AmInvestment Bank

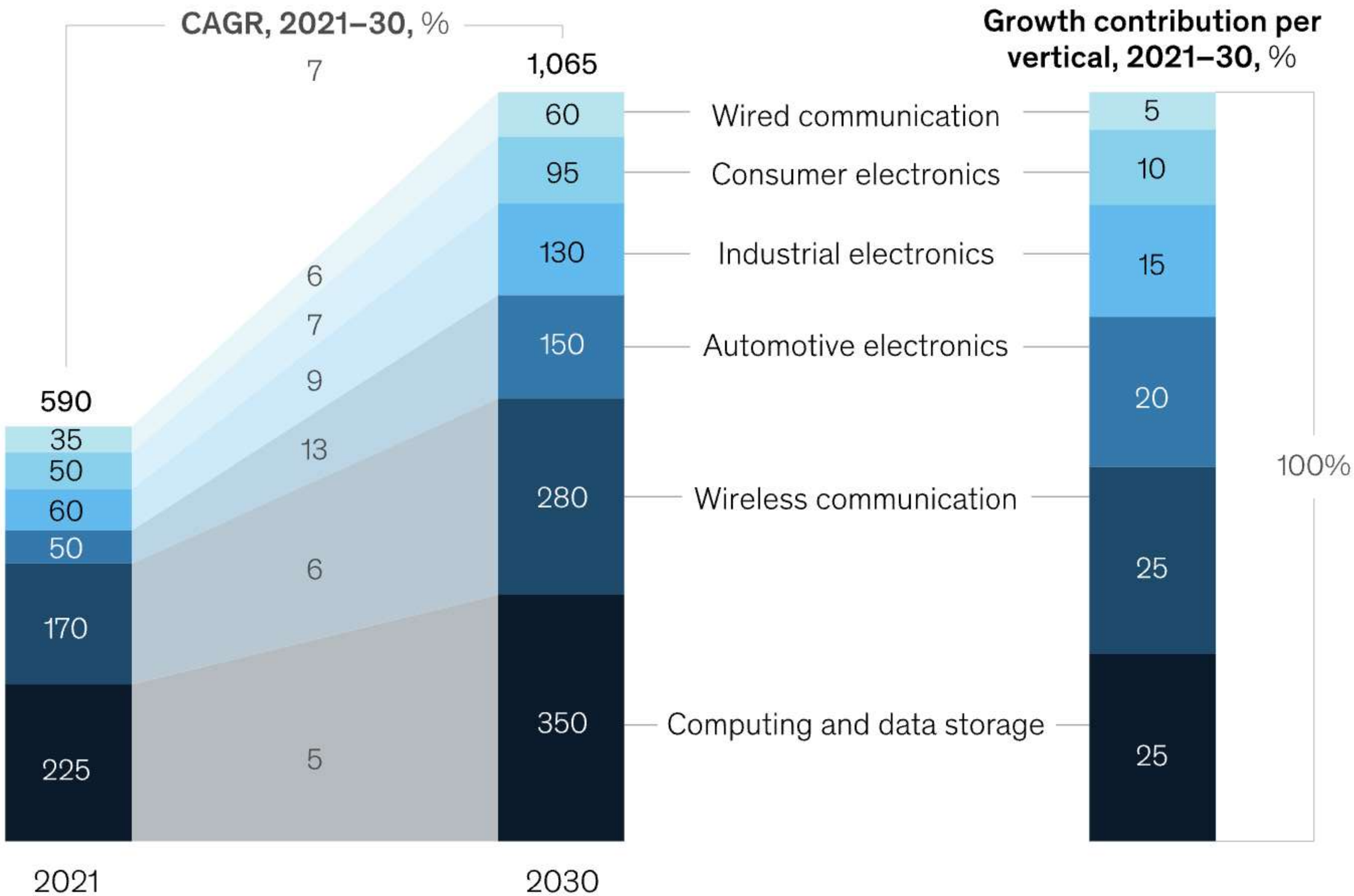
Malaysia Tech Primer

July 2025

What is a semiconductor?

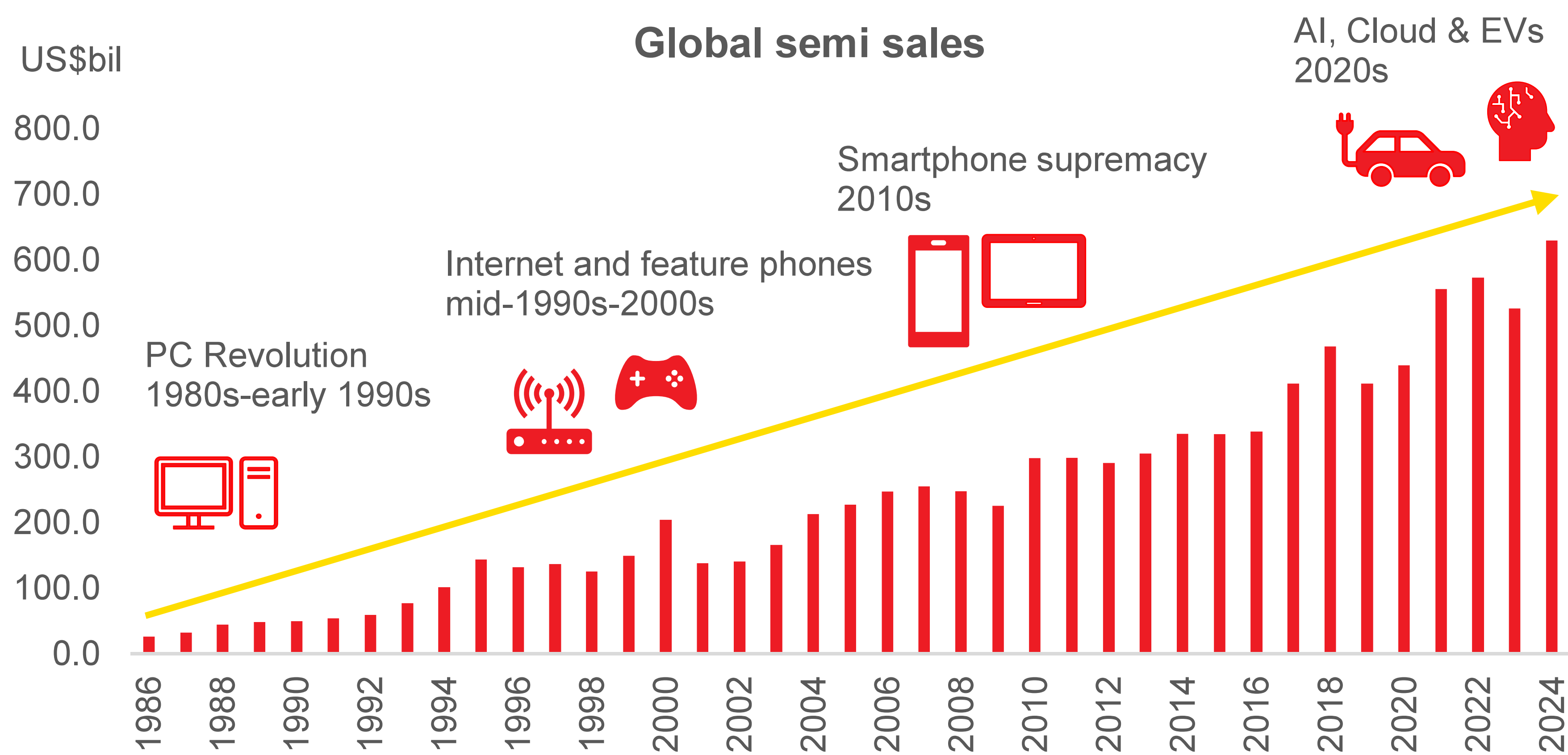
- A semiconductor is a material that acts both as a conductor (like metal) and insulator (like plastic).
- Usually made from silicon, a common element found in sand.
- Semiconductors are **used to create transistors** – tiny switches that control the flow of electricity.
- Combined in large numbers, transistors can process and store information, amplify signals and manage communication.
  - By acting as switches, transistors can maintain binary states of “0” and “1,” which are the basic units of digital data.

Projected to be a trillion-dollar industry by 2030



Source: McKinsey

Evolution of semiconductor demand drivers

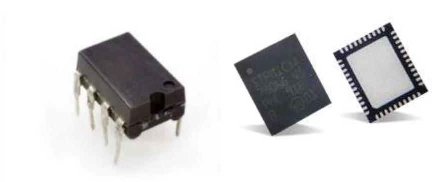


Source: WSTS, AmInvestment Bank

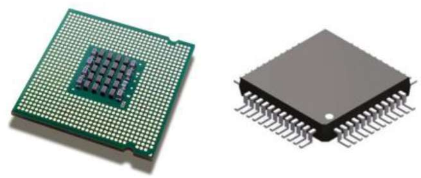
Type of semiconductors (by % of 2024 revenues)

Integrated Circuits (86%)

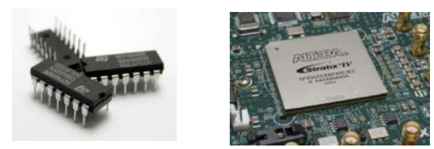
Analog (13%)
Handles real-world signals like sound and temperature in electronics
Audio amplifiers, power management, signal conversion



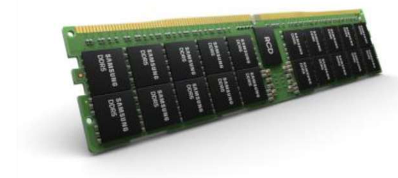
Micro (12%)
Acts as brains of devices
Microprocessors, Microcontrollers, DSPs



Logic (34%)
Chips that make decisions and control how devices operate
Standard logic, Programmable logic, ASICs



Memory (26%)
Stores data
DRAM, SRAM, Flash memory



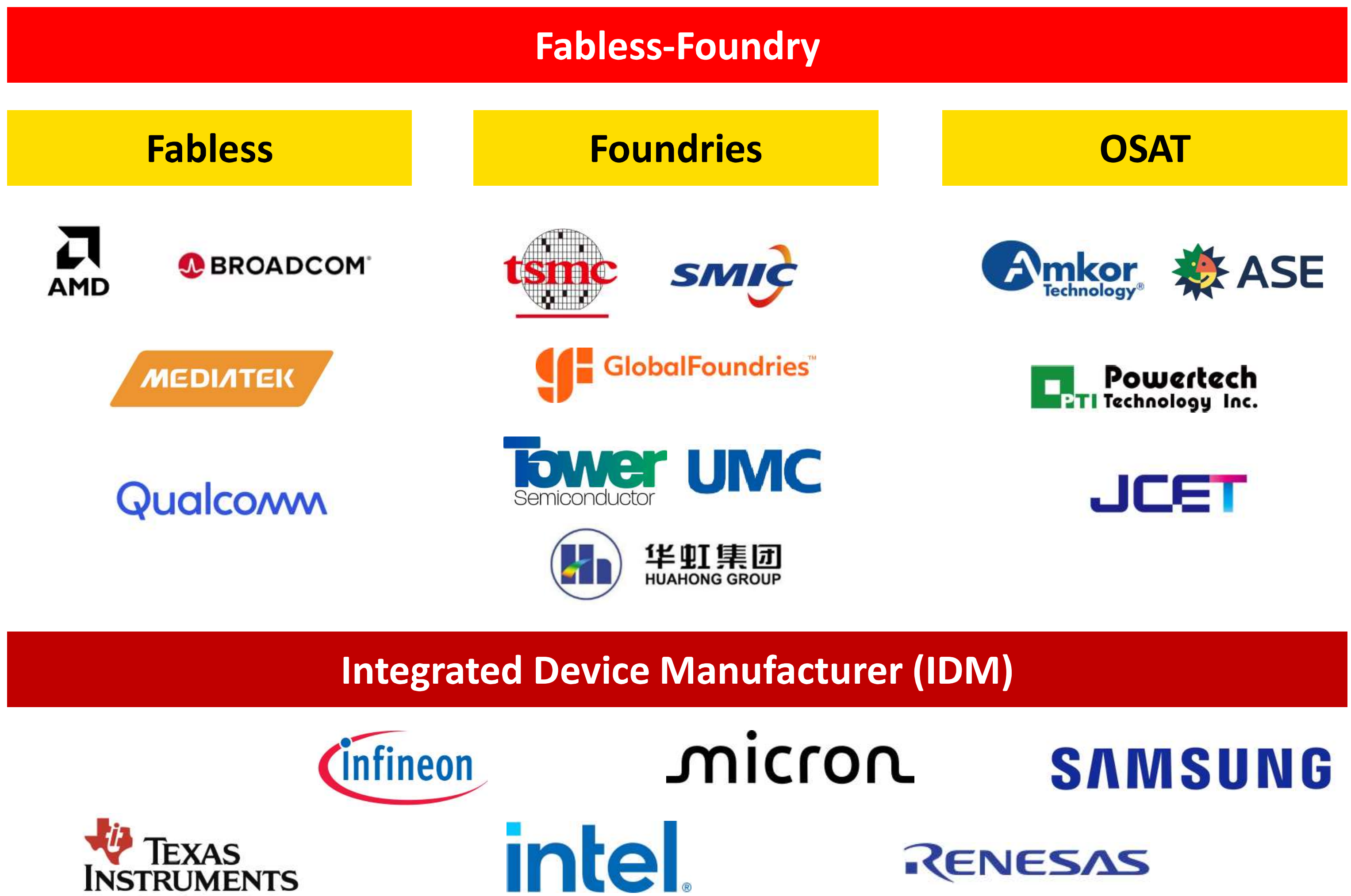
Sensors (3%)
Detect things like motion, light, or pressure

