country move further up the value chain.

This suggests Singapore's advanced manufacturing sector is supported by more than one trend.

It rests on a broad and well-developed industrial base.



Examples of Singapore companies and valuation

Singapore-listed advanced manufacturing companies give investors different ways to gain exposure to the theme.

The opportunity set spans semiconductor test equipment, precision engineering, advanced materials, electronics manufacturing and GPU-linked hardware.

AEM, UMS and Frencken provide more direct exposure to semiconductor and AI-related demand.

Venture, Aztech and InnoTek offer broader exposure across industrial, medical and electronics end markets.

Addvalue Technologies, Global Invacom and ST Engineering provide listed exposure to Singapore's smaller but growing aerospace and space value chain.

However, earnings momentum and valuation can vary widely across these companies.

This depends on their end-market exposure, customer concentration and stage of recovery.

For investors, this makes stock selection especially important within the sector.

Key risks

The main risks to Singapore's advanced manufacturing sector are macro, geopolitical and industry-specific.

Rising US-China technology tensions, Taiwan Strait risk and shifting US trade policies could disrupt supply chains, customer demand and order visibility.

This could affect even companies that may benefit from supply chain diversification over the long term.

Semiconductor cyclicalities is another key risk.

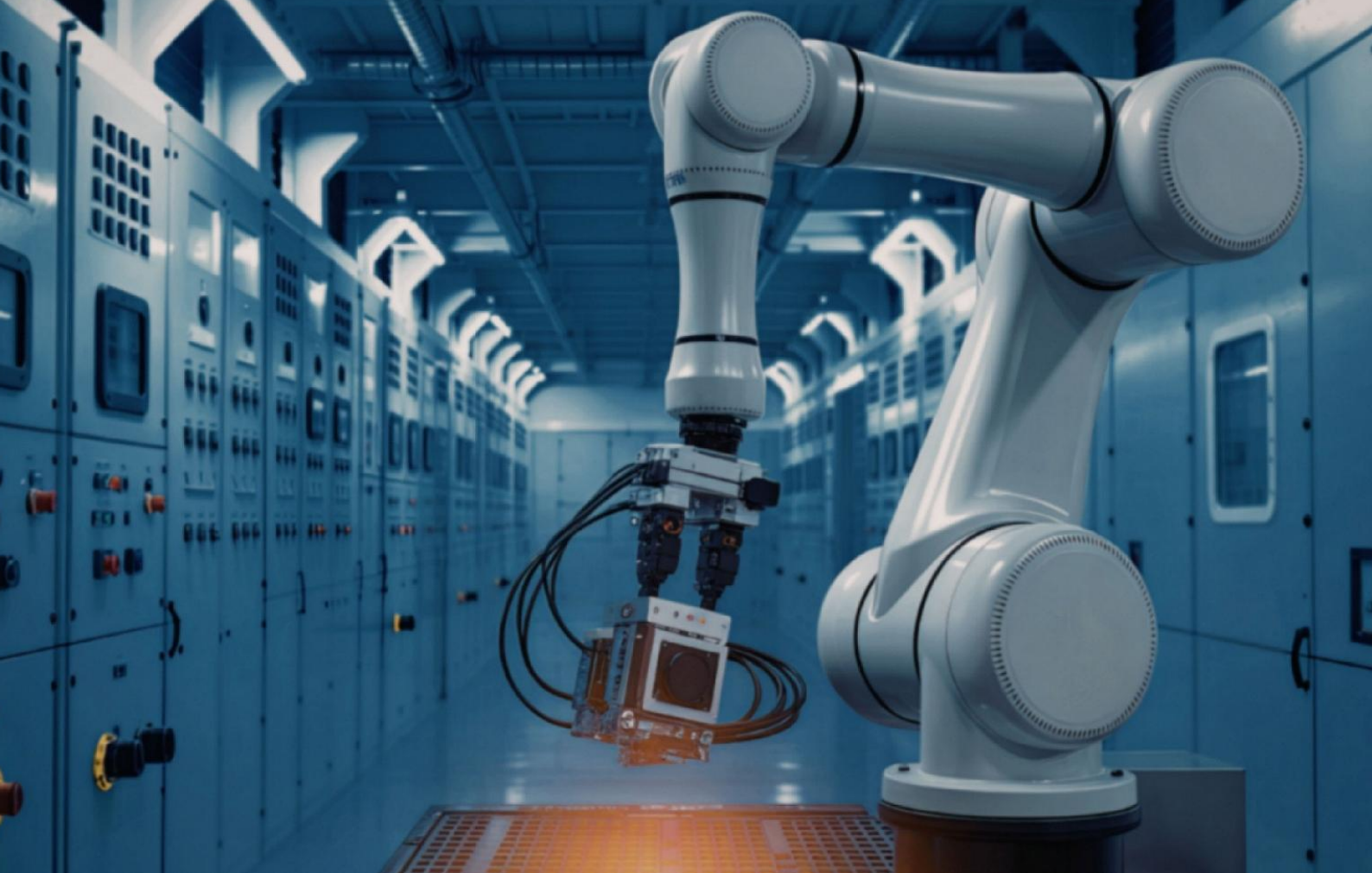
Demand can recover strongly in one period and weaken sharply in another, creating uneven earnings across the sector.

Customer concentration is also important, as some companies depend heavily on a small number of large customers.

Technology shifts can add further volatility if companies fail to keep up with changes in design, manufacturing processes or customer requirements.

Talent is another constraint.

Advanced manufacturing requires specialised engineers and technicians, and companies may struggle to scale if they cannot hire and retain enough skilled workers.



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The global advanced manufacturing market is expected to grow from USD 511 billion in 2025 to USD 1.55 trillion by 2033, a 14.9% annualised growth rate.

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Introduction to Advanced Manufacturing

Understanding the technologies reshaping global manufacturing

A new industrial era built on precision, AI, and supply chain resilience

Advanced manufacturing refers to the use of newer technologies to improve or replace traditional production methods.

These include artificial intelligence, robotics, precision engineering, additive manufacturing and advanced semiconductor packaging.

Unlike the factory model of the past, advanced manufacturing is less about cheap labour or raw materials.

It is more about specialised know-how, extremely high precision and the ability to combine software with physical production.

This matters because advanced manufacturing sits at the centre of the global electronics supply chain.

Products such as smartphones, data centre chips, electric vehicles, industrial robots and medical devices all rely on these capabilities somewhere in the production process.

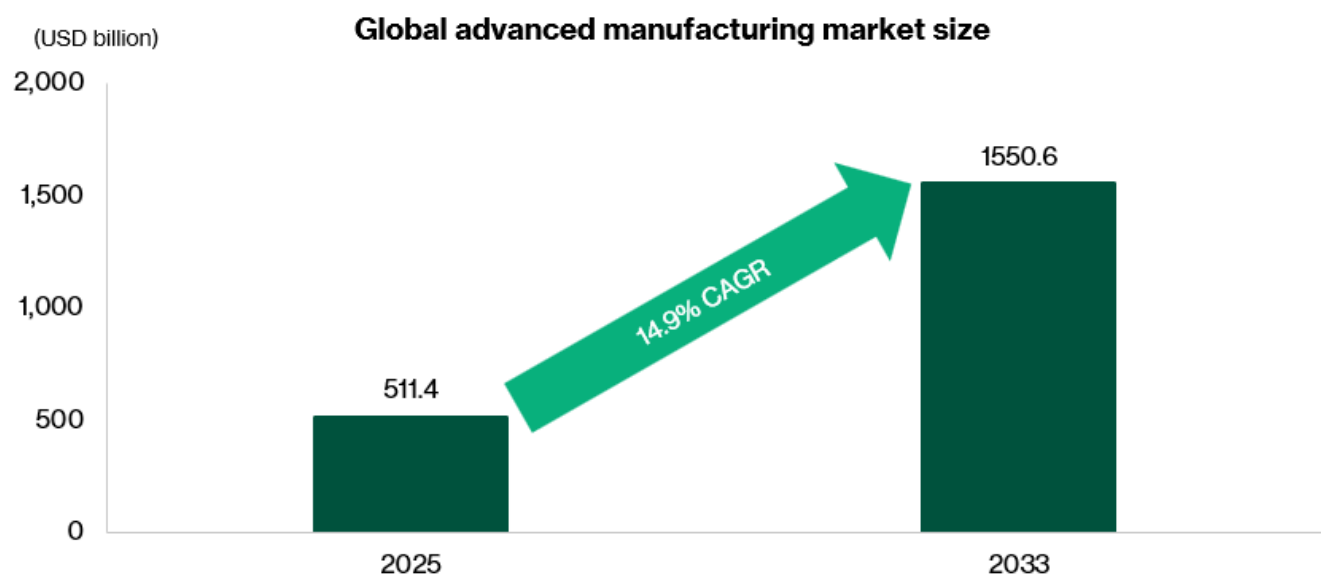
As demand for computing power, connectivity and intelligent devices continues to grow, advanced manufacturing is becoming more important.

It is also becoming more valuable.

After a sharp downturn in 2022 and 2023, the sector started recovering in 2024 as excess inventory across the semiconductor supply chain was gradually cleared.

According to World Semiconductor Trade Statistics (WSTS), global semiconductor revenue rose 26.2% in 2025 to US\$795.6 billion.

Figure 1: Global advanced manufacturing market size



Source: Future Data Stats, Advanced Manufacturing Market report (2025 base year)

Future Data Stats estimates that the global advanced manufacturing market was valued at US\$511.4 billion in 2025.

It expects the market to grow at a compound annual growth rate of 14.9%, reaching about US\$1.55 trillion by 2033.

In other words, advanced manufacturing is not a small or niche opportunity.

It points to a large and fast-growing market that could become one of the more important industrial growth areas of this decade.

Understanding the semiconductor cycle

The semiconductor cycle is important to understand when looking at advanced manufacturing.

Semiconductors have always been cyclical.

When demand is strong, customers may over-order and inventory can build up across the supply chain.

This is usually followed by a period of destocking, where customers work through excess inventory and new orders slow down for equipment and component suppliers.

That is what happened in 2022 and 2023.

It helps explain why companies such as AEM and UMS reported weaker revenue, even as the broader semiconductor market started to recover.

However, this does not change the longer-term growth story.

The main drivers of demand, such as AI computing, electric vehicles, 5G and more connected devices, are still growing.

In fact, they are becoming more important over time.

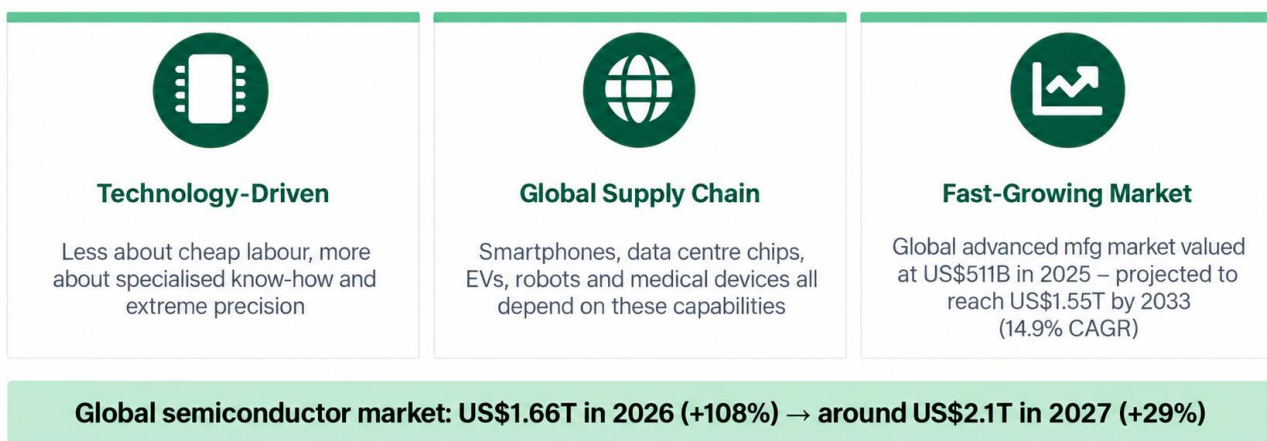
Following strong industry momentum in late 2025 and early 2026, World Semiconductor Trade Statistics (WSTS) now expects the global semiconductor market to continue expanding.

Based on WSTS's August 2026 Q2 update, which incorporates actual first-half results while retaining its Spring forecast assumptions for the remainder of the year, the global semiconductor market calculation rises to about US\$1.66 trillion in 2026, up 108%, and around US\$2.1 trillion in 2027.

Periods of weakness in the sector can sometimes create opportunities.

Figure 2: What Is Advanced Manufacturing?

Advanced manufacturing uses AI, robotics, precision engineering, and semiconductor packaging to replace traditional production — and sits at the centre of the global electronics supply chain.



Source: World Semiconductor Trade Statistics (WSTS), Future Data Stats, Beansprout analysis

The key question is not whether semiconductors will continue to grow over time.

It is whether a company is well positioned to benefit when the next upcycle comes.

Key sub-sectors and market opportunity

1. Advanced semiconductor packaging

Advanced semiconductor packaging has become one of the most important parts of the semiconductor value chain.

For many years, chipmakers improved performance mainly by shrinking transistors on a single chip.

But this is becoming harder and more expensive.

As a result, chipmakers are increasingly combining multiple smaller chips into one package.

This allows them to improve performance, flexibility and power efficiency without relying only on transistor miniaturisation.

It also makes packaging much more complex.

That is why technologies such as 2.5D and 3D stacking, fan-out packaging and hybrid bonding are becoming more important.

The market opportunity is also growing.

The global advanced packaging market is estimated at around US\$50 billion to US\$52 billion in 2025.

It is projected to reach about US\$90 billion by 2031.

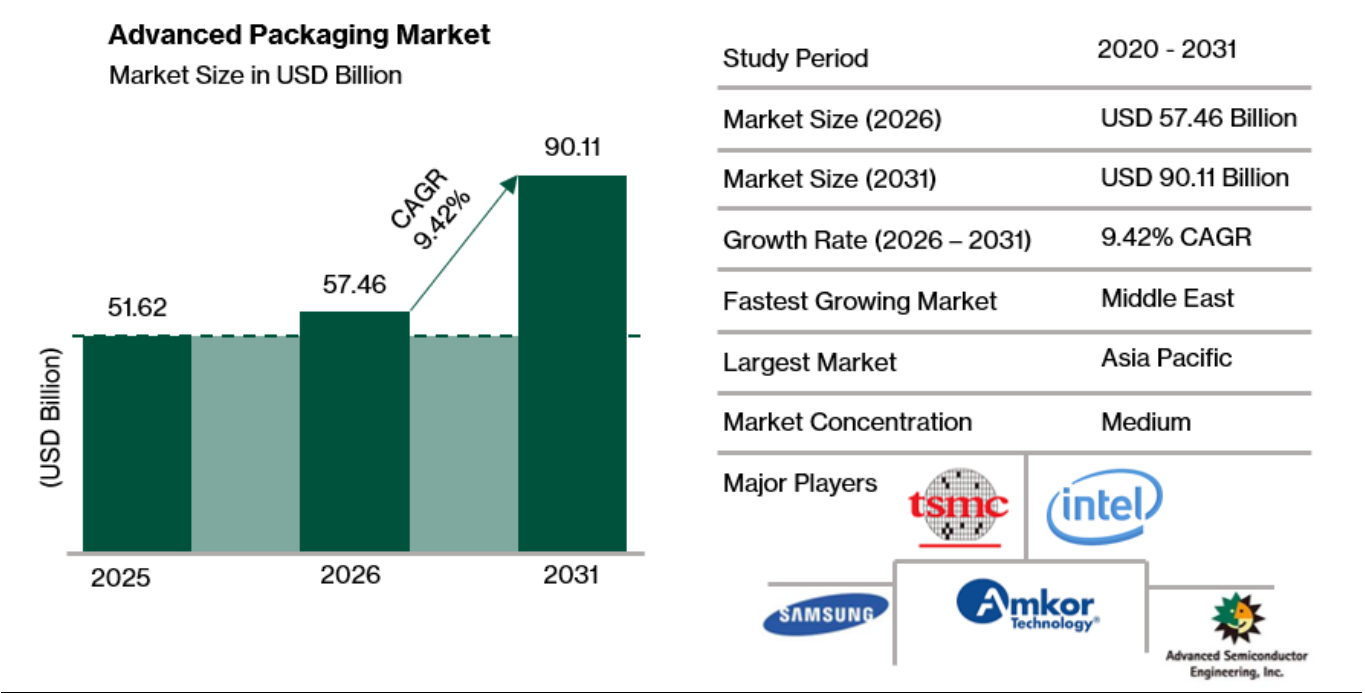
The fastest-growing areas are linked to AI infrastructure.

These include GPUs, AI accelerators and chiplet-based processors, which require more sophisticated packaging to handle higher computing performance and power demands.

2. Aerospace & Space

Aerospace and space is a smaller but fast-growing subsector within advanced manufacturing.

Figure 3: Advanced Semiconductor Packaging Market Size and Share



Source: Mordor Intelligence. Advanced Packaging Market (updated Jul 2026)

It is supported by rising air travel, large aircraft order backlogs and growing demand for satellite-based services.

The commercial aerospace opportunity alone is significant.

A global backlog of more than 17,000 aircraft could support years of production for aircraft manufacturers and their suppliers, according to International Air Transport Association (IATA) , as of 9 December 2025.

At the same time, an expanding global fleet should drive recurring demand for maintenance, repair and overhaul services.

The space economy could be even larger over the longer term.

According to the World Economic Forum and McKinsey, it is projected to grow from around US\$630 billion in 2023 to US\$1.8 trillion by 2035.

Much of this growth may come from applications closer to Earth, rather than rocket launches.

These include satellite communications, ground-station equipment, earth observation, geospatial data, navigation services and specialised components that can operate in space.

Satellite technology is also becoming more relevant across many industries.

It can support aviation and maritime connectivity, weather monitoring, agriculture, logistics, defence and disaster response.

This expands the addressable market beyond the traditional space sector.

3. Edge AI Semiconductors

Edge AI semiconductors could become another important growth area within advanced manufacturing.

Most people think of AI as something that runs in large data centres.

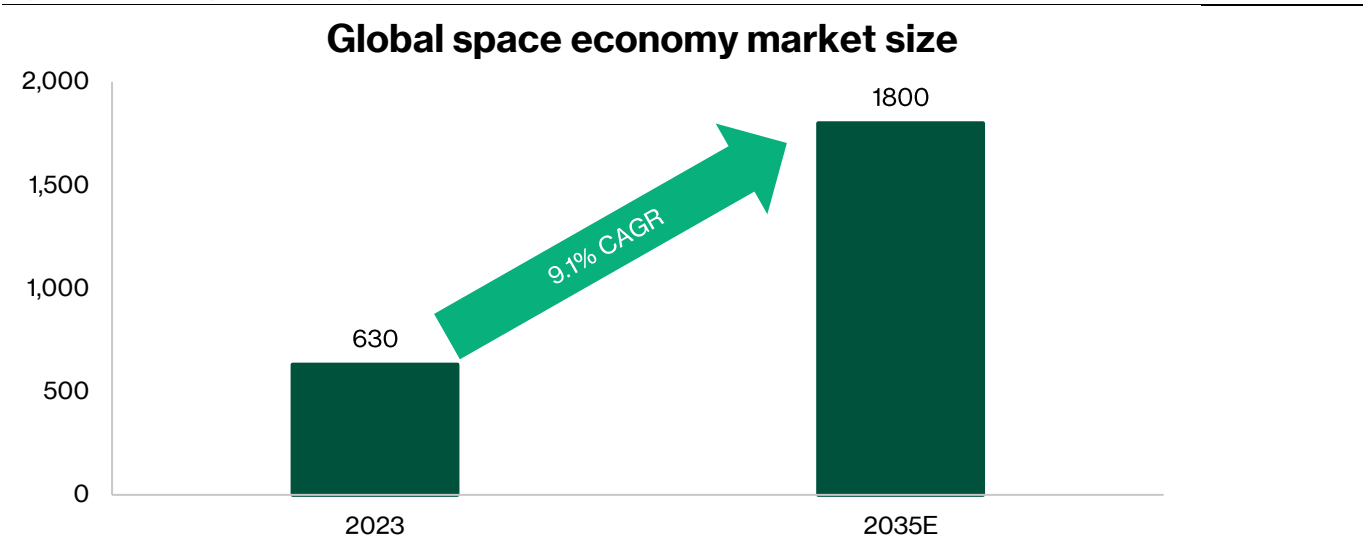
But over time, more AI processing is likely to happen directly on devices.

These include smartwatches, earbuds, industrial sensors, cameras, vehicles and medical devices.

This matters because many of these devices need to run AI tasks locally, without always sending data back to the cloud.

They also need to do this while using very little power, especially if they are battery-powered and expected to operate for long periods.

Figure 4: Global Space Economy Market Size



Source: World Economic Forum, McKinsey "Space: The \$1.8 Trillion Opportunity for Global Economic Growth", Apr 2024

This creates a distinct opportunity for ultra-low-power edge AI chips.

These chips are designed to support AI processing on the device itself, while balancing performance, battery life and cost.

Edge AI could become an important part of this growth as more everyday devices become smarter and more connected.

For companies with strong capabilities in low-power chip design, this could create a longer-term opportunity beyond the data centre.

4. Semiconductor equipment

Semiconductor equipment remains a critical part of the chipmaking value chain.

Every advanced semiconductor plant needs specialised equipment to produce, inspect and test chips.

This includes tools for lithography, etching, deposition, inspection, packaging and testing.

The market opportunity is also growing.

According to Straits Research, the global semiconductor assembly and packaging equipment market was estimated at about US\$5.3 billion in 2025.

It is projected to reach US\$11.2 billion by 2034.

Companies in this segment can benefit from more than just rising semiconductor demand.

They may also benefit from the increasing complexity of advanced chip production, as newer chips require more sophisticated testing, packaging and inspection capabilities.

5. Precision Engineering & Electronics Manufacturing Services

Precision engineering and electronics manufacturing services form the backbone of many major global industries.