Optoelectronics (7%)
Use light to send or receive signals, like in fiber optics or remote controls
LED, Photodiodes, Laser diodes, Image sensors

Discrete (5%)
Basic building blocks like transistors and diodes that control electricity flow
Transistors, Diodes, Thyristors

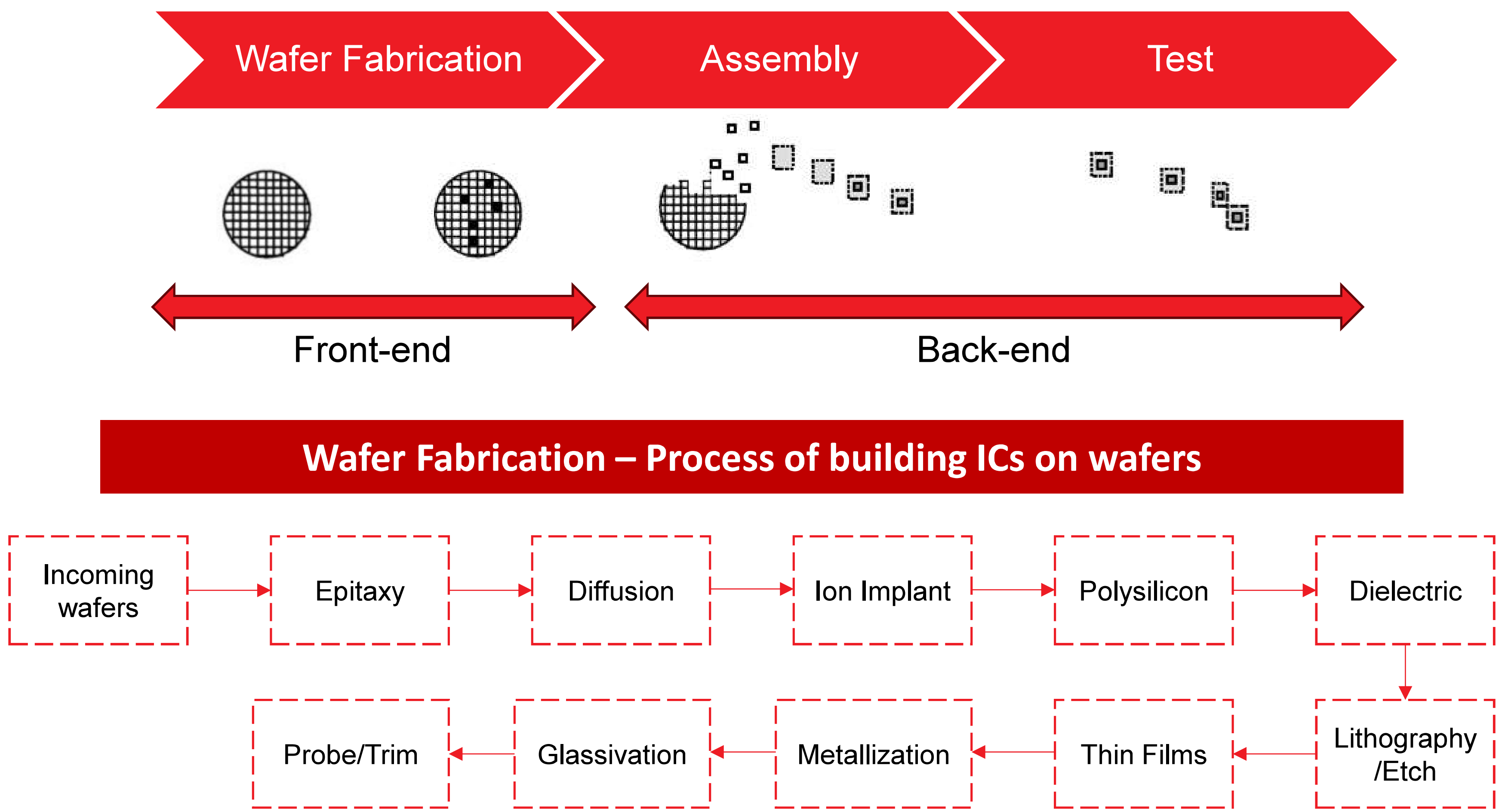
Source: WSTS, AmInvestment Bank

Key players in global supply chain



Source: Semiconductor Industry Association

Semiconductor manufacturing process



Source: EESemi, AmInvestment Bank

Semiconductor manufacturing process (cont'd)

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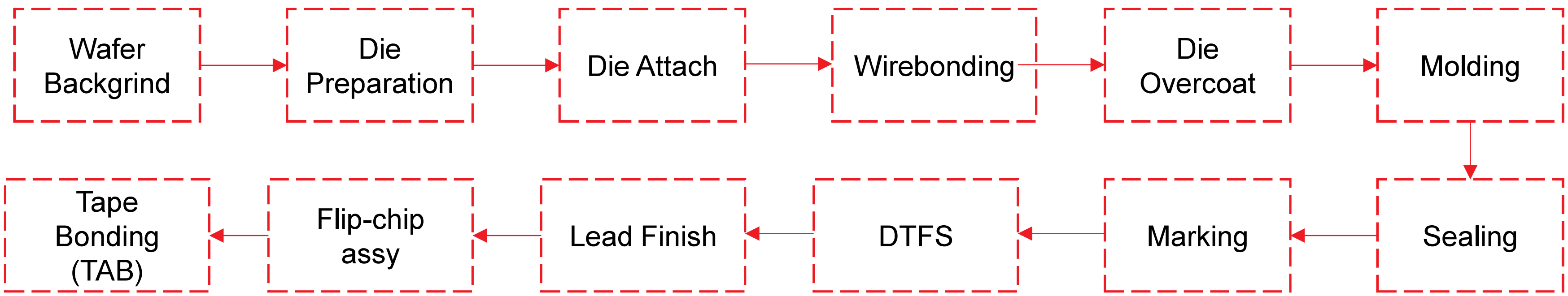
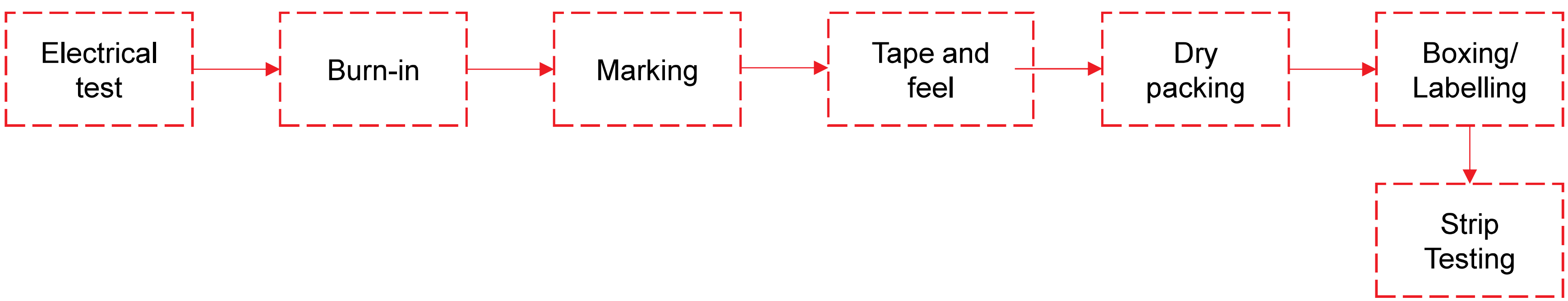
Assembly – ICs are put into package

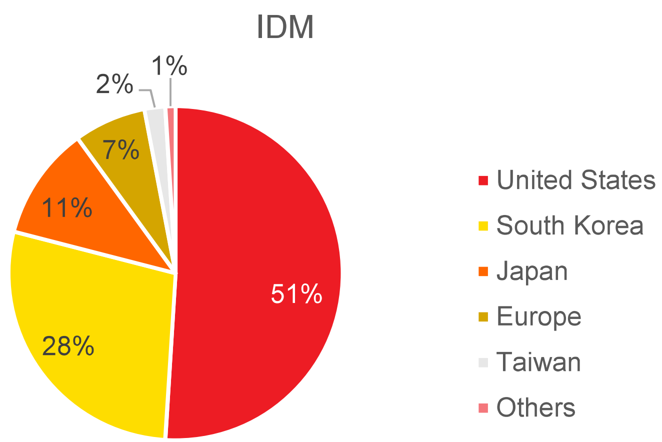


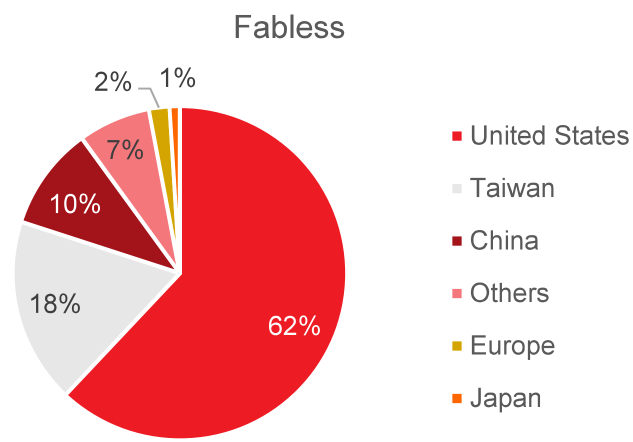
Test – Assembled devices are tested for defects

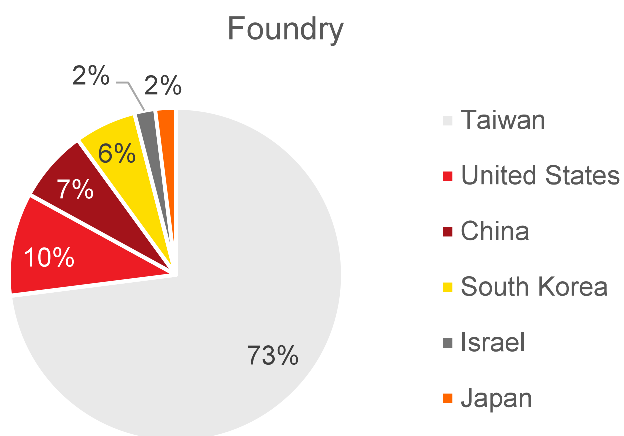


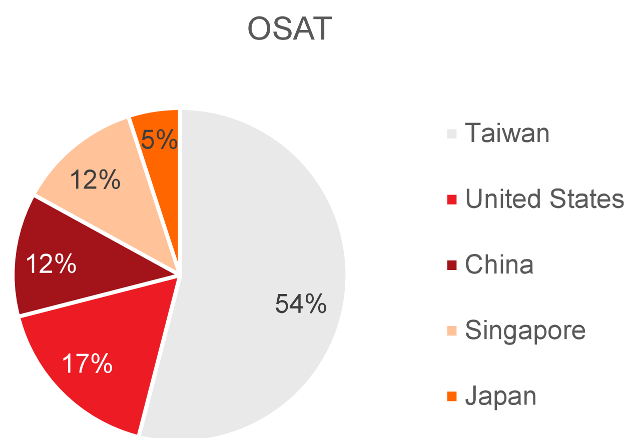
Source: EESemi, AmInvestment Bank

Market share by country



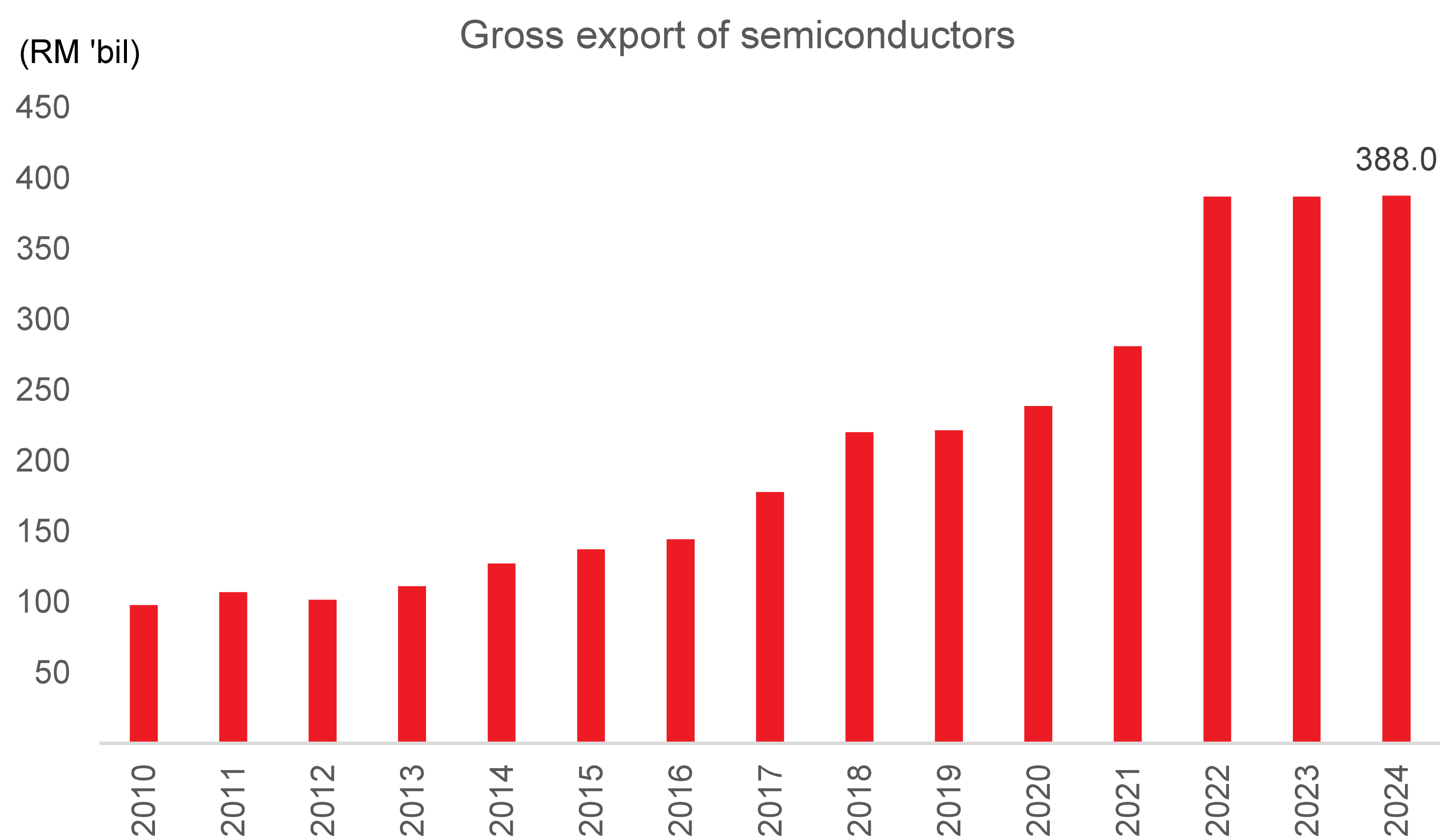






Source: Semiconductor Industry Association

Malaysia has 13% share of global backend



Source: Bank Negara Malaysia

Story of Penang

1969: Govt revoked Penang's free port status.