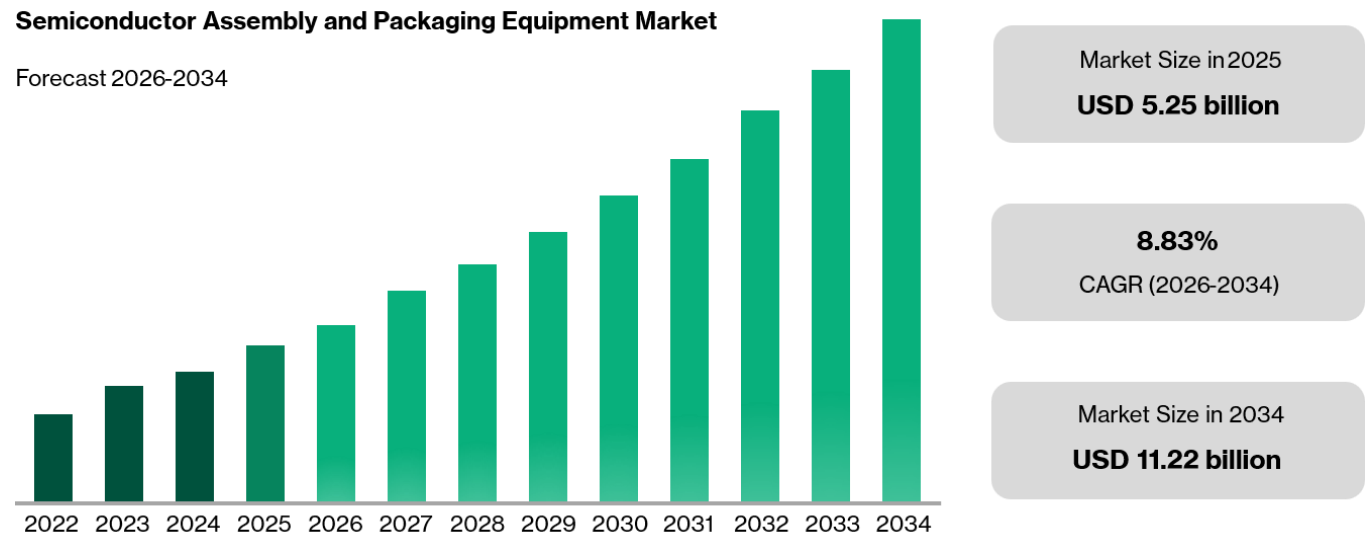
Companies in this segment manufacture highly precise components, modules and sub-assemblies.

These are used in sectors such as semiconductors, aerospace, medical devices, consumer electronics and industrial equipment.

Although these businesses often operate behind the scenes, their products can be critical to the performance and reliability of the final equipment.

The global opportunity is supported by the increasing complexity of manufactured products.

Figure 5: Semiconductor Assembly and Packaging Equipment Market Growth Trends



Source: Straits Research, Semiconductor Assembly and Packaging Equipment Market (updated 24 Aug 2026)

Advanced chips, aircraft systems, medical devices and factory equipment all require components with tighter tolerances, higher reliability and more specialised engineering capabilities.

New semiconductor technologies are raising these requirements further.

Chiplets and advanced packaging involve integrating multiple components within a single system.

This creates demand for more precise manufacturing, testing and assembly.

Supply-chain diversification is another structural driver.

Global companies are building more resilient production networks and expanding their supplier bases beyond a single country.

This could create opportunities for qualified manufacturers in Southeast Asia and other trusted production hubs.

Industry 4.0 may also strengthen the sector's long-term prospects.

Automation, robotics, data analytics and smart-factory systems can help manufacturers raise productivity, reduce production errors and handle more complex projects.

This is a relatively mature part of advanced manufacturing.

It may not offer the fastest growth within the sector.

However, its addressable market spans several large and expanding industries.

As products become more complex, manufacturers that can meet demanding technical and quality standards may become increasingly valuable within the global supply chain.

Why advanced manufacturing matters

Five structural problems that advanced manufacturing solves

Advanced manufacturing is solving real physical limits

Advanced manufacturing matters because it helps solve some of the biggest physical and economic constraints facing the electronics industry.

It is not just about making factories faster or more efficient.

It is about finding new ways to keep improving performance, lowering costs and producing smaller, more complex products.

This has become more important as older manufacturing methods become less effective.

For example, it is becoming harder and more expensive to keep shrinking transistors on a single chip.

At the same time, products such as AI chips, electric vehicles, medical devices and industrial equipment are becoming more complex.

This creates demand for better packaging, more precise components, smarter production tools and higher-quality testing.

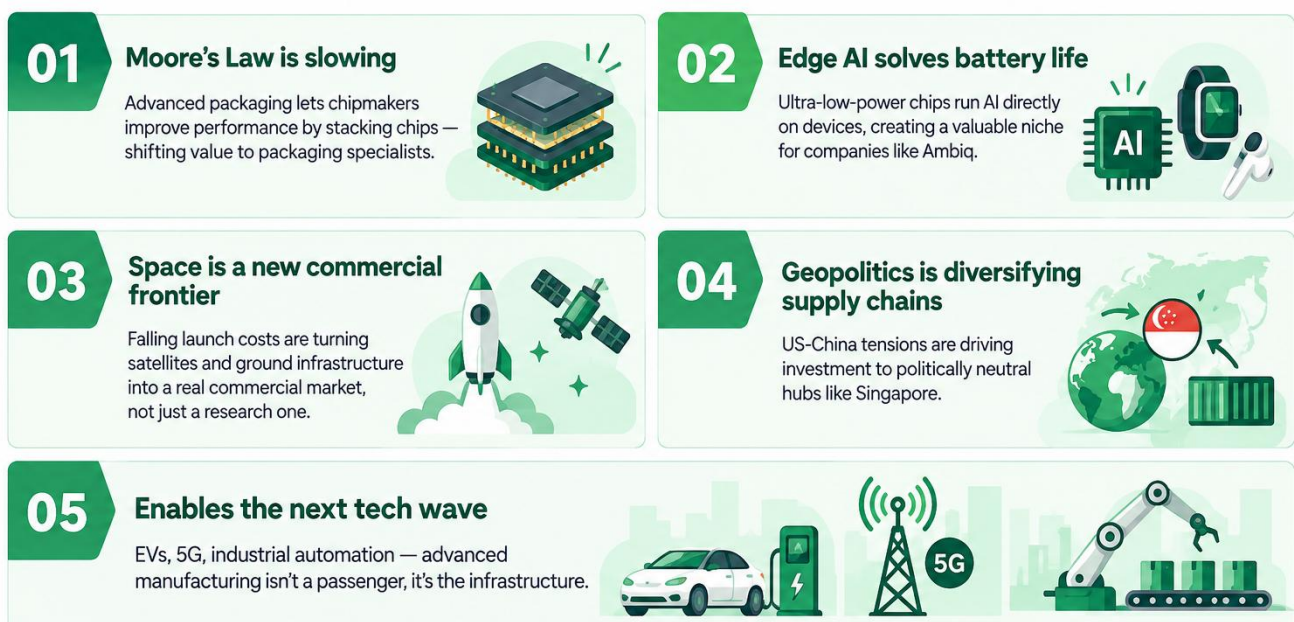
Understanding these constraints, and how different companies are trying to solve them, is an important part of the investment case.

The companies that help customers overcome these physical limits may become more valuable within the global manufacturing supply chain.

1. Moore's Law is slowing, so chip design is changing.

For decades, the semiconductor industry improved by shrinking transistors.

Figure 6: Why Advanced Manufacturing Matters



Source: Beansprout analysis

This made chips faster, smaller and cheaper at the same time.

That trend powered much of the growth in computers, smartphones and the internet.

But it is becoming harder to sustain.

As transistors approach extremely small sizes, the physical limits become more difficult and expensive to overcome.

At the same time, the cost of building leading-edge semiconductor plants has risen sharply.

This is why advanced packaging has become more important.

Instead of relying only on smaller transistors, chipmakers are now combining multiple smaller chips into one high-performance package.

Each smaller chip can be designed for a specific function, such as processing, memory or connectivity.

This allows chipmakers to improve performance in a different way, without depending only on traditional transistor scaling.

It also shifts more value towards companies that specialise in advanced packaging, chip assembly and interconnect technologies.

2. Edge AI solves the battery life problem.

A growing share of AI may not run only in data centres.

Instead, more AI processing could happen directly on devices such as smartwatches, earbuds, industrial sensors and hearing aids.

These devices need to process data locally and in real time, often without relying on a constant cloud connection.

The key challenge is power consumption.

If an AI-enabled device drains its battery too quickly, it becomes much less useful in everyday life.

This creates a clear need for ultra-low-power chip design.

Companies such as Ambiq are trying to solve this by building chips that consume far less power than conventional designs, while still being fast enough for everyday AI tasks at the edge.

As more devices become connected and intelligent, demand for edge AI chips could grow.

The value is not just in AI itself.

It is in making AI practical on small, battery-powered devices.

3. Falling launch costs are turning space into a commercial market.

For decades, space was mostly led by governments and a small group of large contractors.

This was because launch costs were too high for many commercial uses.

That is starting to change.

Reusable rockets and smaller, cheaper satellites are bringing costs down.

This is opening the door to more commercial applications, such as satellite communications, earth observation and ground infrastructure.

These areas rely on many of the same precision engineering and electronics capabilities used in semiconductor manufacturing.

This is where Singapore could have an opportunity.

Many underlying components, such as satellite communication modules and ground-station equipment, can be built using capabilities that already exist in Singapore's semiconductor and precision engineering clusters.

As satellite constellations expand, space could become a larger commercial market.

This would increase the value of companies that can supply components, ground infrastructure and data services.

It could also create opportunities for companies that are still early in building exposure to this ecosystem.

4. Geopolitical risk is pushing supply chains to diversify.

Semiconductor production is still heavily concentrated in a few locations, especially Taiwan.

This worked well when the industry was focused mainly on efficiency and cost.

But concentration risk has become more important as geopolitical tensions have risen.

As a result, governments and companies are trying to spread semiconductor manufacturing and related capabilities across more countries.

This is leading to more investment in locations seen as politically stable, reliable and strategically important.

Singapore is one of the markets that could benefit from this trend.

Its stable business environment, engineering talent and existing semiconductor ecosystem make it attractive to companies looking to diversify production and reduce supply chain risk.

This means advanced manufacturing is no longer just about technology.

It is also increasingly tied to national resilience, industrial policy and long-term investment decisions.

5. Advanced manufacturing helps enable the next wave of technology.

Advanced manufacturing matters because it sits behind many of the technologies expected to grow over the next decade.

Electric vehicles need specialised power semiconductors.

5G and future communications networks need highly precise radio-frequency components.

Industrial automation needs sensors, control systems and electronics that can be produced reliably and at scale.

In many of these areas, advanced manufacturing is not just helpful.

It is a basic requirement.

Companies that control key parts of the production process are therefore not just benefiting from technology trends.

In many cases, they are helping to make those trends possible in the first place.

Long-term industry growth drivers

Nine structural tailwinds underpinning long-term growth

Nine structural trends are converging to support long-term demand for advanced manufacturing

Advanced manufacturing is supported by several long-term tailwinds.

This matters because the investment case does not depend on a single driver.

Instead, demand is being supported by multiple changes across technology, industry and global supply chains.

These include AI, data centres, electric vehicles, automation, smarter devices, aerospace, space, semiconductor complexity and supply-chain diversification.

Together, these trends can reinforce one another over time.

This could make the sector more resilient than one driven only by a single cycle or theme.

1. AI and data centres are driving near-term demand.

One of the clearest near-term tailwinds for advanced manufacturing is the rapid buildout of AI infrastructure.

Training and running large AI models requires highly complex chips and systems.

These include GPUs, memory-heavy processors and high-bandwidth memory.

Many of these products rely on advanced semiconductor manufacturing, advanced packaging and precision engineering capabilities.

Figure 7: Long-Term Industry Growth Drivers



Source: Beansprout analysis

This means companies exposed to this part of the value chain could benefit as AI-related investment continues to grow.

Data centres are likely to be one of the biggest beneficiaries of this trend.

According to Infosys' Semiconductor Industry Outlook 2025, semiconductor sales linked to data centres are projected to grow at an 18% CAGR.

This would take sales from US\$156 billion in 2025 to US\$361 billion by 2030.

AI is also changing how factories operate.

Manufacturers are increasingly using AI for quality inspection, predictive maintenance and process optimisation.

This means AI is not only creating demand for advanced manufactured products.

It is also helping make manufacturing itself more efficient and competitive.

2. Chiplets are becoming a more common way to design chips.

Another important shift is the move from single large chips to chiplet-based designs.

Instead of putting every function onto one large chip, companies can split different functions into smaller chips.

These functions may include logic, memory and input-output.

The smaller chips are then combined into one package.

This can improve manufacturing yield, lower cost and make it easier to mix different production processes in a single product.

Standardisation is also helping this trend move faster.

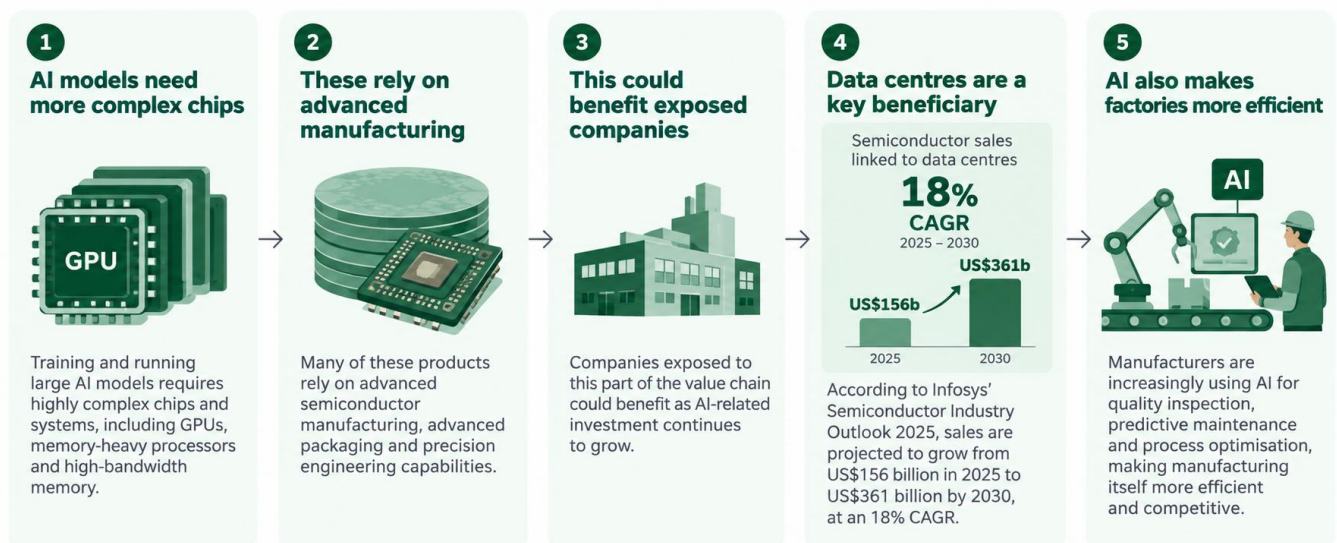
Industry support for common chiplet interconnect standards should make it easier for different chip components to work together, even if they come from different suppliers.

As chiplets become more widely used, advanced packaging becomes more important.

This is because chiplets still need to be assembled, connected and integrated efficiently within one package.

In other words, the more the industry moves towards chiplet design, the more value may shift to companies that support advanced packaging, chip assembly and integration.

Figure 8: AI is a major tailwind for advanced manufacturing



Source: Beansprout analysis

3. Electric vehicles and autonomous driving are creating a bigger, stickier chip market.

Electric vehicles are increasing the amount of semiconductor content needed in every vehicle.

According to the International Energy Agency, battery electric vehicles averaged around US\$1,200 of semiconductor content in 2025.

This is almost three times the semiconductor content of a traditional petrol car.

The increase is driven by power management, software, connectivity, sensors and driver assistance systems.

Autonomous driving is reinforcing this trend.

Advanced driver assistance features are moving from optional extras to a more common expectation in new vehicles.

More vehicles are also being built with the sensors, high-performance computing and software needed for higher levels of automation.

According to Fortune Business Insights, the autonomous vehicle chip market is projected to

grow from around US\$14.5 billion in 2026 to more than US\$35 billion by 2034.

Commercial robotaxi services are also starting to move beyond pilot projects.

As of March 2026, Waymo operates driverless vehicles across a growing list of US cities and completes around 500,000 paid rides a week.

Baidu's Apollo Go and other operators are also scaling similar services in China.

This means automotive semiconductor demand is likely to grow on two fronts.

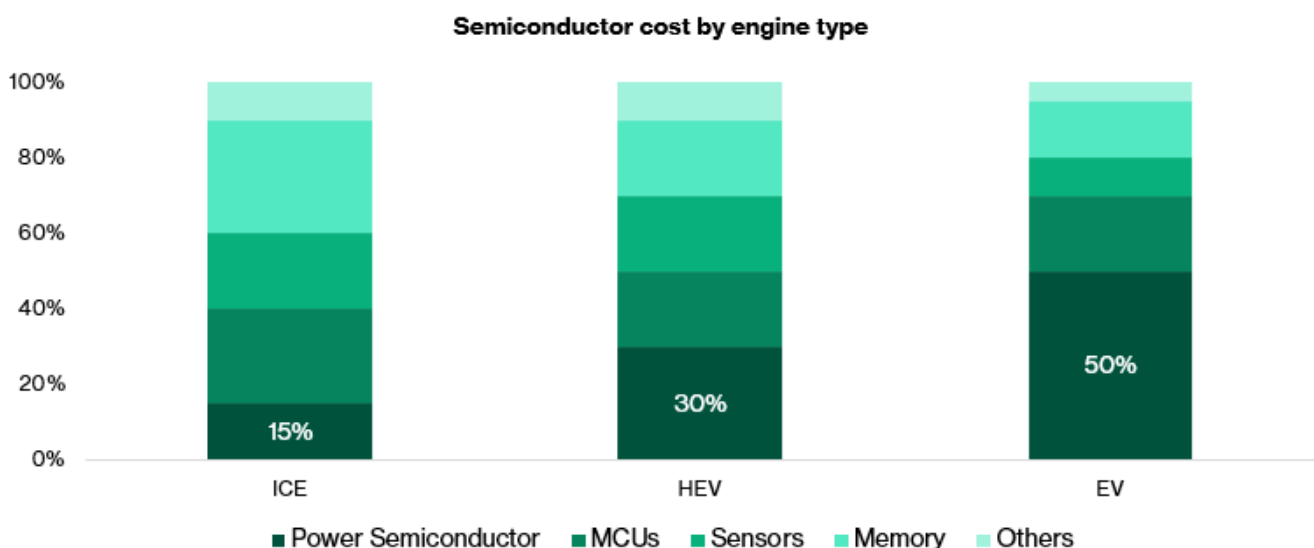
The first is more power semiconductors per vehicle as electrification spreads.

The second is more high-performance computing, sensors and memory per vehicle as autonomy advances.

This matters for advanced manufacturing because automotive chips need to meet stricter quality and reliability standards than consumer electronics.

That creates opportunities for manufacturers with strong precision engineering capabilities and experience serving demanding industrial customers.

Figure 9: Semiconductor cost by engine type



Source: PwC Autofacts, PwC analysis. Note: ICE refers to Internal Combustion Engine, HEV refers to (Hybrid Electric Vehicle, and EV refers to Electric Vehicles.

4. 5G and future 6G networks are another long-term tailwind for advanced manufacturing.

5G and future 6G networks are another long-term growth driver for advanced manufacturing.

5G rollout is still at a relatively early stage globally.

The number of 5G connections is expected to grow sharply over the rest of the decade.

Compared with 4G, 5G infrastructure requires more complex hardware.

This includes more antennas, more radio-frequency chips and more advanced signal processing.

This matters because higher-frequency networks require more precise components.

That increases the need for advanced manufacturing, advanced packaging and precision engineering.

At the same time, research into 6G is already underway.

This suggests demand for these capabilities could continue beyond the current 5G investment cycle.

From an advanced packaging perspective, Yole Group's Status of the Advanced Packaging Industry report identifies telecom and infrastructure as the fastest-growing end-market.

It projects this segment to grow at a 14.9% CAGR between 2024 and 2030.

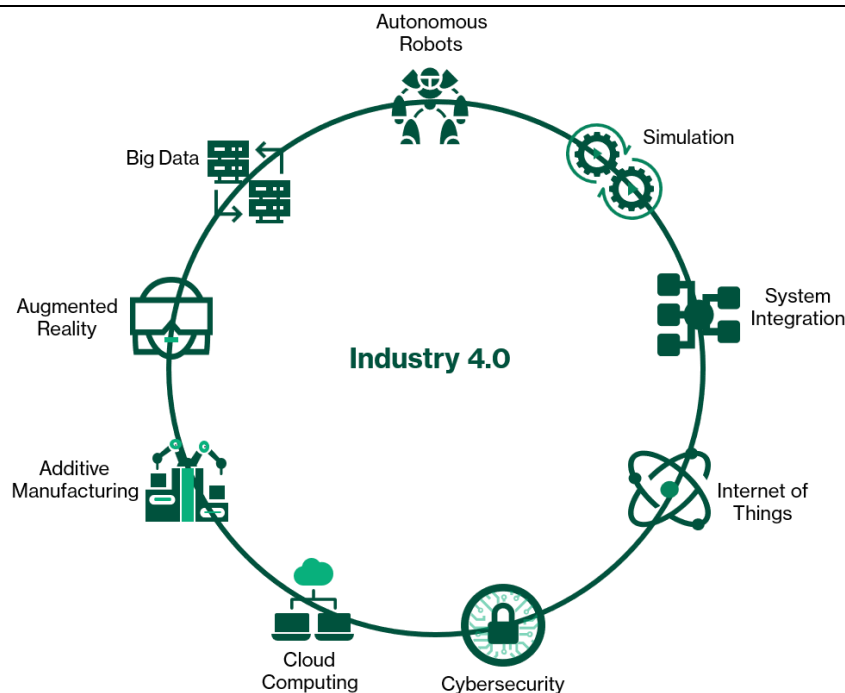
Companies exposed to telecom infrastructure, advanced packaging and precision components could benefit as connectivity demand continues to rise.

5. Industry 4.0 is helping manufacturers become more efficient.

Industry 4.0 is another long-term driver for advanced manufacturing.

It refers to the use of technologies such as AI, sensors, cloud systems, robotics and connected machines to improve how factories operate.

Figure 10: Industry 4.0



Source: Boston Consulting Group

In practice, these tools can help manufacturers raise output, reduce downtime and lower maintenance costs.

They can also improve quality control by detecting production issues earlier.

Singapore has been actively positioning itself as a leader in smart manufacturing.

This could support the competitiveness of its manufacturing base over time.

For companies, investment in automation and smart manufacturing can help improve productivity and margins.

In other words, Industry 4.0 is not just a growth theme.

It can also help manufacturers become more efficient, reliable and profitable.

6. Wearables and smart devices are increasing demand across the chain.

Wearables and smart consumer devices are becoming another broad tailwind for advanced manufacturing.

Products such as smartwatches, wireless earbuds, smart glasses, and AR or VR headsets

all require smaller and more advanced components.