1972-1974: Dr. Lim Chong Eu established FTZ. Eight samurais followed.

1980s: Continued to attract companies involved in assembly and test. Intel invested in R&D centre (1988).

1990s: Began developing supporting ecosystem, including local suppliers and service providers for MNCs.

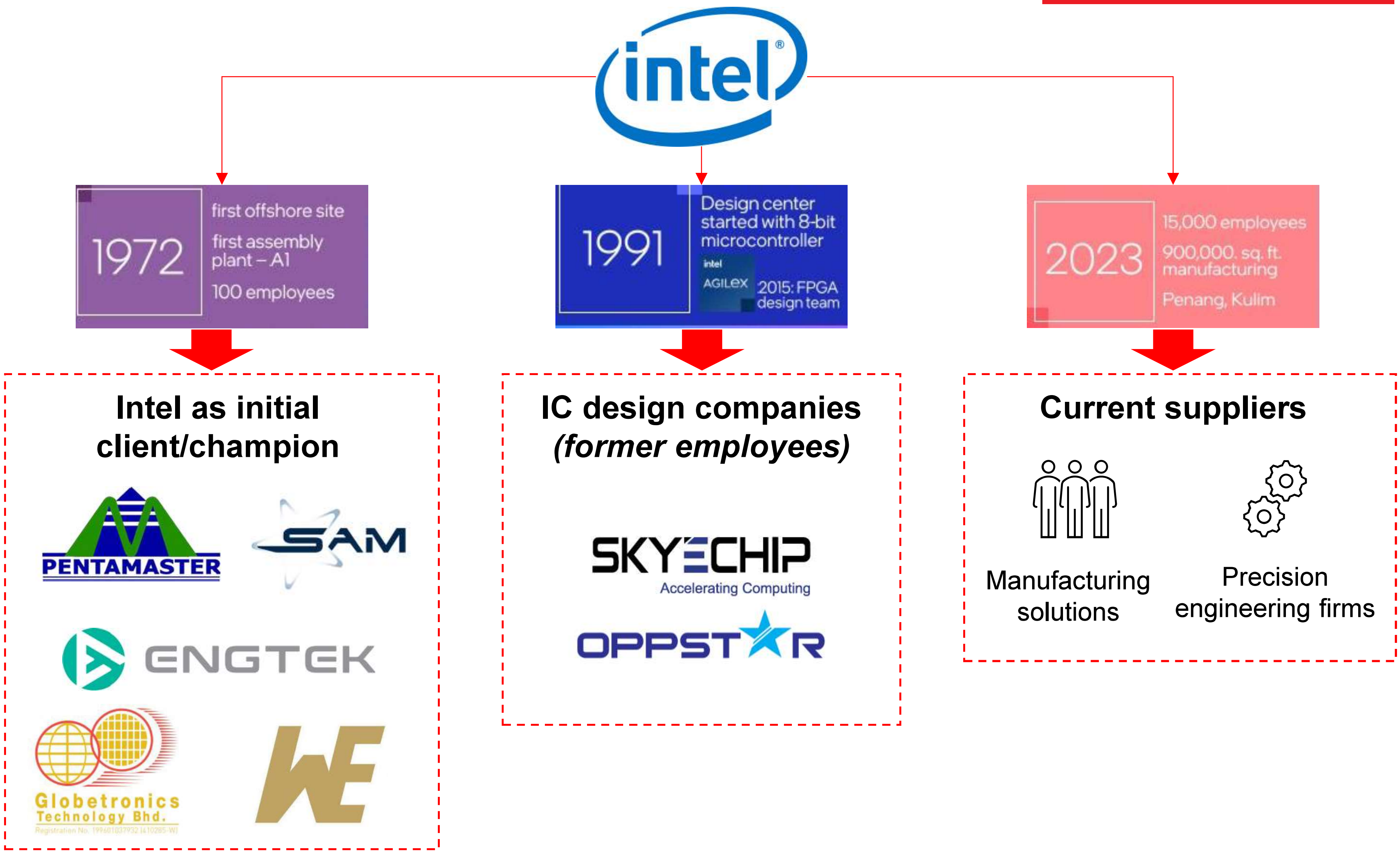
2000s: Penang became hub for higher-value functions like R&D, design, and engineering.

2010s: New wave of investments as global semiconductor demand surged. Companies like Broadcom, ASE, and Jabil continued to expand operations.

Local firms like Vitrox, Pentamaster, and Inari Amertron became important global players

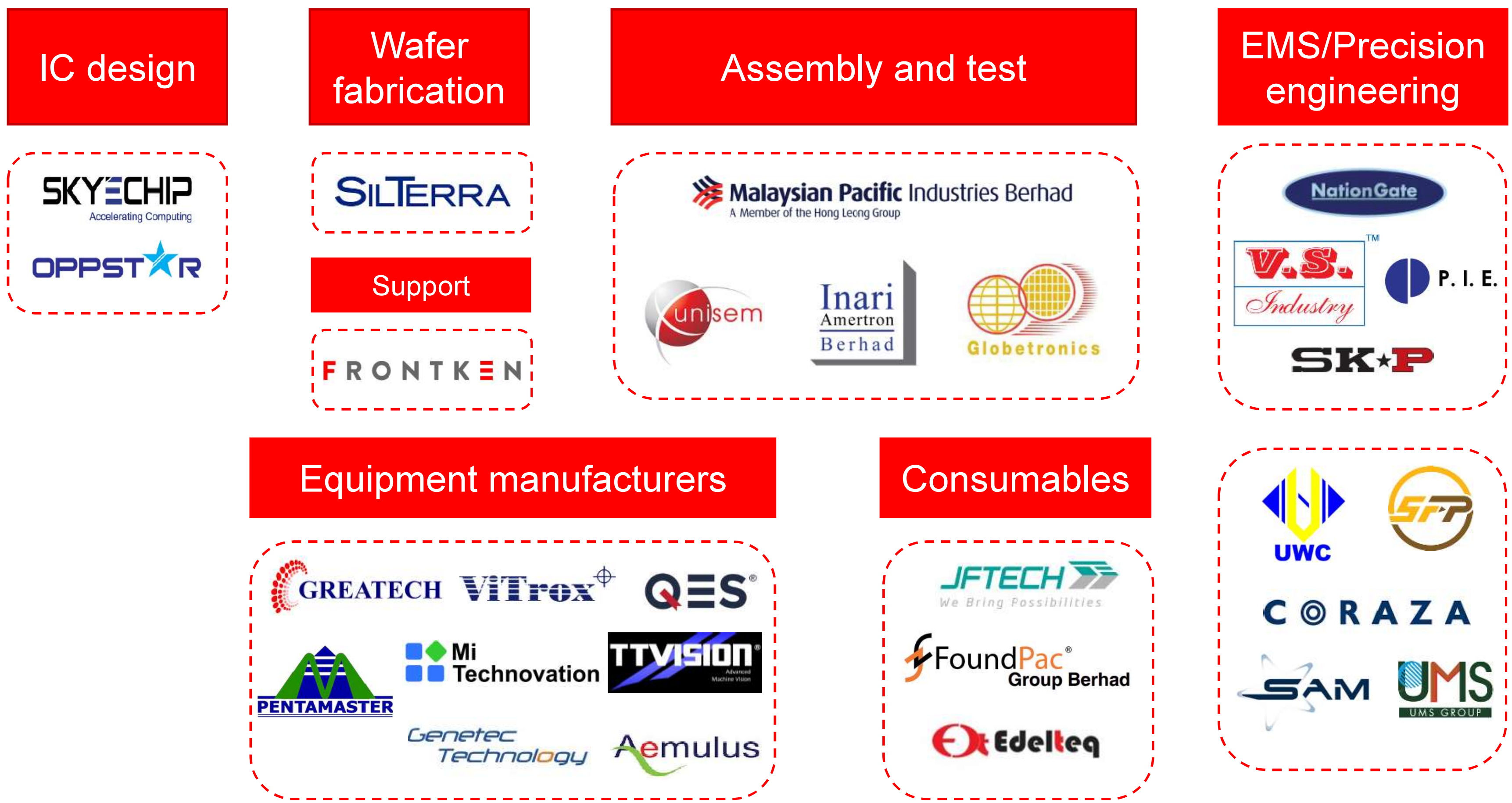
2020s: Penang's semiconductor industry benefited from the global chip shortage, seeing increased investment from both local and multinational companies. Launch of National Semiconductor Strategy.