They also need longer battery life, better sensors and more precise optics.

This creates demand across multiple parts of the ecosystem.

Low-power chips are needed to support on-device AI.

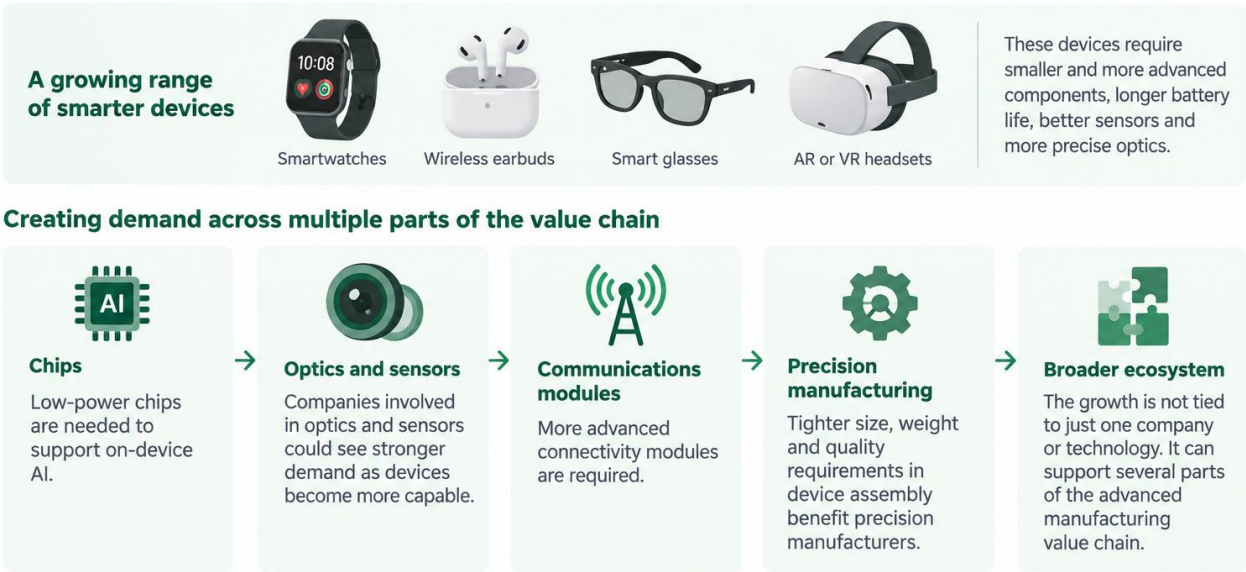
Precision manufacturers benefit from tighter size, weight and quality requirements in device assembly.

Companies involved in optics, sensors, communications modules and specialised components could also see stronger demand as devices become more capable.

The growth in wearables and smart devices is not tied to just one company or technology.

It can support several parts of the advanced manufacturing value chain.

Figure 11: Wearables and smart devices are increasing demand across the chain



Source: Beansprout analysis

7. Southeast Asia is also becoming a growing source of AI demand, not just a manufacturing base.

Southeast Asia is becoming more than a manufacturing base for global technology companies.

It is also becoming a growing source of AI demand.

More companies in the region are moving beyond small AI trials and starting to adopt AI more seriously.

A McKinsey study with Singapore's Economic Development Board (EDB) found that 46% of Southeast Asian companies have already moved beyond pilot projects.

This is slightly ahead of the global average.

Nearly 90% also plan to experiment with AI agents in 2026.

At the same time, hyperscalers such as AWS, Google and Microsoft are investing heavily in the region.

According to company disclosures compiled by Bloomberg, they have announced more than US\$50 billion in combined AI-ready data centre and cloud infrastructure commitments across Southeast Asia.

AWS alone has committed another US\$9 billion in Singapore by 2028 and US\$6 billion in Malaysia through 2038.

Singapore also hosts more than 60 AI Centres of Excellence, according to The Edge Singapore.

This matters for Singapore's manufacturing sector because the regional AI buildout creates direct demand for semiconductors, advanced packaging, memory and power-related components.

Singapore could therefore benefit in two ways.

It is a place where some of these products and components are made.

It is also part of a region where AI demand is growing quickly.

8. Space and aerospace are emerging as a new source of long-term demand.

Space and aerospace add another long-term demand driver for advanced manufacturing.

This is still an early-stage opportunity, but it is starting to show up more clearly in the numbers.

As launch costs fall, space is becoming a more commercial market.

Every satellite, launch vehicle and ground terminal requires specialised, high-reliability

Figure 12: Southeast Asia is also becoming a growing source of AI demand



Source: Beansprout analysis

semiconductors that can operate in harsh conditions.

According to Straits Research and Global Market Insights, the aerospace semiconductor market is projected to grow from roughly US\$9 billion to US\$10 billion in 2026 to around US\$16 billion to US\$20 billion by the mid-2030s.

This implies a compound annual growth rate of around 8%.

The radiation-hardened semiconductor segment, which holds the largest share of the market, is expected to grow at a broadly similar pace as satellite constellations expand.

Demand spans several areas.

These include radiation-hardened processors, high-frequency radio-frequency chips for satellite communications, and power semiconductors for satellites and launch vehicles.

Many of these products rely on the same precision engineering, analogue design and packaging capabilities used in the broader semiconductor industry.

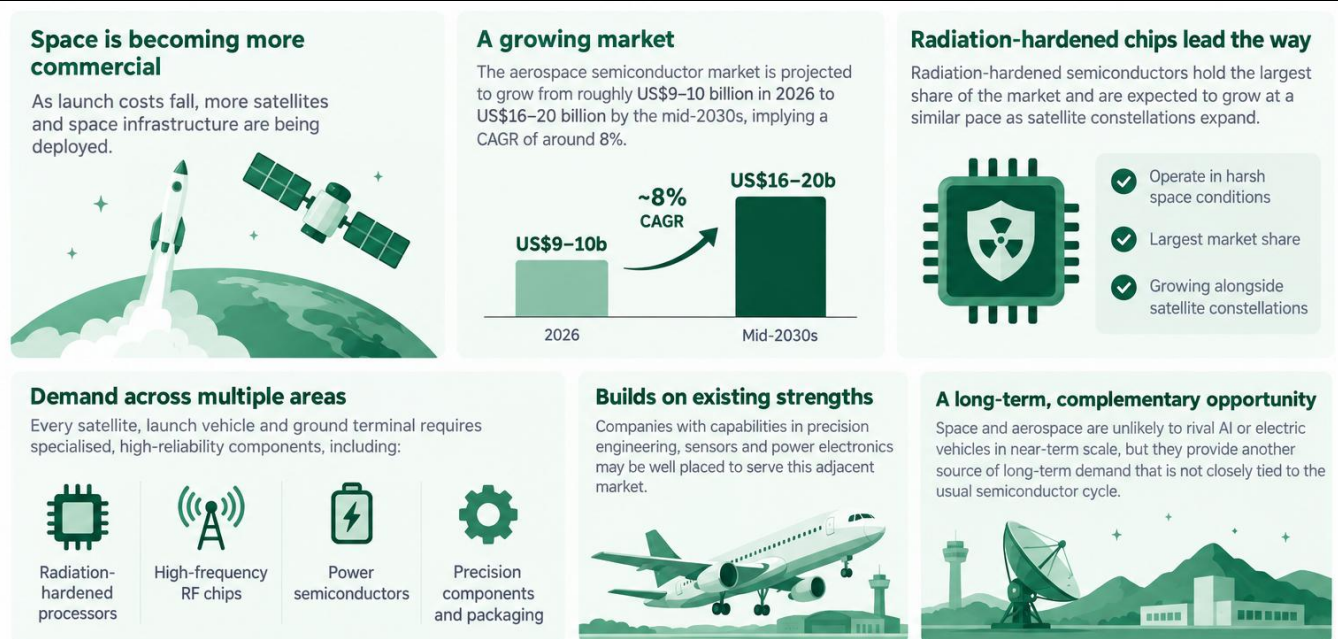
For Singapore, this looks like a natural extension of existing strengths.

Companies already producing precision components, sensors and power electronics for the semiconductor and electronics industries may be well placed to serve this adjacent market.

Space and aerospace are unlikely to rival AI or electric vehicles in near-term scale.

However, they add another source of long-term demand that is not closely tied to the usual semiconductor cycle.

Figure 13: Space and aerospace are emerging as a new source of long-term demand



Source: Beansprout analysis

Singapore's role and strategic positioning

Singapore is a critical node in the global semiconductor supply chain

Singapore has become an important hub in the global semiconductor supply chain

Singapore has become one of the most important hubs in the global semiconductor supply chain.

This is despite its small size and lack of natural resources.

According to Singapore's Economic Development Board and Ministry of Trade and Industry, Singapore accounts for roughly 10% of global semiconductor output.

It also accounts for around 20% of semiconductor equipment production and about 5% of global wafer capacity.

This gives Singapore an influence in the semiconductor industry that is much larger than its physical size would suggest.

Singapore is not just participating in advanced manufacturing.

It is a critical part of the global system.

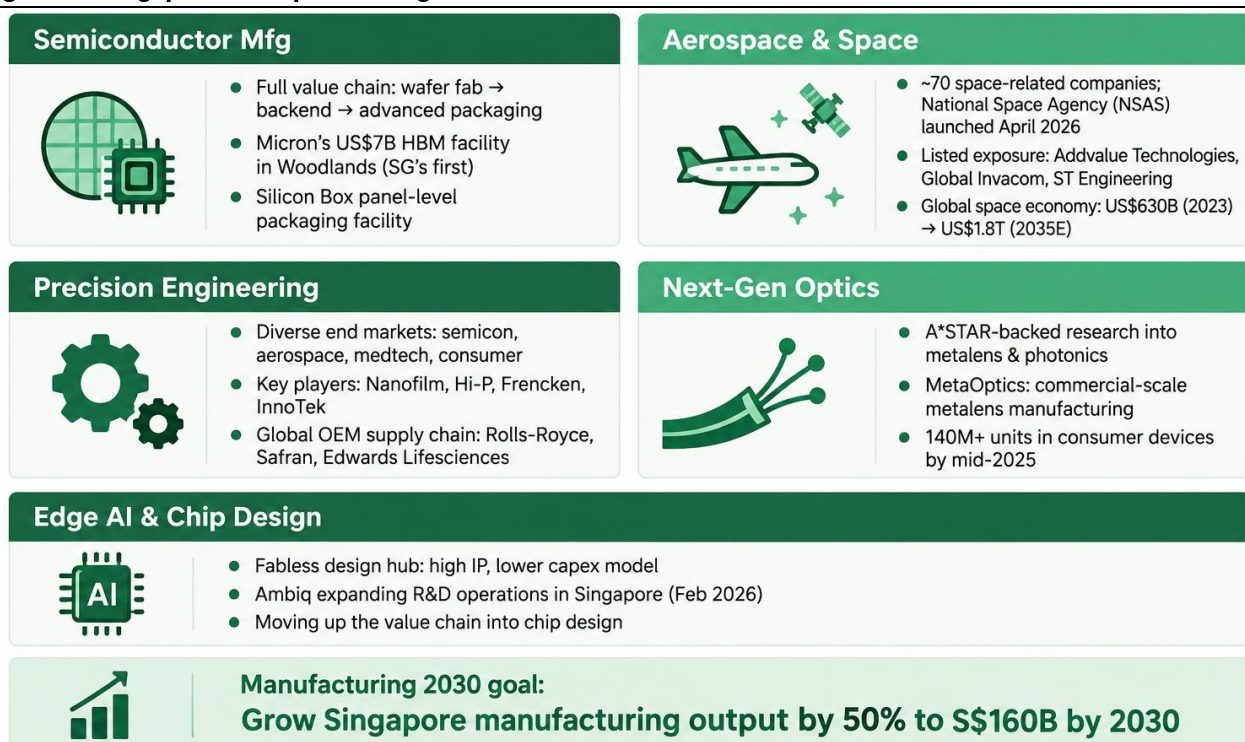
How Singapore built this position

Singapore did not build this position by chance.

It reflects decades of deliberate planning and investment, supported by agencies and institutions such as EDB, A*STAR, NUS and NTU.

From the start, Singapore focused on higher-value, knowledge-intensive manufacturing rather than labour-intensive industries.

Figure 14: Singapore's competitive edge



Source: Beansprout analysis, based on company disclosures and Singapore government sources (MTI, NSAS)

This made sense given the country's high land and labour costs.

Over time, it has also become a long-term strength.

Singapore has built deep engineering talent, strong institutions and a trusted operating environment around advanced manufacturing.

Today, the country hosts a dense cluster of major semiconductor and equipment players.

These include GlobalFoundries, Micron, UMC, STMicroelectronics, Siltronic, Applied Materials, Lam Research and KLA.

This concentration matters because it creates a flywheel effect.

Large manufacturers attract suppliers.

Suppliers attract more investment.

A deeper ecosystem then helps develop a stronger talent pool.

Singapore's position in advanced manufacturing is therefore not built on one or two successful companies.

It is supported by a broader ecosystem that can continue reinforcing itself over time.

Singapore's Five Key Manufacturing Clusters

1. Electronics is where Singapore is strongest.

Electronics is the largest and most important part of Singapore's advanced manufacturing sector.

Within electronics, semiconductors are especially important.

Electronics is also one of the five official sectors in EDB and the Ministry of Trade and Industry's Advanced Manufacturing & Trade cluster, alongside precision engineering, energy and chemicals, aerospace, and logistics.

Singapore's semiconductor ecosystem covers many parts of the value chain.

These include wafer fabrication, backend assembly, advanced packaging and semiconductor equipment.

A major recent development is **Micron's** new US\$7 billion high-bandwidth memory packaging facility in Woodlands.

This is Singapore's first HBM facility and strengthens the country's role in AI-related semiconductor production.

At the same time, **Silicon Box's** panel-level packaging facility adds another important capability in advanced packaging.

Together, these investments show how Singapore is positioning itself around two of the most important areas in the semiconductor value chain today.

These are advanced packaging and AI memory.

Both are closely linked to the global buildout of AI infrastructure.

Singapore's semiconductor strength also fits into a broader ASEAN value proposition.

As chipmakers pursue "China plus one" diversification, Singapore can remain a hub for higher-value activities such as R&D, engineering and commercial functions.

Galatek is one example of this model.

The Singapore-headquartered automation company raised US\$30 million in a Series A round in December 2025.

It then opened a manufacturing hub in Penang, Malaysia in mid-2026, while keeping its R&D and commercial base in Singapore.

Electronics also extends beyond chipmaking.

Singapore has built real research strength in next-generation optics and photonics through institutions such as A*STAR.

MetaOptics is a good example of how this can translate into commercial opportunity.

Its metalens technology was developed with support from A*STAR's research infrastructure and fabrication capabilities.

This shows how Singapore's public research ecosystem can help create new technology platforms that private companies can commercialise.

The value is not only in the technology itself.

It is also in turning research into manufacturing, skilled jobs and longer-term industrial growth.

Singapore is also attracting more semiconductor design and R&D work.

These activities sit at the higher-value end of the supply chain.

They require less physical capital than manufacturing, but can generate more intellectual property and higher-skilled jobs.

Fabless chip companies are especially relevant here, as they focus on designing chips while outsourcing production.

Ambiq is one example.

The company announced in February 2026 that it would expand its R&D operations in Singapore, covering research, engineering, design, product management and business development.

The key takeaway is that Singapore is not only strengthening its role in electronics manufacturing.

It is also moving further up the value chain into advanced packaging, AI memory, chip design, photonics and edge AI.

2. Precision engineering is a broader but resilient part of the sector.

Singapore's precision engineering cluster is one of the more diverse in Asia.

It includes companies involved in precision machining, mould and die making, surface treatment, metal fabrication and contract electronics manufacturing.

Examples include **Nanofilm Technologies**, **Hi-P International** and **Frencken Group**.

These companies supply components to a wide range of industries.

These include semiconductors, aerospace, medical devices and consumer electronics.

Major aerospace players such as **Rolls-Royce**, **Safran** and **ST Engineering** all have operations in Singapore.

Medical device companies such as **Edwards Lifesciences** and **Becton Dickinson** also form part of the broader manufacturing ecosystem.

This matters because precision engineering is not dependent on just one end market.

Its customer base spans several industries, which can make the segment more resilient across cycles.

Precision engineering may not always be the fastest-growing part of advanced manufacturing.

However, its diversity, technical know-how and role in critical supply chains make it an important part of Singapore's industrial base.

3. Energy and Chemicals is reinventing itself around sustainability.

Energy and Chemicals is Singapore's largest manufacturing cluster by output.

The sector is built around Jurong Island, a 3,000-hectare integrated refining and petrochemicals hub.

Jurong Island is home to more than 100 global companies, including ExxonMobil, Shell, BASF, Chevron Oronite and Mitsui Chemicals.

According to EDB and JTC, the sector accounted for about 23% of Singapore's manufacturing output in 2024.

It has also attracted more than S\$50 billion of investment over the past three decades.

However, the industry is going through a structural shift.

Global petrochemicals remain in a prolonged, capacity-driven downcycle.

Singapore's response has been to help existing players move up the value chain into specialty chemicals and sustainable materials.

At the same time, Jurong Island is being positioned as a global testbed for new energy and low-carbon technologies.

Under the Sustainable Jurong Island plan, the government is targeting a 1.5-times increase in sustainable product output by 2030, compared with 2019 levels.

Companies such as Neste, Evonik and Aster are already producing sustainable aviation fuel, biodiesel feedstocks and other lower-carbon products on the island.

This matters for advanced manufacturing because Energy and Chemicals shares real engineering overlap with the rest of Singapore's industrial base.

This includes process engineering talent, shared utilities and specialised infrastructure.

The shift towards specialty chemicals and new energy could also create more demand for precision engineering, automation and process equipment providers.

Energy and Chemicals remains cyclical, especially in refining and petrochemicals.

But its reinvention around sustainability, specialty chemicals and low-carbon technologies adds another layer to Singapore's advanced manufacturing ecosystem.

4. Aerospace and space are among Singapore's most global manufacturing clusters.

Aerospace is one of Singapore's most global advanced manufacturing clusters.

Although it is still smaller than electronics, it is becoming strategically more important.

The sector draws on Singapore's strengths in precision engineering, electronics and software.

It is also supported by a large maintenance, repair and overhaul base.

According to Singapore Economic Development Board, Singapore services roughly 10% of the world's aircraft and close to 20% of its aircraft engines, as of 27 Feb 2026.

Space is the newest and fastest-growing frontier within this cluster.

A key milestone was the launch of the National Space Agency of Singapore in April 2026.

The agency has since signed a cooperation agreement with Japan's space agency, JAXA.

For listed exposure, Singapore names linked to this value chain include **Addvalue Technologies, Global Invacom and ST Engineering.**

Singapore's aerospace opportunity is no longer just about aircraft maintenance.

It is also expanding into space-related capabilities, supported by precision engineering, satellite communications and stronger government-level cooperation.

5. Logistics is the connective layer that makes the other four clusters work.

Logistics does not manufacture products directly.

But it is an important part of Singapore's advanced manufacturing ecosystem.

It is one of EDB’s five official Advanced Manufacturing & Trade cluster sectors because the other clusters depend on the movement of raw materials, components and finished products.

Singapore’s role is supported by PSA, the world’s busiest transshipment port, and Changi Airport, Southeast Asia’s largest air cargo hub.

Changi handles almost 7,000 weekly flights operated by close to 100 carriers.

Two large infrastructure projects are reshaping this cluster.

The first is Tuas Port.

When fully completed in the 2040s, it is expected to become the world’s largest fully automated container terminal, with capacity of 65 million TEUs a year.

The second is the expansion of Changi’s logistics infrastructure.

A second Airport Logistics Park and other upgrades are expected to lift air cargo handling capacity from 3 million tonnes to 5.4 million tonnes a year.

This is important for time-sensitive cargo such as pharmaceuticals, biologics, semiconductors and medical devices.

These are many of the same high-value products produced by Singapore’s other advanced manufacturing clusters.

This matters because fast and reliable logistics is part of what makes Singapore attractive as a base for high-value manufacturing.

As automation and AI are built into port and warehouse operations, under the refreshed Logistics ITM, the sector was targeted to reach around S\$6.9 billion in annual value-added and create about 2,000 ne jobs..

Logistics may not be a manufacturing sector in the traditional sense.

But it is the connective layer that allows Singapore’s electronics, precision engineering, energy and chemicals, and aerospace clusters to operate efficiently and serve global customers.

Government Initiatives & Policy Support

Singapore’s policy support for advanced manufacturing is unusually broad and deep.

Rather than relying on one or two schemes, the government has built a wider support system around the sector.

This includes long-term industrial plans, R&D funding, tax incentives, grants for smaller companies, shared facilities, semiconductor infrastructure and talent development programmes.

At the centre of this is Manufacturing 2030.

The plan aims to grow manufacturing value-added by 50% from 2020 to 2030.

Figure 15: Government Policy Support

\$S\$37B RIE 2030 R&D Plan	\$S\$800M RIE Flagship in Semiconductors	50% Mfg Output Growth Target	\$S\$500M NSTIC Cleanroom Facility
Manufacturing 2030	10-year national plan → \$S\$160B output target; innovation hub across electronics, precision engineering, aerospace		
Refundable Investment Credit (RIC)	Up to 50% support on qualifying capex over 10 years — Singapore’s answer to US CHIPS Act & EU Chips Act		
Enterprise Innovation Scheme (EIS)	400% tax deductions on approved R&D + \$S\$100K convertible to cash at 20% — targeted at SMEs, now expanded to cover AI-related spending		
Budget 2026 Measures	\$S\$800M for semiconductor R&D via new RIE Flagship in Semiconductors Programme (building on NSTIC, focused on advanced packaging & photonics); new National AI Missions launched for advanced manufacturing and other key sectors; MTI has also flagged space-related industries as a new growth frontier		

Source: National Research Foundation, IRAS, Ministry of Finance, MTI, A*STAR, EDB

This gives the sector a clear long-term policy direction.

Singapore has also committed significant funding through its broader research and innovation plans.

These include dedicated support for semiconductors, advanced packaging, photonics, power electronics and AI-enabled manufacturing.

This matters because advanced manufacturing requires long investment cycles, specialised talent and strong public-private coordination.

Government support can help reduce some of these barriers and strengthen Singapore's position as a trusted manufacturing and innovation hub.

- **Manufacturing 2030 (launched in 2021):** Manufacturing 2030 is a 10-year national plan that aims to grow Singapore's manufacturing value-added by 50% from 2020 levels by 2030, which has been described as taking the sector's contribution to around S\$160 billion.

- **Refundable Investment Credit (RIC) under Budget 2024:** Introduced in Budget 2024, the Refundable Investment Credit was designed to help Singapore compete with incentives such as the US CHIPS Act and the EU Chips Act.