Malaysia-MNC linkage – case study of successful FDI

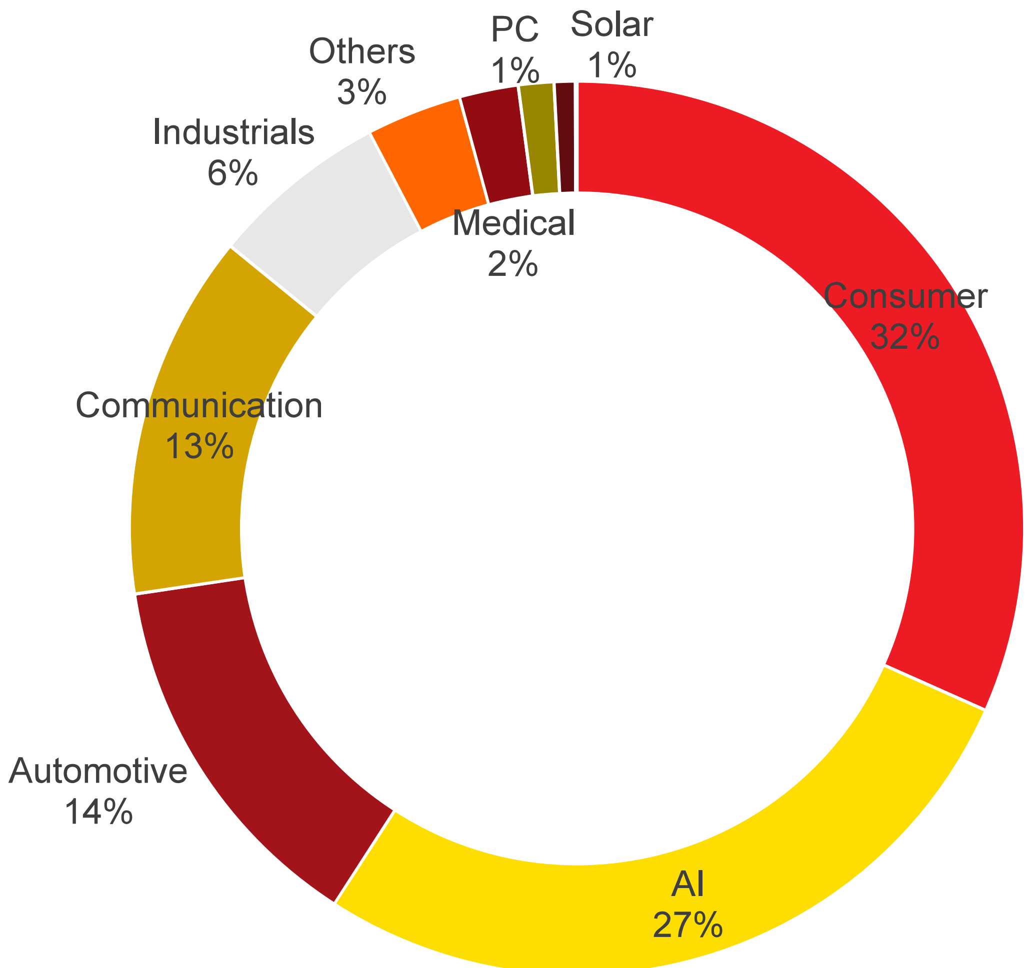


Source: ASEAN Investment Report

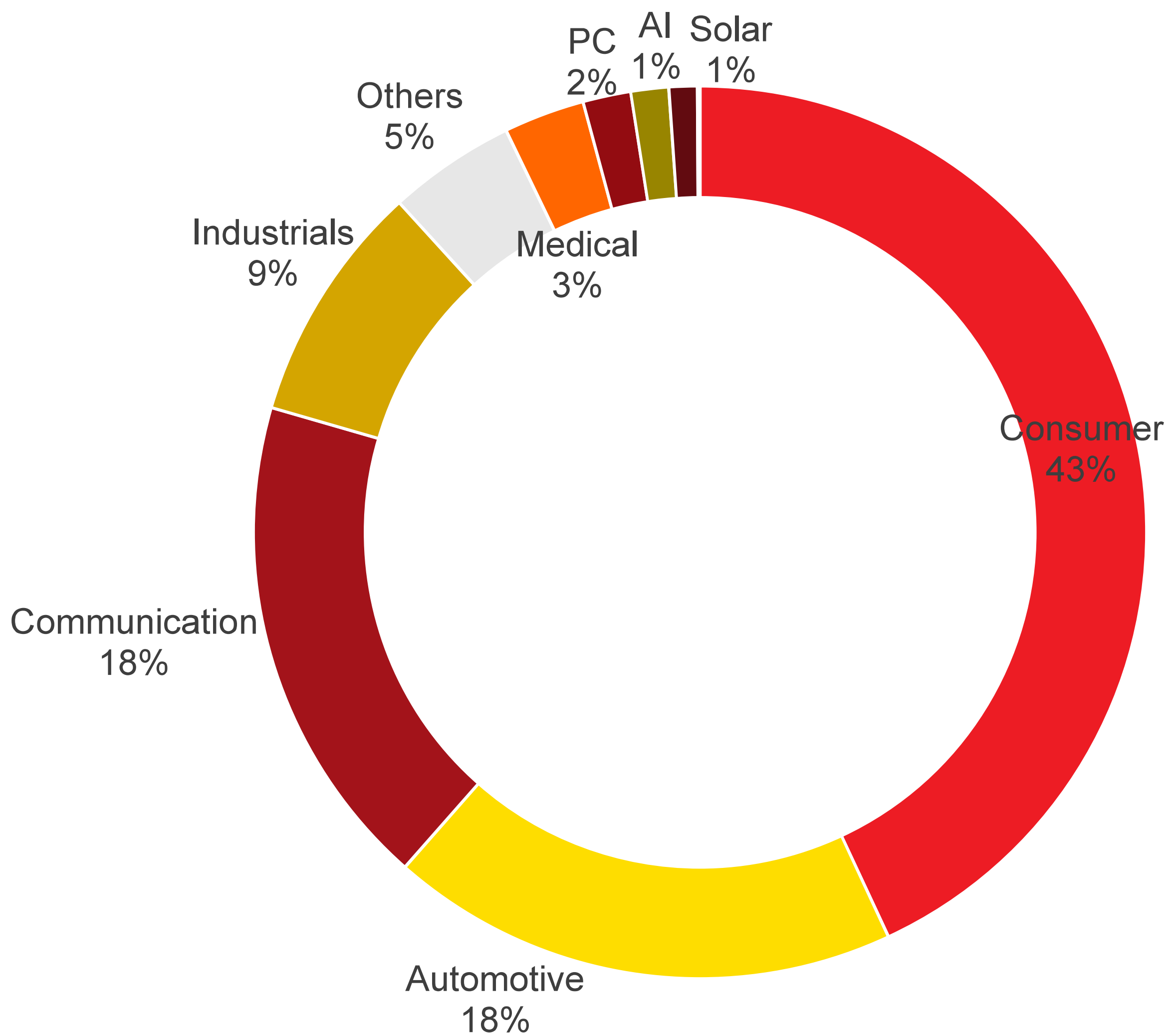
Malaysia semiconductor supply chain



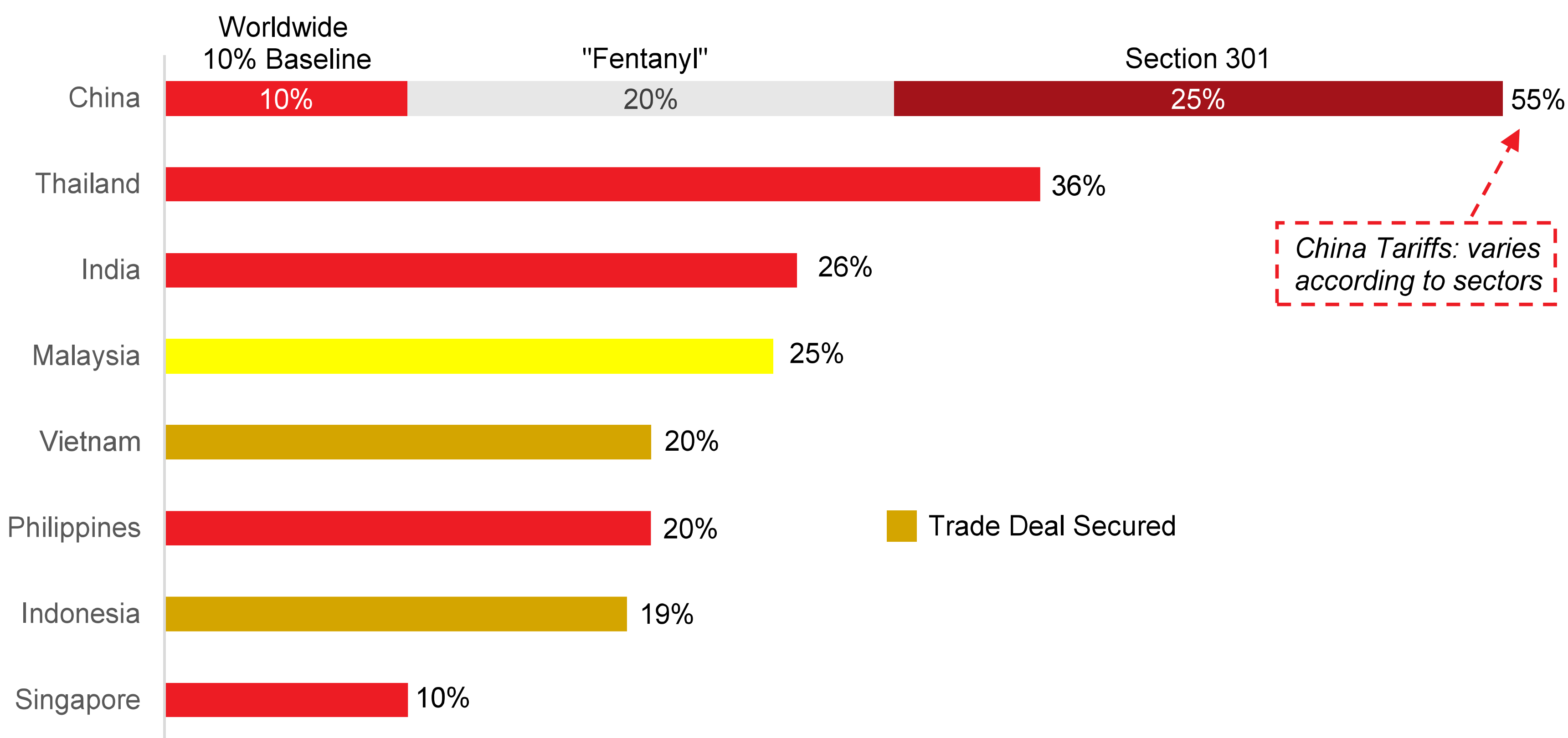
Malaysia semiconductor revenue breakdown



Malaysia semiconductor revenue breakdown (excluding AI server)



Trade war creates opportunities – from tariff differences



Benefitting from trade diversion – spike in approved manufacturing investments

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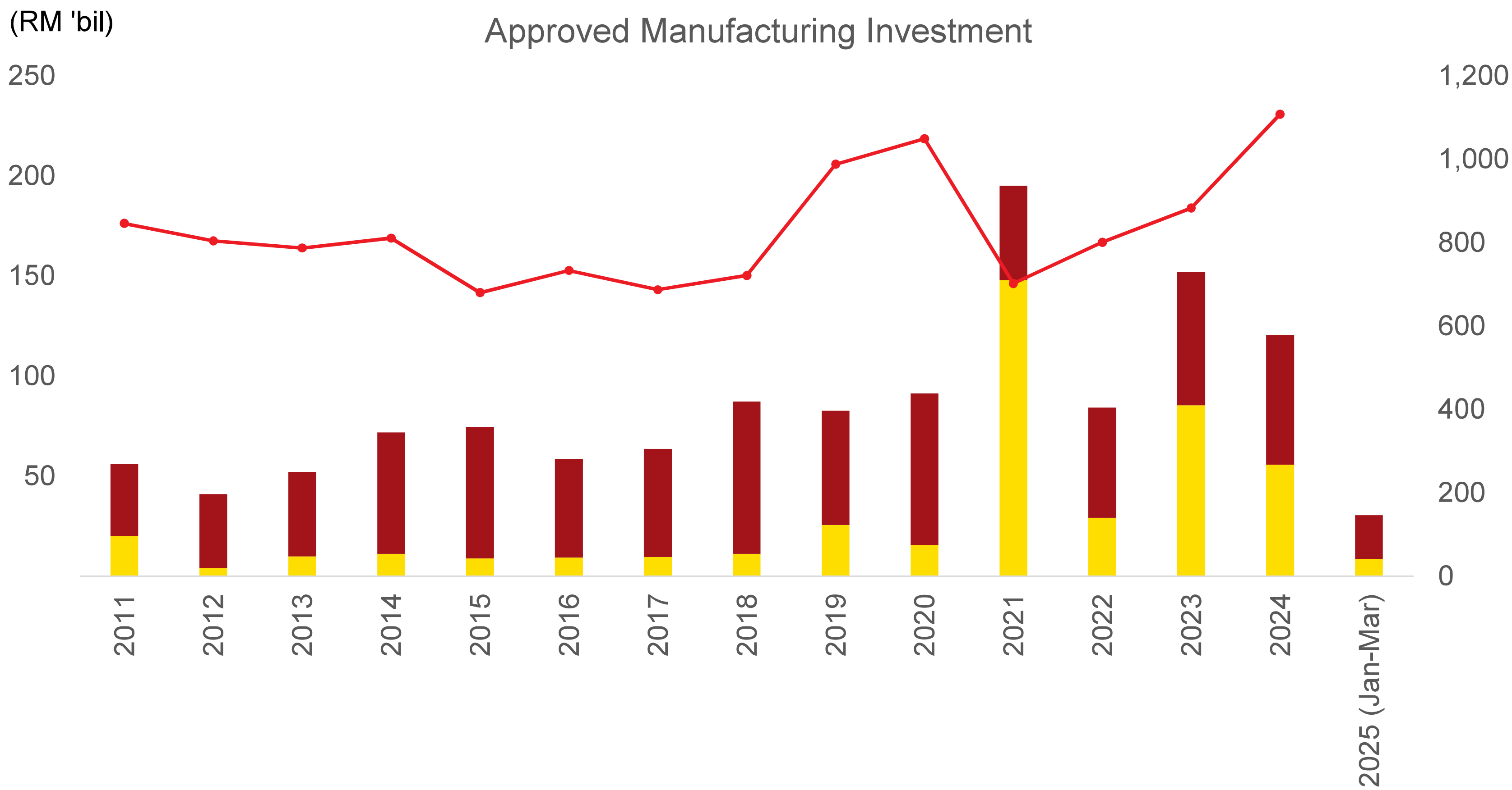