The Refundable Investment Credit provides credits of up to 50% of qualifying expenditure for eligible investment activities, with support awarded for qualifying periods of up to 10 years.

RIC can support multiple categories of qualifying expenditure, not just capex, and it is not exclusively for advanced manufacturing. This reflects Singapore's response to the growing global subsidy competition for semiconductor investment.

- **Enterprise Innovation Scheme (EIS):** The Enterprise Innovation Scheme allows eligible firms to convert up to S\$100,000 of

total qualifying expenditure across eligible innovation activities into a cash payout at a 20% conversion rate, subject to the scheme's conditions.

It also provides enhanced tax deductions or allowances of up to 400% for specified qualifying activities through YA2028.

- **National Semiconductor Translation and Innovation Centre (NSTIC):** The National Semiconductor Translation and Innovation Centre includes a S\$500 million R&D Fab announced under Budget 2025, offering shared cleanroom infrastructure and industry-grade fabrication tools, initially focused on advanced packaging.

It is designed to lower capital barriers for startups working on advanced packaging and chiplet integration.

This allows companies to develop and validate new packaging technologies without having to bear the very high capital expenditure required for a dedicated facility.

- **Budget 2025 support measures:** In Budget 2025, the government added S\$3 billion to the National Productivity Fund to support productivity investments, including advanced manufacturing automation.
- **Additional S\$3 billion for RIE2025 (2024):** In 2024, the government committed an additional S\$3 billion to RIE2025, with advanced manufacturing among the priority areas supported.
- **RIE 2030 Plan – S\$37 billion R&D investment:** The Research, Innovation and Enterprise 2030 (RIE 2030) masterplan commits S\$37 billion over five years to areas including advanced manufacturing, semiconductors, biomedical sciences, sustainability technologies, and quantum computing.
- **RIE semiconductor flagship programme (Budget 2026) – S\$800 million:** Funded under Budget 2026, Singapore has launched

a dedicated S\$800 million semiconductor flagship programme led by A*STAR and EDB, part of the broader RIE Flagship initiatives announced by Senior Minister Lee Hsien Loong in December 2025.

The programme aims to strengthen capabilities in advanced packaging and advanced photonics, both of which are important for improving chip performance while reducing power consumption.

- **NSTIC for power electronics – S\$60 million:** A separate S\$60 million National Semiconductor Translation and Innovation Centre (NSTIC) has been set up for power electronics, with a focus on Silicon Carbide and Gallium Nitride technologies, and is expected to commence operations by April 2026.

These materials are important for electric vehicle charging infrastructure and other power electronics applications. The centre is intended to support industry-academia collaboration and scalable manufacturing.

- **Advanced Manufacturing AI Mission:** The Advanced Manufacturing AI Mission is intended to speed up innovation and support the development of AI-enabled factories.

Since its launch in 2024, A*STAR's AI Centre of Excellence in Manufacturing has supported close to 30 firms and is expanding its suite of common AI models.

Singapore is also building capabilities in embodied AI for the manufacturing, aviation, and maritime sectors.

- **Champions of AI Programme:** The Champions of AI Programme supports selected Singapore-based companies that use AI as a core driver of productivity, innovation, and revenue growth.

It reflects Singapore's broader ambition to position itself as a leading global AI hub.

There are also practical tools to help companies invest. These include refundable tax credits for advanced manufacturing projects, cash support for R&D spending, shared cleanroom and fabrication facilities through NSTIC, and additional funding for productivity and automation under recent Budgets.

Advanced manufacturing is a clear national priority, with policy support that spans both near-term investment and longer-term capability building.

Investment and R&D backdrop

Singapore's investment data also points to the scale of the opportunity.

EDB reported S\$14.2 billion in fixed asset investment commitments in 2025.

Manufacturing contributed S\$12.1 billion of this amount.

This was supported by semiconductor firms expanding capacity for AI-related demand, as well as aerospace companies investing in maintenance, repair and overhaul capabilities.

This followed S\$13.5 billion of fixed asset investment commitments in 2024.

At the same time, private R&D activity has been rising.

Singapore's inaugural RIE2025 report card showed that business R&D spending rose 64% to S\$9 billion between 2018 and 2023.

Industry R&D jobs also grew by about a third over the same period.

Singapore residents made up more than seven in ten of these roles.

Examples of Singapore companies and valuation

Singapore companies with exposure to advanced manufacturing

Singapore companies span the advanced-manufacturing value chain

Singapore-focused investors have a wide range of ways to gain exposure to advanced manufacturing.

The opportunity set spans semiconductor equipment and materials, precision engineering, optics and machine vision, aerospace and space, and electronics and AI hardware.

Importantly, this ecosystem includes not only SGX-listed companies, but also Singapore-headquartered companies listed overseas, private companies and businesses that may eventually come to the public market.

Rather than viewing these companies separately based on their listing status, it can be more useful to look at where they sit along the advanced-manufacturing value chain.

Semiconductor equipment, testing, materials and advanced packaging

AEM is one of Singapore's clearest listed exposures to semiconductor test equipment.

Its relevance comes from rising test intensity in advanced chips, particularly those used for AI and high-performance computing.

AEM's core products include test-cell solutions, system-level test and burn-in platforms, memory and logic handlers, test boards, sockets and its proprietary PiXL thermal-management technology.

These solutions help semiconductor customers improve throughput and test

coverage as chips become more powerful, complex and heat-intensive.

UMS Integration is another important semiconductor-related name.

The company focuses on high-precision front-end semiconductor components, complex electromechanical assembly, final-testing devices and modular and integration systems for semiconductor-equipment manufacturers.

Its role in the value chain is to supply critical parts and assemblies used in semiconductor capital equipment, giving it exposure to wafer-fab investment and equipment demand.

Kulicke & Soffa (NASDAQ: KLIC) is a Singapore-headquartered supplier of semiconductor assembly and packaging equipment.

Its equipment is used further downstream in the semiconductor manufacturing process, including chip assembly, advanced packaging and interconnect applications.

ASMPT (SEHK: 522) is another Singapore-headquartered global semiconductor-equipment company.

It supplies equipment and solutions used in semiconductor assembly and packaging as well as surface-mount technology.

GlobalFoundries (NASDAQ: GFS) is one of the world's largest pure-play semiconductor foundries, with a long-established Singapore manufacturing base.

Its fabs give Singapore direct exposure to wafer manufacturing, including chips used in

automotive, communications, industrial and consumer applications.

Silicon Box (private) specialises in advanced semiconductor integration and panel-level packaging for chiplet-based designs.

Rather than processing chips individually, panel-level packaging allows multiple semiconductor dies to be integrated across a larger panel, potentially improving manufacturing scale and economics.

Its technology is targeted at applications such as artificial intelligence and high-performance computing, where multiple specialised chips increasingly need to operate together.

VSMC (private) is a joint venture between Vanguard International Semiconductor and NXP Semiconductors.

The partners are investing around US\$7.8 billion in a new 300mm wafer fabrication plant in Singapore, with production targeted to begin in 2027.

The facility is expected to manufacture mature-node chips used in automotive, industrial, consumer and communications applications.

Nanofilm Technologies provides exposure to advanced materials and nanotechnology.

The company is built around its proprietary Filtered Cathodic Vacuum Arc, or FCVA, coating technology.

Its products and services span advanced vacuum coatings, nanofabrication, industrial equipment and other applications.

In practical terms, Nanofilm produces ultra-dense, low-friction and wear-resistant coatings that can be used across consumer electronics, automotive, semiconductor and industrial applications.

Mi Material (proposed SGX listing) is a Singapore-headquartered semiconductor-materials company specialising in precision solder spheres and proprietary alloy

formulations used in advanced semiconductor packaging.

It is among the top three solder-sphere suppliers globally.

Its products are used as critical electrical interconnects in semiconductor packages, including increasingly complex high-performance computing, high-bandwidth memory and mobile applications.

The company has particular expertise in fine and ultra-fine-pitch solder spheres, with manufacturing capabilities extending down to 30 microns.

Its competitive capabilities extend beyond manufacturing precision.

Mi Material has developed proprietary alloy formulations such as iSAC and Cyclomax, as well as copper-core solder spheres designed for more demanding advanced-packaging applications.

Galatek (private) develops automation solutions for smart laboratories and semiconductor advanced-packaging processes.

Its technologies sit at the intersection of advanced manufacturing, laboratory automation and semiconductor production.

Following a US\$30 million Series A funding round in December 2025, the company expanded its manufacturing footprint with a new facility in Penang while retaining its R&D and commercial base in Singapore.

Precision optics, photonics and machine vision

MetaOptics is a Singapore-listed precision-optics and photonics company specialising in metalens technology.

Metalenses use nanoscale structures to manipulate light and can potentially replace or simplify conventional multi-element lens systems.

This allows optical modules to become thinner and lighter, with applications including

smartphone cameras, 3D biometrics, AR/VR devices, IoT cameras and pico projectors.

MetaOptics' capabilities span metalens design, wafer-scale fabrication, camera modules, testing equipment and automated module assembly, making it better viewed as a precision-optics and photonics company rather than primarily as a conventional semiconductor company.

WEO Corporation (private) is a Singapore-headquartered manufacturer of high-precision optical components and opto-mechanical assemblies.

Its capabilities span precision optics, precision mechanics, optical-system design and opto-mechanical integration.

WEO supplies applications across medical and life sciences, industrial inspection, metrology and aerospace and security, including endoscopes, surgical microscopes, machine-vision systems, robotic vision, satellite imaging and surveillance systems.

This makes WEO primarily an exposure to precision optics and photonics manufacturing rather than satellite-data analytics.

Emage Vision / Emage Group (private) is a Singapore machine-vision and automation company with particularly deep expertise in medical manufacturing.

The company established its foothold by developing specialised optical and machine-vision systems for inspecting contact lenses, where transparent and curved surfaces make automated defect detection particularly difficult.

It has since expanded from inspection systems into AI and robotics for other highly regulated medical-manufacturing applications, including surgical and aseptic operations.

Emage is now branching further into industrial automation and physical AI.

Its newer initiatives combine AI, sensors, machine vision and robotics, including the development of industrial robots for complex factory-automation tasks.

While the company also has exposure to semiconductor and electronics inspection, its core positioning is better described as medical machine vision with an expanding presence in industrial robotics and physical AI.

Diversified precision engineering and EMS

Venture Corporation is one of Singapore's key diversified electronics manufacturing and technology-services companies.

It provides high-value design, engineering and manufacturing services across life sciences, medical technology, networking, test and measurement and semiconductor-related equipment.

This diversified customer base gives Venture exposure to several parts of the advanced-manufacturing ecosystem rather than a single end market.

Frencken is another diversified advanced-manufacturing company.

Its operations span mechatronics, precision engineering and integrated manufacturing solutions.

The company serves semiconductor, medical, analytical life-sciences, industrial-automation, automotive and aerospace customers.

Its key offerings include precision-engineered systems, complete machines, complex electromechanical assemblies and high-precision components, making it an important supplier to multinational OEMs.

InnoTek is a Singapore-listed precision-engineering company.

It manufactures tooling, die-cast, stamped and machined components for industries including automotive, office automation and displays.

The company has also been expanding into GPU-server components, giving it growing exposure to AI-related hardware demand.

JEP Holdings is a Catalist-listed precision engineering group majority-owned by UMS Holdings.

It spans both the semiconductor and aerospace value chains.