Source: Malaysia Investment Development Authority

Malaysia’s value proposition

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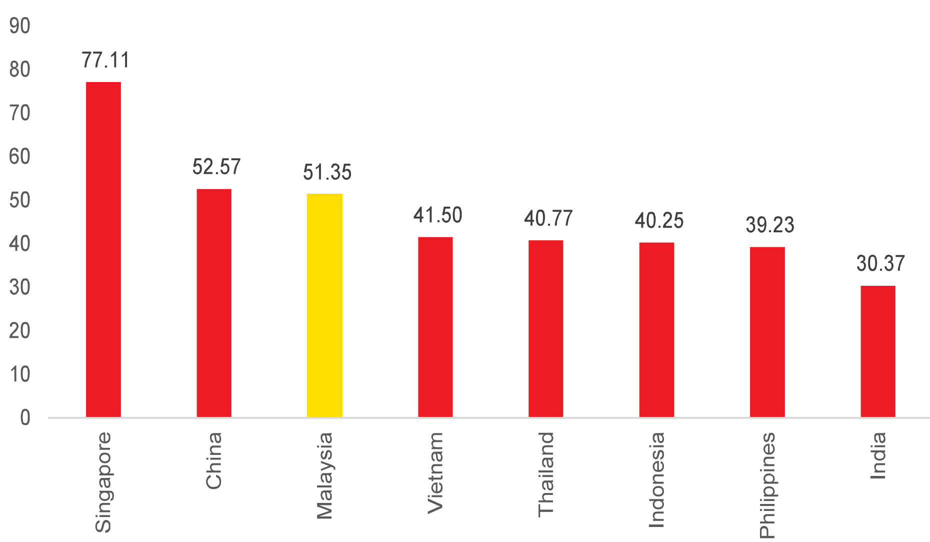
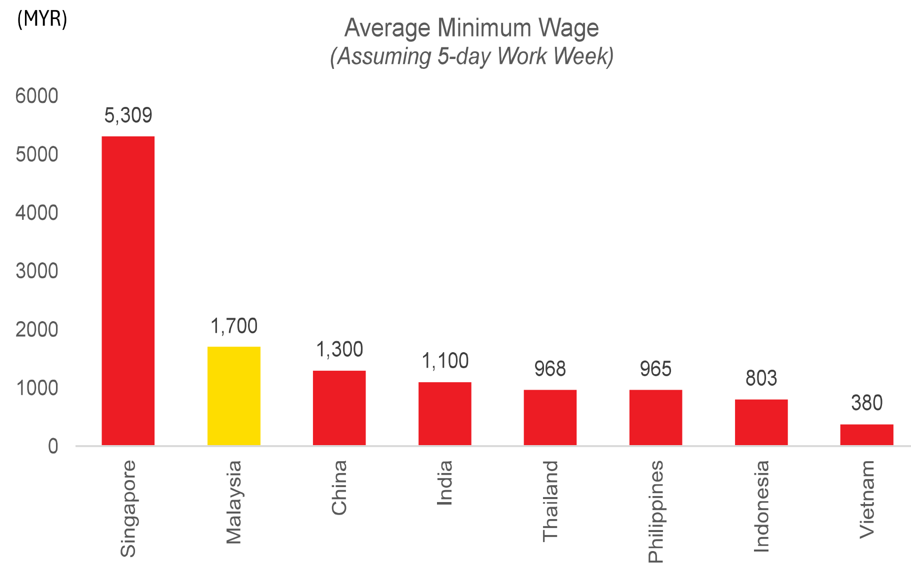
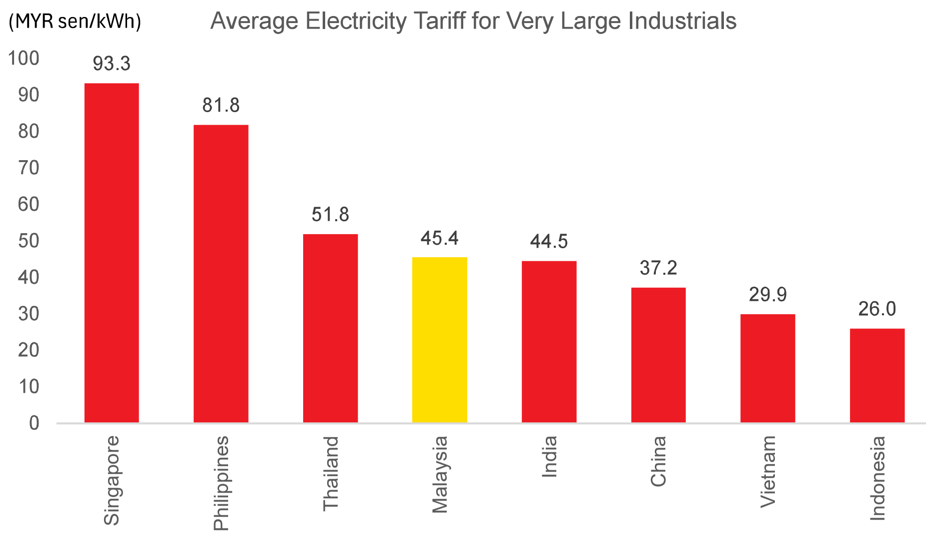
Strategic location with competitive cost	• Centre of Asean • Stable economic profile • Among cheapest utilities in Asia • Lower median salary
Available talent pool	• Multilingual population • Relatively lower attrition rate
Successful track record	• More than 45 years of industrial experience • Home to over 300 MNCs • Established and complete supply chain enable “plug and play” options
Conducive business environment	• Good connectivity and infrastructure • Quality lifestyle and vibrant cultures/heritage city
Strong IP protection	• Active membership in international IP treaties • IP in Malaysia comprise patents, trademarks, industrial designs, copyrights, geographical indications, layout design ICs

Analysing key costs



Source: INSEAD Global Talent Competitive Index 2023





Ease of Doing Business Index

Country	Rank
Singapore	2
Malaysia	12
Thailand	21
China	31
India	63
Vietnam	70
Indonesia	73
Philippines	95

Source: World Bank Ease of Doing Business Index 2020

Country of origin rule

- A Certificate of Origin (COO) is required to prove Malaysian origin
- It is required by customs to determine applicable tariffs
- MITI is the sole authority for issuing non-preferential certificate of origin for exports to the US

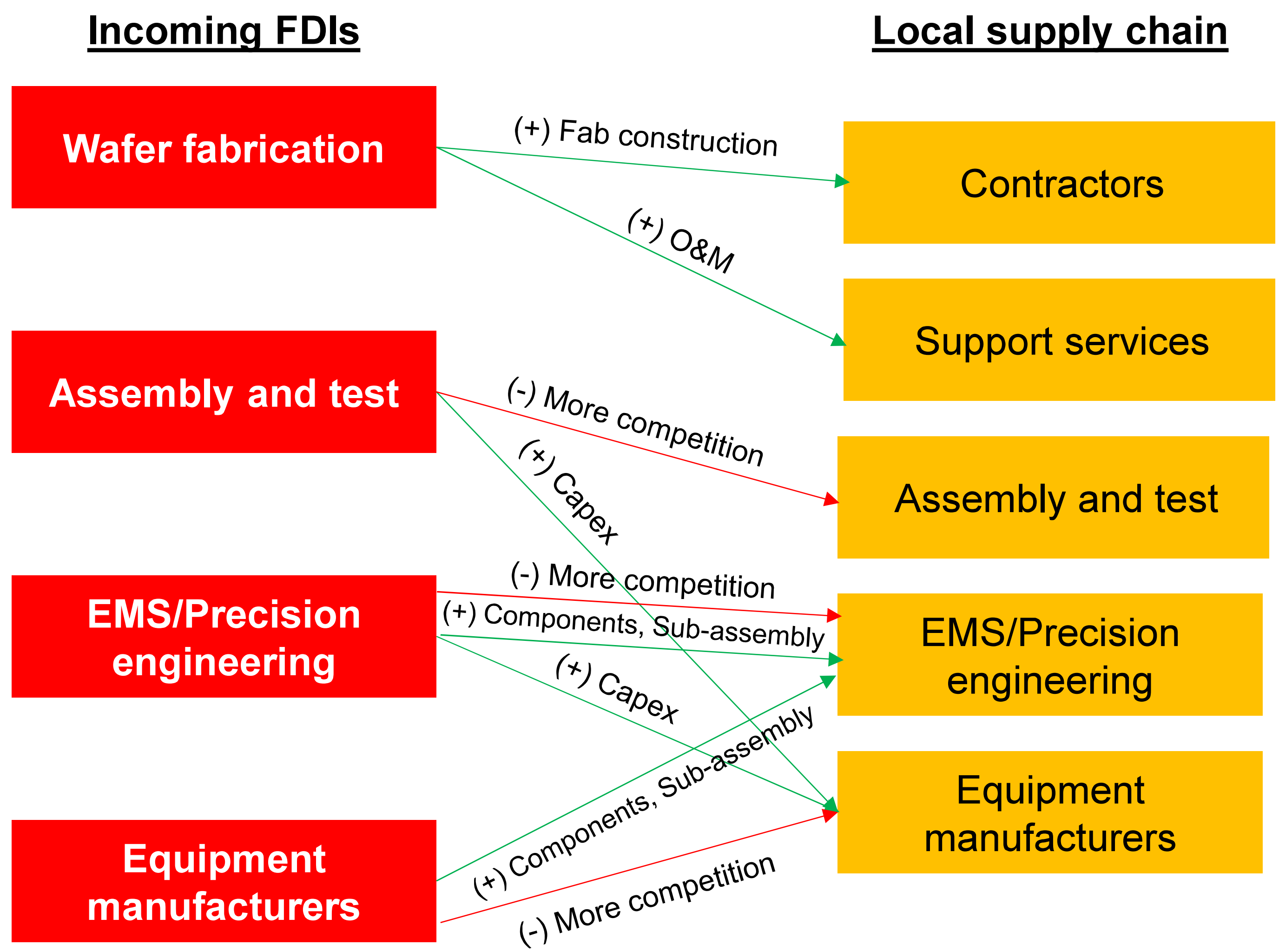
To qualify:

- Must be registered with SSM
- Manufactured in Malaysia and used 100% local materials, or
- Undergo substantial transformation that changes the HS code, or
- Contains at least 25% local materials

BUATAN MALAYSIA

Source: Ministry of International Trade and Industry

Spillover impact of FDIs to local supply chain



Existing FDIs (non exhaustive)

IC Design

- intel
- RENESAS
- StarFive 赛昉科技

Wafer fabrication

- infineon
- xfab
- ams
- OSRAM
- onsemi
- Fuji Electric

Assembly & test

- intel
- infineon
- Texas Instruments
- NXP
- ASE
- micron
- BROADCOM
- Amkor Technology
- BOSCH
- TF · AMD
- RENESAS

Manufacturing

- Celestica
- First Solar
- Sensata Technologies
- OMRON
- PLEXUS
- VISHAY
- MOTOROLA
- JABIL
- ANALOG DEVICES
- flex
- knowles
- DELL
- Abbott
- Benchmark
- KYOCERA
- COHERENT
- hp

Equipment manufacturers

- HOYA
- Lam Research
- KEYSIGHT
- VAT
- Hermes Epitek
- ni
- Agilent
- Advanced Energy
- AccoTEST
- Besi
- Cohu
- ADVANTEST

Government policies – Moving upstream

National Semiconductor Strategy ("NSS")

Three-phase RM25 billion plan

Phase 1: Building on Foundations

- *Developing OSATs towards Advanced Packaging & Grow fabs*
- *Attract FDIs to expand capacity in trailing edge chips, particularly power chips*
- *Develop local chip design champions*

Phase 2: Moving to the Frontier

- *Develop logic & memory chip design, fabrication and testing and look to integrate purchasers of these chips*
- *Integrate local design champions into the advanced fab ecosystem*

Phase 3: Innovating at the Frontier

- *Support development of Malaysian semiconductor design, advanced packaging and manufacturing equipment firms*
- *Attract buyers of advanced chips to pursue advanced manufacturing in Malaysia*

Key Headline Targets

- Court ≥ RM500 billion of investments in Phase 1
- Establish ≥ 10 MY design and advanced packaging companies with revenues between RM1 billion to RM4.7 billion and ≥ 100 semiconductor-related companies with revenues close to RM1 billion
- Develop Malaysia as global R&D hub for Semiconductors
- Train & upskill 60,000 high-skilled Malaysian engineers

Source: Malaysia National Semiconductor Strategy

Arm Holdings Partnership

arm

- RM1.11 billion for IP licenses and compute subsystems (CSS)
- 10-year agreement to develop 10,000 IC design engineers
- Building complete supply chains for each CSSs
- Prioritising local players through technology transfer and localization requirement.

Malaysia has limited front-end exposure

Subsectors	R&D	Design	Manufacture	Assembly, testing & packaging
Electronic components	Low	Medium	Low	High
Consumer electronics	Low	Low	Low	High
Industrial computer equipment	None	Low	Low	High
Industrial communication equipment	None	None	High	Medium
Electrical	Low	Medium	High	High

Source: National Industrial Master Plan 2030

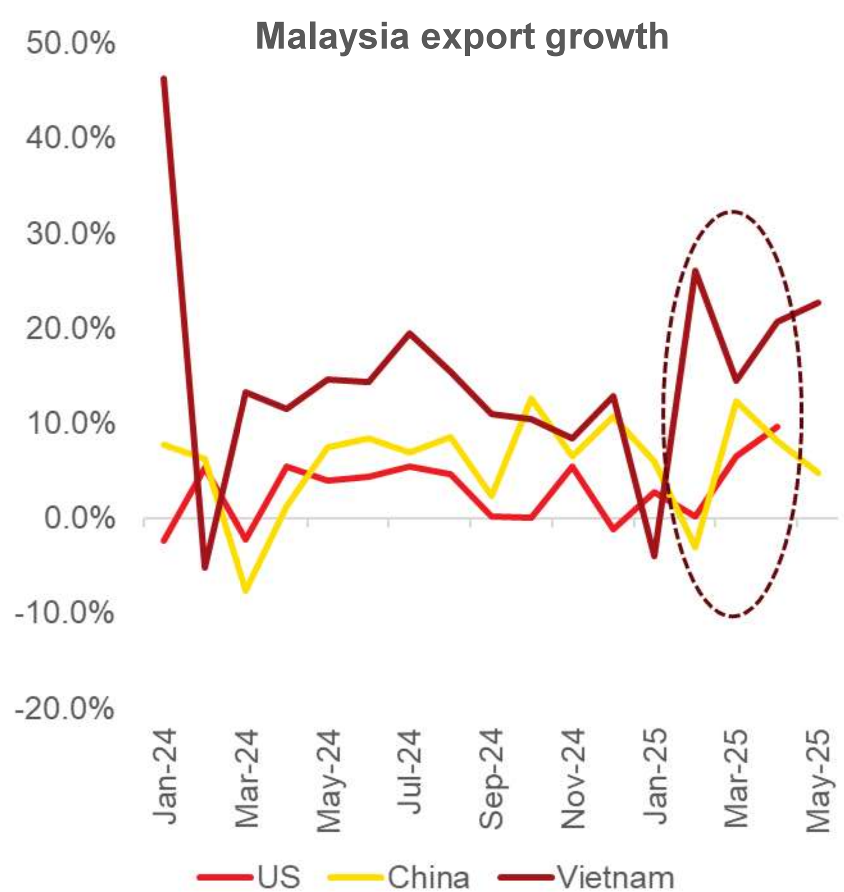
2H25 Outlook

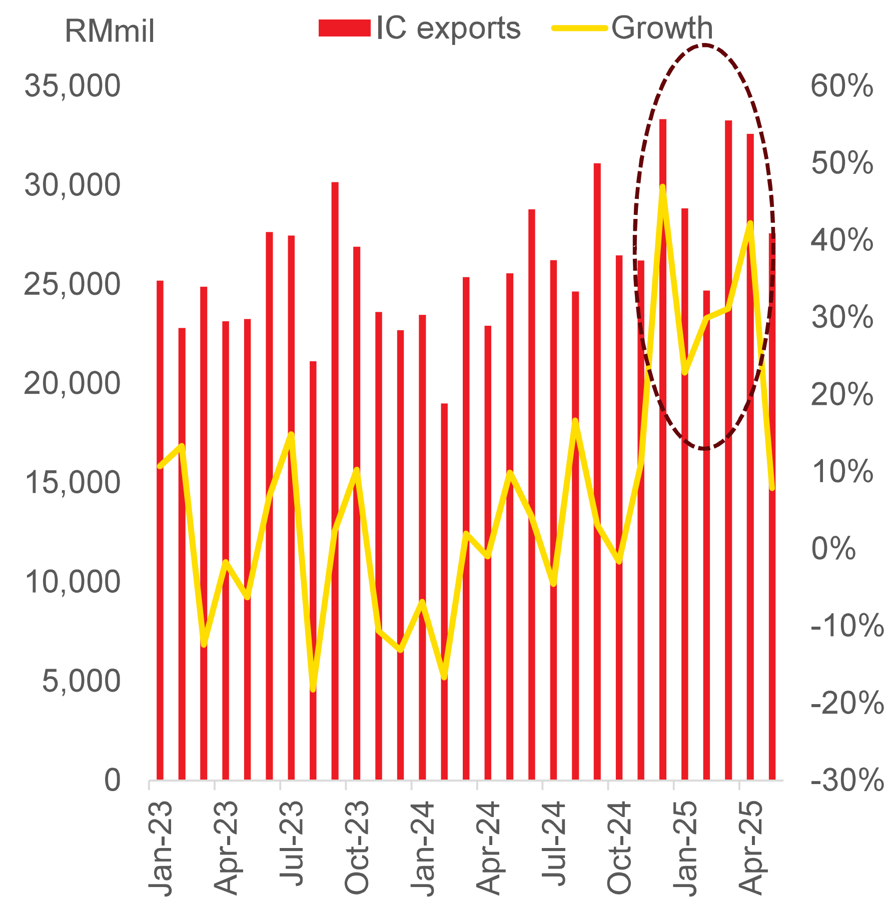
More reasonable consensus forecasts, but concern lies on 2H demand

	Earnings (RMmil)				% change (consensus)		% change (Am)	
	Year ago	Last Q	Upcoming (consensus)	Upcoming (Am)	YoY	QoQ	YoY	QoQ
EMS	**161.5**	**147.9**	**165.7**		3%	12%		
SKP Resources	28.4	27.8	35.2		24%	26%		
VS Industry	83.8	22.8	45.9	50.3	-45%	101%	-40%	121%
PIE Industrial	16.4	16.3	21.4		31%	31%		
Nationgate Holdings	26.7	77.7	46.3		74%	-40%		
Cape Ems Manufacturing	6.3	3.3	16.9		167%	415%		
Precision engineering	**10.1**	**38.7**	**50.4**		397%	30%		
UWC	6.5	12.3	16.8		157%	37%		
JHM Consolidation	-5.3	-2.1	4.5		-185%	-320%		
Sam Engineering & Equipment	9.2	25.5	26.0		181%	2%		
Coraza Integrated Technology	-0.3	2.9	3.1		-1136%	6%		
OSAT	**106.7**	**118.7**	**109.7**		3%	-8%		
Inari Amertron	59.3	56.0	71.7	58.0	21%	28%	-2%	4%
Unisem	14.2	4.3	23.7		66%	451%		
Malaysian Pacific Industries	18.7	59.1	-8.9	18.0	-147%	-115%	-4%	-69%
Globetronics Technology	4.9	0.6	6.1		23%	897%		
D&O Green Technologies	9.5	-1.3	17.1		79%	-1456%		
Equipment maker	**141.5**	**107.8**	**141.7**		0%	31%		
ViTrox Corp	28.0	25.3	34.7	19.0	24%	37%	-32%	-25%
Elsoft Research	1.2	-0.6	2.8		133%	-601%		
QES Group	6.3	0.9	4.8		-24%	449%		
Pentamaster Corp	20.8	21.6	17.4	13.9	-16%	-19%	-33%	-36%
Mi Technovation	26.3	18.6	21.6		-18%	16%		
Greatech Technology	49.0	38.1	50.3	36.9	3%	32%	-25%	-3%
Genetec Technology	9.9	3.8	10.1		2%	163%		
Supporting industry								
Frontken Corp	32.2	33.1	45.4		41%	37%		
Kelington Group	26.9	26.9	39.9	39.9	48%	48%	48%	48%

Source: Bloomberg, AmInvestment Bank

Spike in Malaysia exports suggest potential frontloading





Source: Bloomberg

Some companies observing accelerated seasonality

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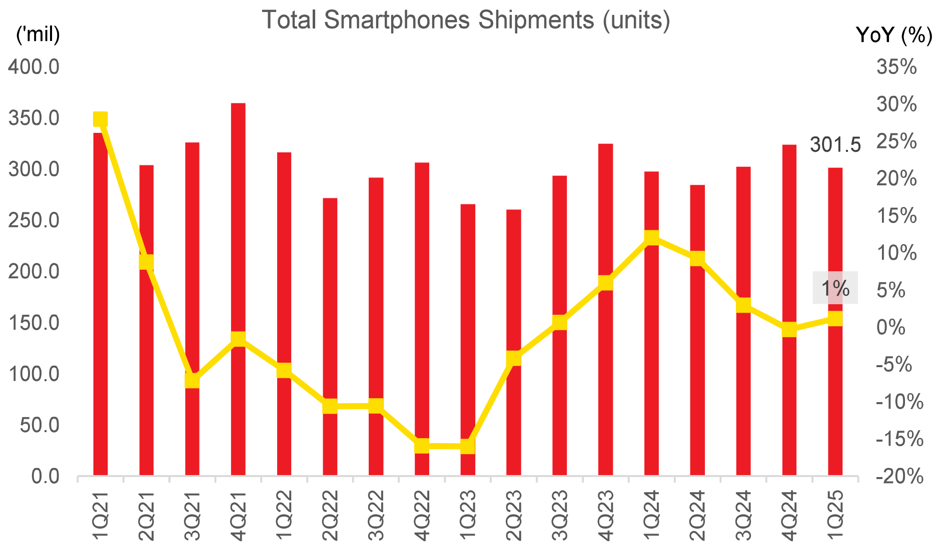
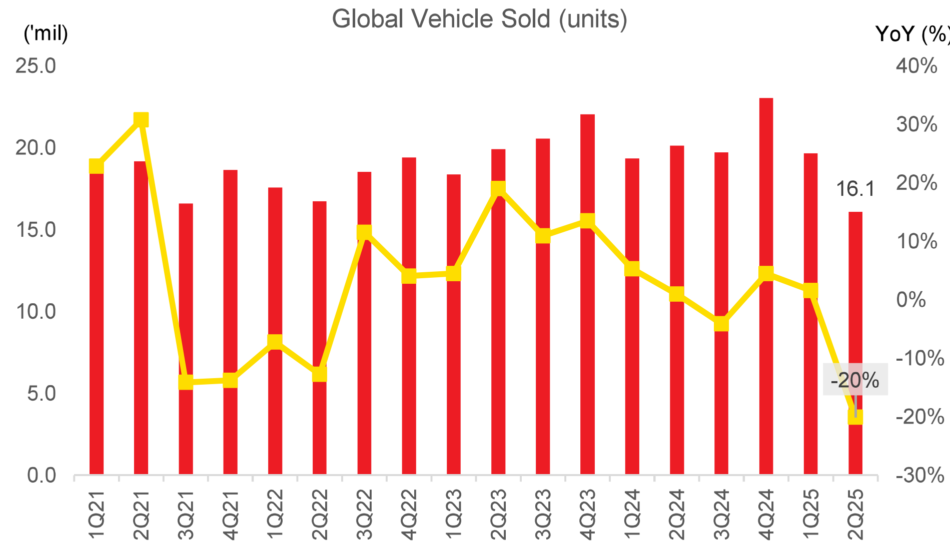
- **Broadcom** observed "some pull-ins of shipments and acceleration" in fiscal '25. They also highlighted the ongoing "threat, the noise of tariffs" as contributing to market uncertainty.
- **Intel** saw "higher-than-expected growth" in Q1 from some hyperscalers, which could be interpreted as customers "hedging your bets or doing pull-ins or just balancing out their portfolio". They also previously noted "some of that tariff pull forward" where customers "pulled revenue into the fourth quarter and away from the first quarter" due to tariffs.
- **Infineon** could not entirely rule out a pull-in effect, but believed it to be minor, particularly for automotive demand in China. Their financial guidance also incorporates a "guesstimate" for potential tariff-induced reductions, which, if not realised, could lead to upside.
- **ON Semiconductor** has not seen "any material pull-ins or push-outs as it relates to tariffs" in the short term, but notes that indirect long-term impacts are still to be seen.
- **ASE Technology Holding** similarly observed "a slight accelerated seasonality" in Q1 due to customers building secure inventory ahead of potential tariffs, though the impact was unquantifiable. They also mentioned "sporadic pull-ins" but no major behavioral shifts from customers.
- **Celestica** reported "a slight accelerated seasonality from certain customers" in Q1, particularly in their EMS business. This was linked to "some customers looking to minimize supply chain volatility by building secure inventory ahead of potential trade tariffs". However, they noted they were "unable to quantify such impact".

Source: Bloomberg, AmInvestment Bank

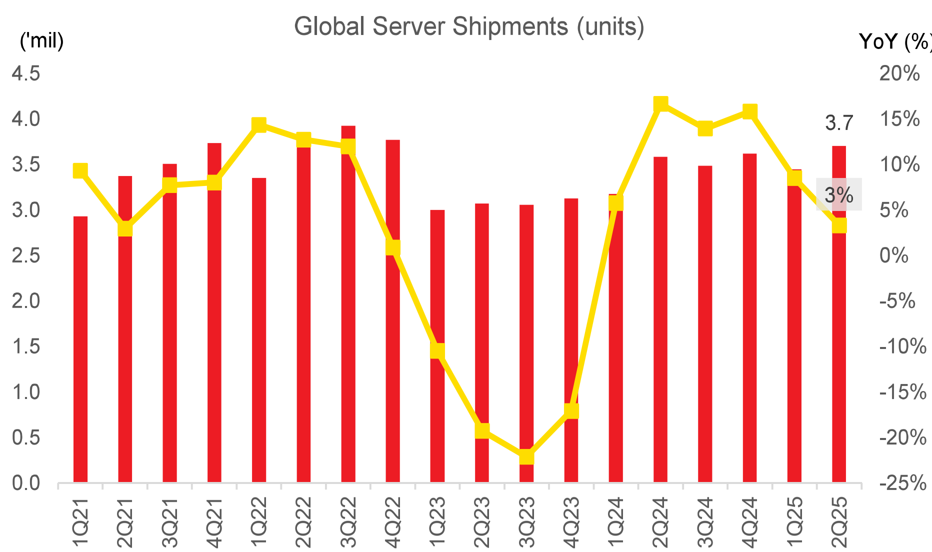
Stable smartphone shipments, while auto sales plunge