The company machines components for aerospace customers such as Safran and Collins Aerospace, as well as semiconductor front-end equipment makers.

Hi-P (private) is one of Singapore's longest-established electronics manufacturing and precision-engineering companies.

It provides end-to-end manufacturing services ranging from product and industrial design to precision plastic and metal components, flexible printed circuits, antenna solutions, final assembly and testing.

The company serves customers across telecommunications, consumer lifestyle, computing and automotive markets.

Hi-P was privatised in 2021 and is no longer listed on the SGX.

Valuetronics is an integrated electronics-manufacturing-services provider.

It helps customers manufacture electronic products and components across industrial, commercial and consumer markets.

Its customers operate in areas such as automotive electronics, telecommunications and networking equipment.

With manufacturing facilities in both China and Vietnam, Valuetronics can also offer customers greater geographical diversification in their manufacturing footprint.

Aerospace and Space

ST Engineering provides one of the broadest listed exposures to Singapore's aerospace and space ecosystem.

It is a major global aircraft maintenance, repair and overhaul provider and also participates in

satellite programmes including TeLEOS-1 and TeLEOS-2.

Its aerospace operations position it as one of the anchors of Singapore's broader aviation-manufacturing and MRO cluster.

Addvalue Technologies provides communications systems that allow low-Earth-orbit satellites to maintain connectivity as they orbit the Earth.

Its key product is the Inter-Satellite Data Relay System, or IDRS.

Rather than waiting for a satellite to pass over a ground station, IDRS can relay information through higher-orbit communications satellites, allowing operators to communicate with spacecraft closer to real time.

This can be useful for time-sensitive applications such as earth observation, weather monitoring and emergency response.

Global Invacom operates at a different part of the satellite communications value chain.

It designs and manufactures ground-based equipment used to receive, process and distribute satellite signals.

Its products include satellite antennas, radio-frequency equipment, receivers, transceivers, switches and fibre-distribution systems.

These products provide some of the physical ground infrastructure connecting satellites with end users.

Pixxel (private) is a hyperspectral earth-observation company backed by investors including Temasek and GIC.

Its satellites capture information across many wavelengths of light, allowing customers to identify changes in agriculture, natural resources and the environment that may not be apparent in conventional satellite images.

Transcelestial (private) develops wireless laser-communications systems.

Its technology uses beams of light to transmit data, providing an alternative to conventional fibre or radio-frequency connectivity in selected applications.

Aliena (private) develops electric propulsion systems for small satellites.

Its propulsion systems allow satellites to manoeuvre and maintain their desired orbits while using compact and power-efficient propulsion architectures.

Zero-Error Systems (private) develops radiation-resistant semiconductor solutions designed to protect satellites and spacecraft from errors caused by radiation in space.

This places the company at the intersection of Singapore's semiconductor and space-technology ecosystems.

Space Faculty (private) supports the broader space ecosystem through education, training and talent development.

It helps build the specialist engineering and technical capabilities required as Singapore's space sector expands.

Kumi Analytics (private) applies satellite and geospatial data to environmental and sustainability-related applications, providing an example of the downstream analytics layer of the space value chain.

Consumer, IoT and AI hardware

Aztech Global designs and manufactures IoT devices and data-communication products.

Its products include connected devices and networking equipment used across security, healthcare, industrial and renewable-energy applications.

Aztech operates largely as an original design manufacturer, meaning it can help customers both develop and manufacture products rather than simply assemble completed designs.

Management has been working to diversify its customer base and expand into areas such as medical technology and renewable energy.

PC Partner manufactures computing hardware under brands including ZOTAC.

Its products include graphics cards, mini PCs, industrial computers and increasingly server-related equipment.

Its core GPU business gives it exposure to gaming and content creation, while its expansion into AI servers is increasing its exposure to data-centre and artificial-intelligence infrastructure.

This makes PC Partner one of the more direct Singapore-listed hardware exposures to the growth in GPU-based computing and AI infrastructure.

Edge AI semiconductors

Ambiq Micro is dual-listed on the NYSE and SGX.

The company gives Singapore investors exposure to edge-AI semiconductors, where computing is performed directly on devices rather than entirely in the cloud.

Its SPOT technology platform and Apollo and Atomiq system-on-chip families target battery-powered applications such as wearables, healthcare monitors, smart-home devices and industrial sensors, where very low power consumption is particularly important.

Taken together, these companies illustrate how Singapore's advanced-manufacturing ecosystem extends well beyond a handful of listed semiconductor stocks.

The value chain now ranges from wafer fabrication, semiconductor equipment and advanced packaging materials to precision optics, machine vision, aerospace components, satellite technology, electronics manufacturing and AI hardware.

The private companies are important in this context because they fill many of the same value-chain niches as their listed peers – and, in some cases, could become part of Singapore's listed opportunity set over time.

Valuation comparison

Valuations across Singapore's advanced manufacturing stocks are mixed rather than uniformly cheap.

Among companies with meaningful forward estimates, the peer group trades at a median 29.8x forward P/E and 16.7x forward EV/EBITDA.

Addvalue Technologies stands out at the higher end, while AEM and UMS also trade at relatively elevated multiples, reflecting stronger expectations around satellite communications, semiconductor recovery and AI-related demand.

Venture and Frencken trade at more moderate valuations, while PC Partner and Valuetronics screen among the cheaper profitable names.

Aztech and Nanofilm also trade below the peer-group median on forward EV/EBITDA.

The differences reflect varying growth expectations, end-market exposure and earnings visibility.

Dividend yields also vary widely, with Venture, Aztech, PC Partner and Valuetronics offering yields of about 5% to 10%, compared with the peer median of 1.4%, giving selected names a mix of growth and income characteristics.

Figure 16: Valuation comparison

Name	Market Cap (USD million)	Forward P/E (x)	Forward EV/EBITDA (x)	ROE (%)	Div Yield %	Year-to- date perf %
Venture Corporation Limited	3,672.7	18.7	11.2	7.99	5.0%	13.3%
AEM Holdings Ltd.	2,702.3	40.6	27.3	3.46	0.8%	529.5%
UMS Integration Limited	1,920.6	34.5	22.0	9.82	3.9%	147.8%
Frencken Group Limited	927.9	25.0	11.9	8.60	2.0%	84.5%
Aztech Global Ltd.	302.0	20.9	7.3	12.74	6.1%	-11.5%
PC Partner Group Limited	1,056.8	19.3	5.4	16.07	10.1%	324.3%
Nanofilm Technologies International Ltd.	429.9	28.3	8.7	2.86	2.1%	44.1%
Valuetronics Holdings Limited	329.9	n.a.	n.a.	7.85	7.0%	19.5%
InnoTek Limited	95.3	n.a.	n.a.	1.15	3.1%	-29.0%
MetaOptics Ltd	61.3	n.a.	n.a.	-82.81	0.0%	-72.8%
Addvalue Technologies Ltd	391.1	60.1	38.0	36.33	0.0%	92.3%
Global Invacom Group Ltd.	10.4	n.a.	n.a.	-7.55	0.0%	-35.4%
JEP Holdings Ltd.	161.6	26.3	11.8	4.09	0.0%	85.9%
Singapore Technologies Engineering Ltd	25,618.6	30.9	19.4	17.65	2.1%	27.7%
Ambiq Micro, Inc.	1,424.5	n.a.	n.a.	-29.38	0.0%	106.7%
Kulicke & Soffa Industries, Inc.	4,757.8	23.5	17.9	n.a.	0.8%	101.0%
ASMPT Limited	8,753.3	37.0	20.8	6.73	0.8%	112.3%
GlobalFoundries Inc.	27,086.4	25.5	11.2	7.80	0.0%	41.9%
Taiwan Semiconductor Manufacturing Co., Ltd.	2,070,983.5	23.5	15.8	35.39	1.4%	63.3%
ASE Technology Holding Co., Ltd.	104,167.0	39.6	19.2	12.13	2.6%	195.1%
Entegris, Inc.	24,782.6	41.3	27.6	6.16	0.5%	93.0%
Amkor Technology, Inc.	12,671.1	19.9	8.3	8.67	0.8%	29.8%
Cohu, Inc.	3,236.5	72.0	37.9	-9.04	0.0%	193.8%
Average		32.6	17.9	3.49	2.1%	93.8%
Median		27.3	16.8	7.82	0.8%	84.5%

Source: Factset, data as of 8 October 2026

Key risks

Macro, sector, and company-level risks

The main risks are macro and geopolitical

Every investment theme has risks, and advanced manufacturing is no exception. For investors looking at Singapore’s advanced manufacturing sector, the main risks are macro and geopolitical.

Macro & Geopolitical Risks

1. US-China Technology Decoupling

One of the biggest is US-China technology tension. Export controls, restrictions on semiconductor tools and software, and China’s response through critical mineral controls have made global supply chains more fragile. For Singapore, this cuts both ways. On one hand, supply chain diversification can create more demand for Singapore-based manufacturers. On the other hand, any sharp escalation could still disrupt trade flows, customer demand, and supply chains.

2. Taiwan Strait Risk

Another major risk is Taiwan. A large share of the world’s most advanced semiconductor production is still concentrated there. Any serious disruption in the Taiwan Strait would likely affect the global semiconductor industry very quickly, including companies in Singapore, even if their manufacturing base is more diversified.

3. US Tariff and Trade Policy Uncertainty

Trade policy is another area to watch. Changes in US tariffs and rules around product origin can make sourcing, compliance, and pricing more complicated for customers and suppliers alike. Even if Singapore-based manufacturers are relatively well positioned, the uncertainty itself can still affect order timing and customer decisions.

Figure 17: Key Risks to Watch

Macro & Geopolitical	Sector-Specific
US-China Tech Decoupling Export controls and mineral restrictions make supply chains fragile – sharp escalation could disrupt SG -based manufacturers too	Semiconductor Cyclicity Even with strong structural trends, equipment and component suppliers see sharp revenue swings when customers destock
Taiwan Strait Risk Majority of advanced semicon production still concentrated in Taiwan – any disruption would reverberate globally within days	Customer Concentration Some companies rely heavily on 1 -2 customers – a single order cut can have outsized impact on earnings
US Tariff & Trade Policy Changing tariff rules and product -origin compliance add friction to customer decisions and order timing	Tech Transition Risk Advanced packaging and chip design evolve rapidly – companies that miss the next node risk losing relevance quickly
	Talent Shortage Specialised engineers are scarce globally – tight talent supply could constrain Singapore's growth rate

Source: Beansprout analysis

Sector-Specific Risks

There are also sector-specific risks that investors should keep in mind.

1. Semiconductor Cyclicalities

One is semiconductor cyclicalities. Even when the long-term demand trend is positive, equipment and component suppliers can still go through sharp revenue declines when customers cut orders and work through excess inventory. That means earnings in this sector can be volatile, even during periods of structural growth.

2. Customer Concentration

Another is customer concentration. Some companies rely heavily on one or two large customers, which can create meaningful downside if those customers reduce spending or delay orders. In these cases, a single customer decision can have a large impact on revenue and profits.

3. Technology Transition Risk

Technology transition is another risk. Advanced packaging, chip design, and related manufacturing processes are evolving quickly. Companies that do not keep up with the next generation of technology could lose relevance, while newer approaches may not always scale commercially as expected.

4. Talent Shortage

Talent is also a constraint. The semiconductor and advanced manufacturing sectors require highly specialised engineers and technicians, and competition for this talent is increasing globally. For Singapore, limited domestic talent supply could slow the pace of growth if companies struggle to hire fast enough.

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