Source: IDC



Source: Bloomberg



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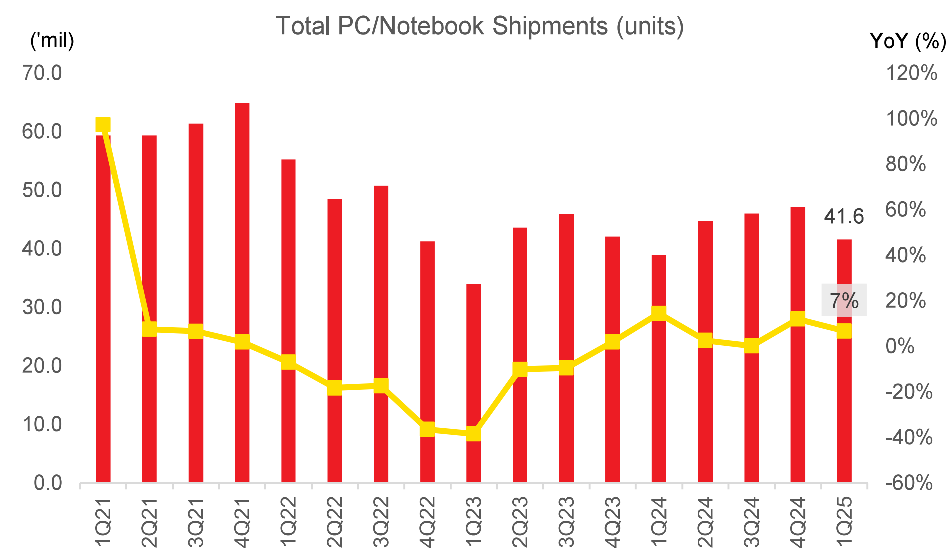
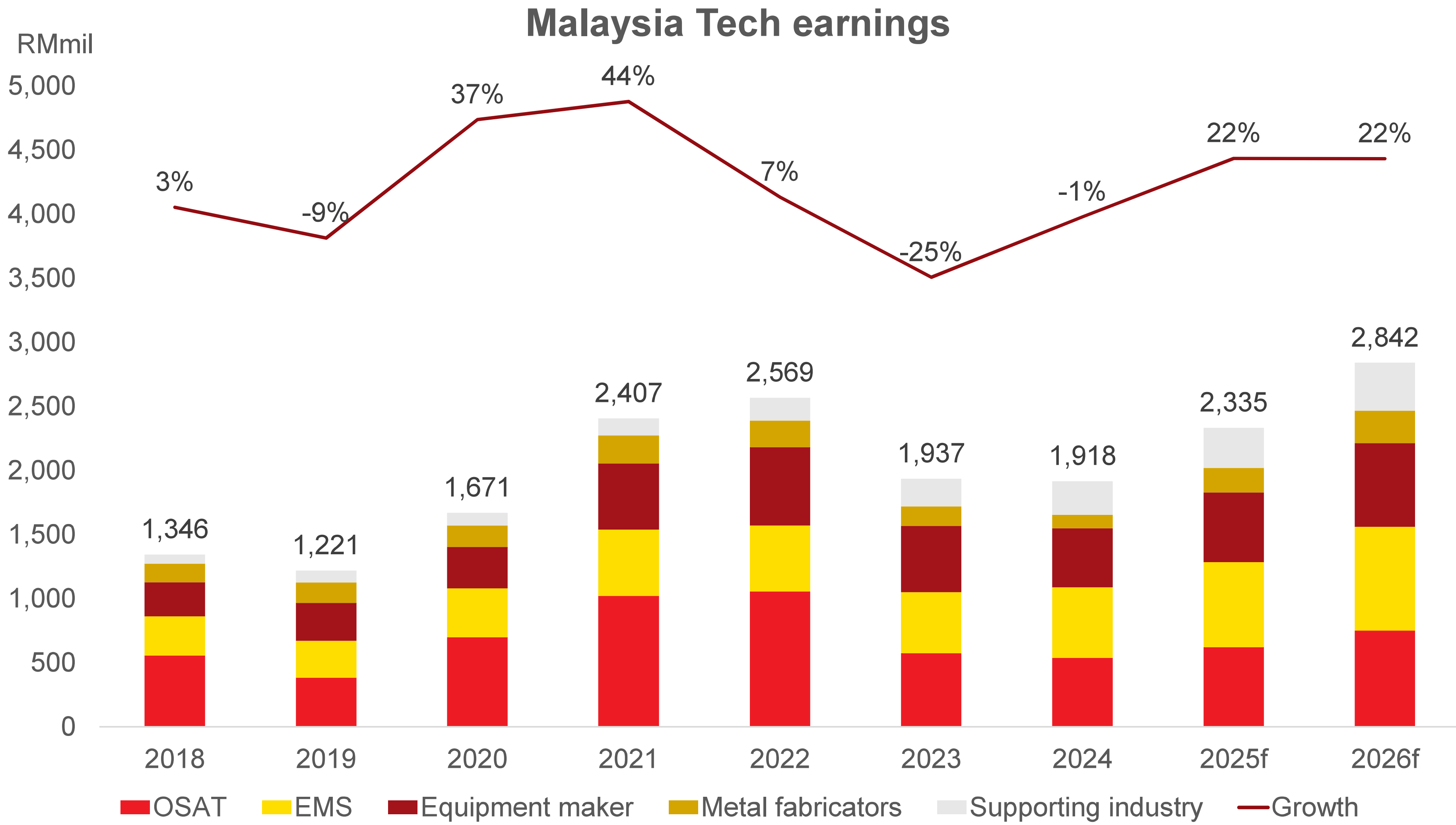


Source: IDC

What happened during 2018 US-China trade war? Not too different so far…



Source: Bloomberg. Forecast refers to consensus numbers.

Rising cash levels spark buying interest…
but how sustainable is it?

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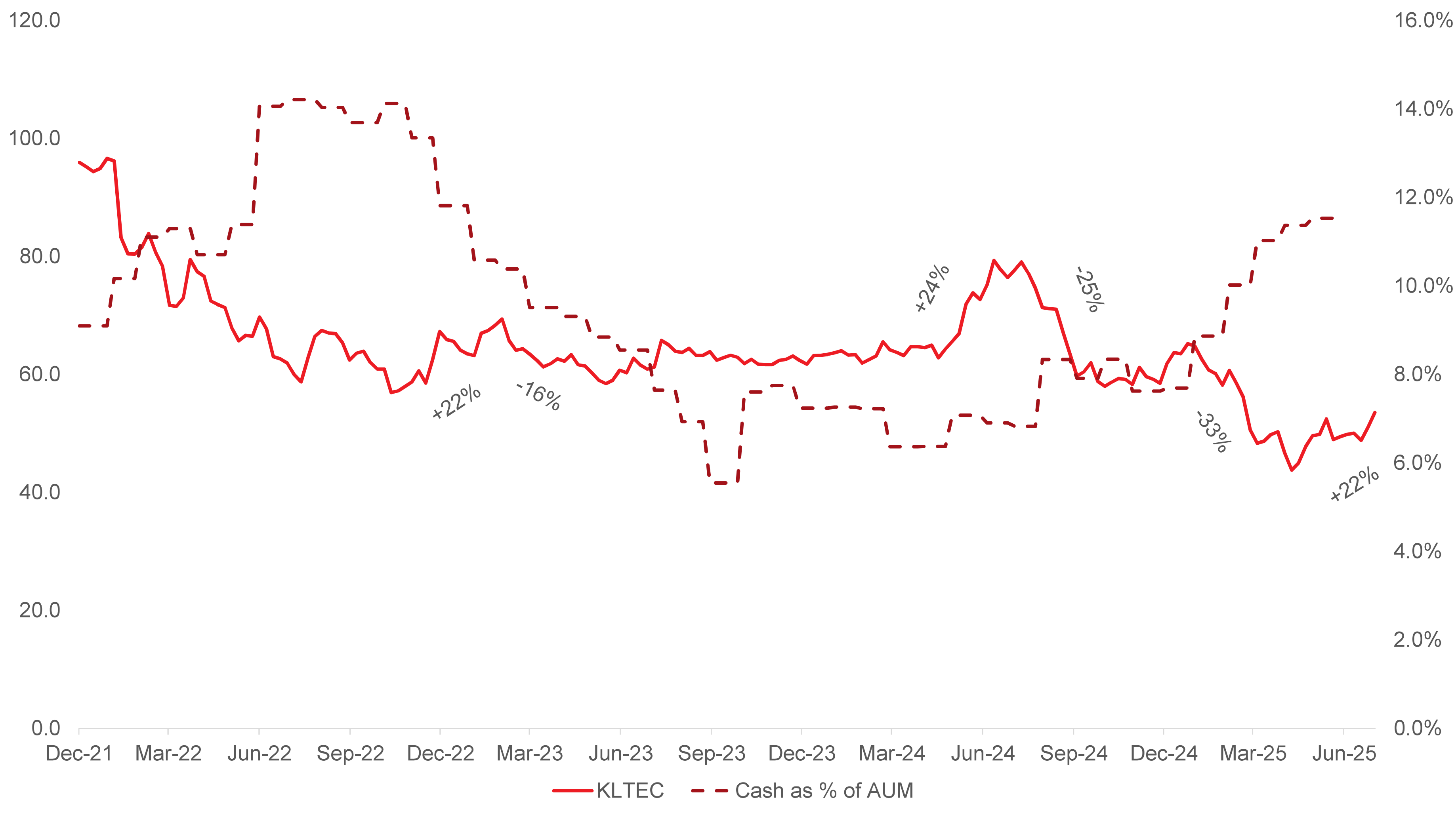
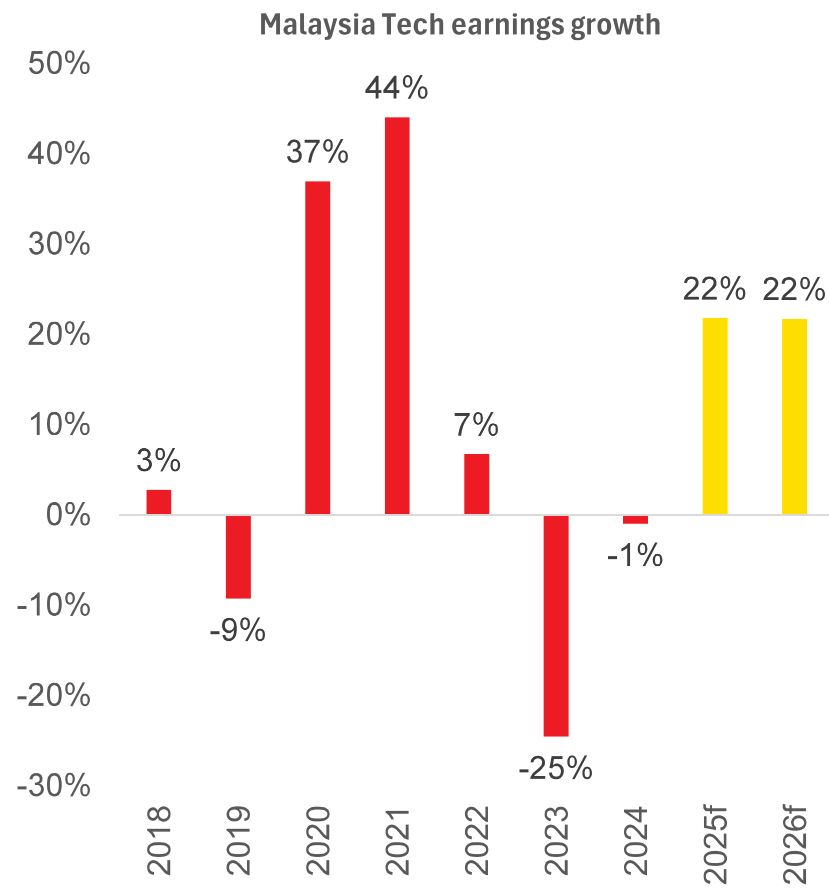


Source: Bloomberg, AmInvestment Bank

Valuations appear cheap, but we believe consensus growth expectations is still high



Source: Bloomberg. Forecast refers to consensus numbers.

Tariff saga not over - Section 232 tariffs a looming risk

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Section 232	• Impose tariffs/restrictions on imports that threaten national security • *Effective:* Steel & Aluminum, Automobiles, Automobile Parts • **Launched investigation into imports of semiconductors on 1st April**
Section 301	• Respond to unfair, unreasonable and discriminatory practices • Retaliatory tariffs, suspending trade concessions & other trade restrictions • China trade war tariffs in response to IP and trade practices issue • **Brazil,** Austria, France, Spain, Turkey, UK, Chinese Maritime Cargo Handling Equipment
IEEPA	• Authorizes President to regulate international commerce after declaring national emergency • Liberation Day tariffs*: Universal 10% tariff and additional tariff for 57 trading partners* • Fentanyl Retaliatory Tariffs: 25% on Canada & Mexico, 10-15% on China
Section 201	• Known as "safeguard measure", allows U.S. to impose temporary import restrictions to protect domestic industries from serious injury caused by increased imports • Imported solar cell and module tariffs *(up to 3,521%)*, washing machine tariffs *(50%)*
Section 122	• Temporary tariffs (up to 15%) for maximum of 150 days (extension subject to Congressional approval) • Address "large and serious" balance-of-payments deficits • Never utilized before; could be employed by Trump administration

Source: The White House, Tax Foundation, ReedSmith, United States Trade Representative, U.S. Department of Commerce

Section 232: Trump's Tariffs & Investigations

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Active Investigations	Initiated	Threatened Rates
Copper	10 March 2025	50%
Lumber, timber & derivative products	10 March 2026	25%
Semiconductor and Semiconductor Manufacturing Equipment	**1 April 2025**	**25% or Higher**
Integrated circuits	**1 April 2025**	**TBD**
Pharmaceuticals and Pharmaceutical Ingredients	1 April 2025	200%
Medium & Heavy-Duty Trucks & Parts	22 April 2025	TBD
Processed Critical Minerals and Derivative Products	22 April 2025	TBD
Commercial Aircraft and Jet Engines & Parts	1 May 2025	TBD
Polysilicon and Derivatives	1 July 2025	TBD
Unmanned Aircraft Systems (UAS) and parts and components	14 July 2025	TBD
Movies	Authorized *(Pending Initiation)*	TBD

Effective Section 232 Tariffs

Active 232 Tariffs	Last Amended Date	Rate
Steel & Aluminum	16 June 2025	• 25% for UK-origin • 50% for other
Automobiles	16 June 2025	• 25%
Automobile parts	16 June 2025	• 10% for most-favored nations & UK-origin for UK vehicles • 25% for other

Developments/Carve-Outs in Section 232 Tariffs

- **US-China Critical Materials *[27 June 2024]*:** China to expedite rare earth & permanent magnet shipments to U.S.
- **US-UK Economic Prosperity Deal *[17 June 2025]*:** First 100k vehicles imported into U.S. subject to 10% tariff, subsequent vehicles subject to 25% tariff; tariff exemption for aerospace; UK Steel & Aluminum imports capped at 25% tariff

Source: The White House, ReedSmith, Bureau of Industry and Security (U.S. Department of Commerce)

Section 232: Process & Procedures

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Investigation Initiation by Secretary of Commerce

Investigation may be initiated by:
- Application from an interested party
- Request from head of any department or agency
- Self-initiated by Secretary of Commerce (SecCom)

270 days

Presentation of findings & recommendations

- The SecCom has **270 days** to present findings and recommendations to the President
- SecCom is must consult with the Department of Defense regarding methodological and policy questions that may arise during investigation & seek advice/info from other departments/offices
- Public hearing/presentation of information only conducted if appropriate and after reasonable notice

90 days

President determines course of action

- If the SecCom finds imports threaten to national security, the President has **90 days** to determine whether he agrees and whether to use his statutory authority to "adjust imports".

30 days

15 days

Federal Register

Upon disposition of each request application or motion, the Secretary shall publish a report in the Federal Register

Disapproval Resolution *(situational)*

- If the Congress disapproves the action taken under Section 232, the Congress and Senate can pass a disapproval resolution to overturn a decision/action that was made

President explains to Congress

- The President has no more than **30 days *(after determining action)*** to submit written statement to Congress on reason for action / inaction

15 days

President implements said action

- The President has no more than **15 days** to implement said determined action

Source: The White House, Bureau of Industry and Security (U.S. Department of Commerce)

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Stock picks

Kelington (BUY, TP: RM4.70)

Kelington **specialises in ultra-high purity (UHP) gas systems**, which serves as "plumbing" for high tech industries like semiconductors, electronics and solar.

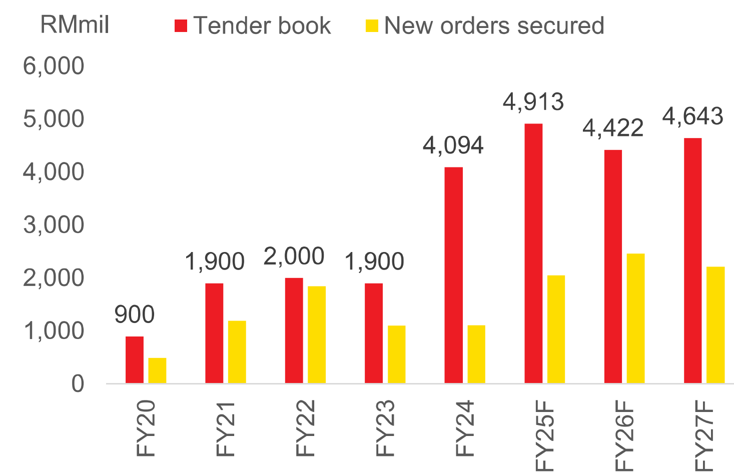
Benefiting from Semiconductor Sovereignty Push. Tender book tripled to RM5bil amid global chip independence efforts. Expansion into Europe, Hong Kong, and India positions the group to win major contracts.

Strong Product Mix Driving Margins. Sustainable Patami margins are supported by high-margin UHP and industrial gas segments. UHP makes up 65% of the order book, while industrial gas revenue grew from 2% to 11% over five years.

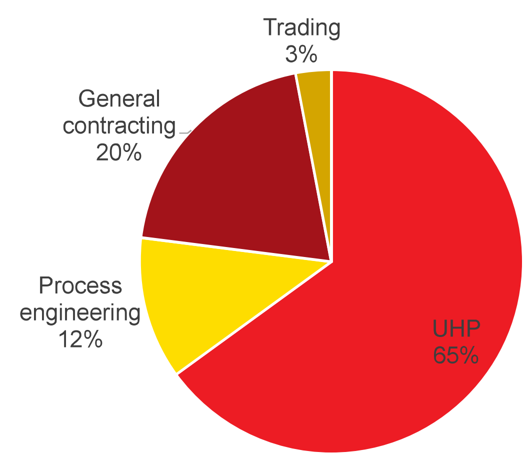
Robust Cash Reserves Enable Strategic Moves. With RM304mil net cash and RM203mil from warrants, the group has flexibility. Dividend payout doubled to 50%, with potential for more or investment in CCUS, where it has CO_2 expertise.

Valuations. We value Kelington based on a target PE of 21x and CY26 EPS. Our target PE is pegged to the group's 5-year average.

Spike in tender book



Higher margins sustained by favourable product mix



Greatech (BUY, TP: RM1.80)

AmInvestment Bank

Greatech is an **automation solutions provider**. By pursuing automation, companies can increase productivity, reduce labour cost, improve quality & consistency and enhance safety.

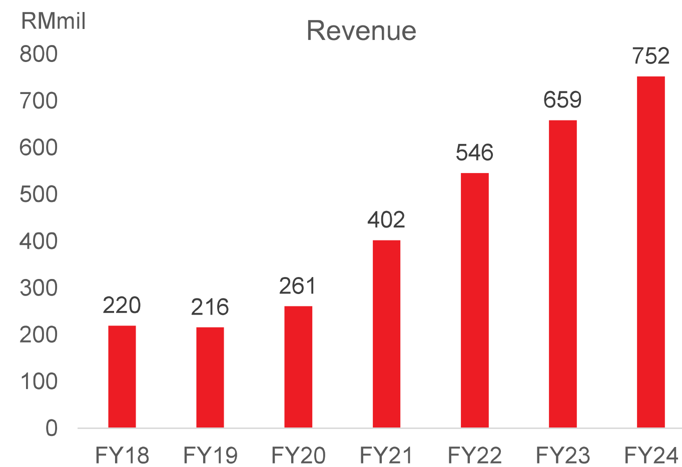
Clean Energy Focus. Over 50% of the group's revenue comes from solar and e-mobility, supporting global climate goals under the Paris Agreement.

US Reshoring Advantage. The group benefits from U.S. reshoring trends, driven by geopolitical tensions and supply chain resilience.

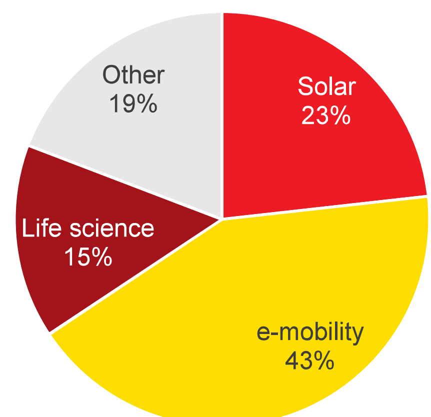
Life Sciences Expansion. To diversify, the group is growing its life sciences division. It acquired Allied Automation Limited in Ireland in 2023 to serve the medical and life sciences sector, anticipating rising demand due to aging populations.

Valuations. We value Greatech based on a target PE of 31x and CY26 EPS. Our target PE is based on 1sd below the group's 5-year average.

Strong track record



Breakdown of order book



V.S. Industry (BUY, TP: RM0.90)

V.S. Industry is a **top 50 EMS (electronics manufacturing services) provider**.

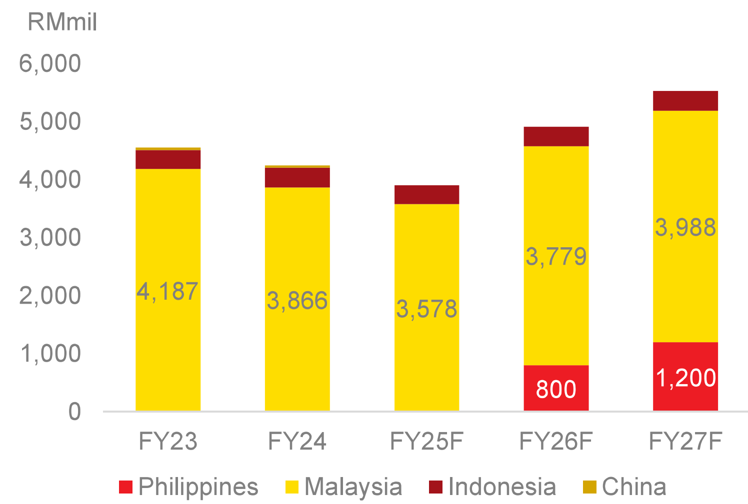
Growth certainty. Driving FY26F earnings, we forecast revenues from Customer X to double, following its expansion into the Philippines. For Customer X, the group has secured four new models in Malaysia and two in Philippines.

Mixed reaction from trade war. Different customers have adopted different strategies, with a mixture of front loading and holding back of purchases. This has resulted in a net neutral impact to orders. We have factored in a 15-20% cut to FY26F revenues across customers.

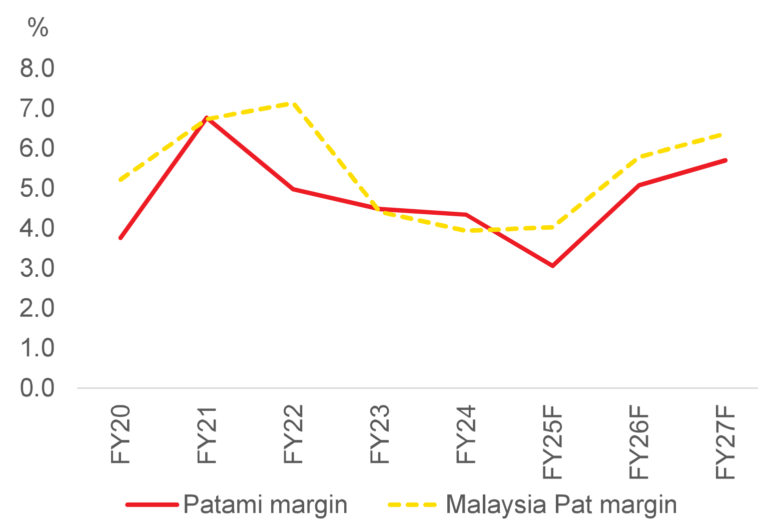
High operating leverage. Margins are dependent on utilisation rate, as operations benefits from economies of scale. We see upside to margins as sales recover. FY24 margins stood at 4.3% vs. its FY21 peak of 6.8%. As volumes improve, our estimates factor in a recovery in margins.

Valuation. We value VSI based on a target PE of 12.5x and CY26 EPS. Our target PE is one standard deviation below its five-year historical average, reflecting present trade war uncertainties.

Philippines expansion to drive growth



High operating leverage business



Pentamaster (HOLD, TP: RM2.45)

Pentamaster Corporation Berhad is a **manufacturer of automated test and factory automation equipment**.

Growth Slowdown. The group's order book has plateaued, with recovery expected only in the second half of 2025. Since share price is closely tied to the order book, this stagnation affects investor sentiment.

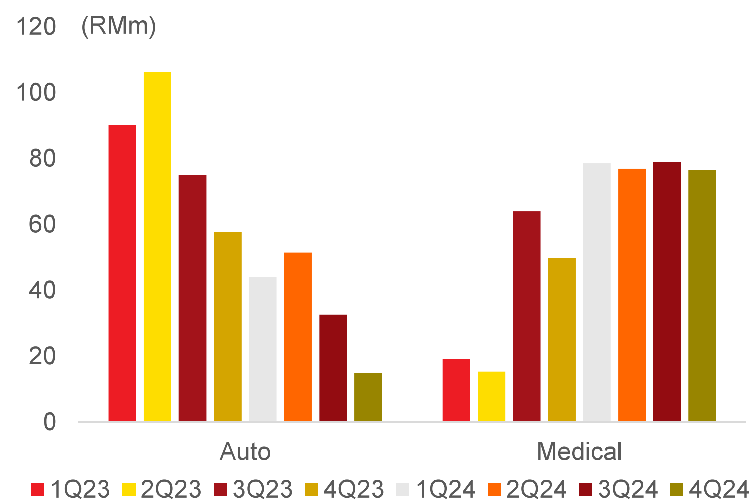
Medical Devices normalisation. Revenue growth has been strong, partly due to foreign direct investments (FDIs) in Malaysia, but is expected to normalize in 2025. The group now serves over five medical device customers.

SiC overcapacity. Automotive recovery is slower than expected. The group's wafer-level burn-in systems for SiC power devices are impacted by overcapacity, stemming from earlier expansion and an EV market slowdown. Geopolitical tensions further delay customer expansion plans.

Valuation. We value Pentamaster at a target PE of 24x and CY26 EPS, to capture a 12-month forward view. Our target PE is based on one standard deviation below the group's 5-year average.

Order book has plateaued

Medical devices normalisation and auto slowdown



Inari (HOLD, TP: RM1.50)

Inari is a professionally runned OSAT (outsourced semiconductor assembly and test) company. It has **one of the largest RF (radio frequency) test sites in the world**, with more than 1k testers.

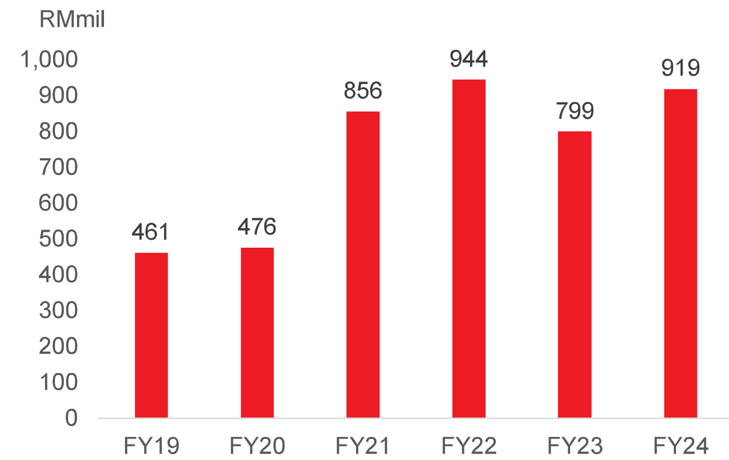
Most liquid Malaysia Technology name. As the majority of its peers trade below US$1mil a day, the group is generally favoured as a quick way to build an exposure to Malaysia Technology.

Normalising RF growth. Due to mature smartphone penetration rates and until 6G arrives, we expect RF revenue growth to normalise to mid-single digit levels going forward.

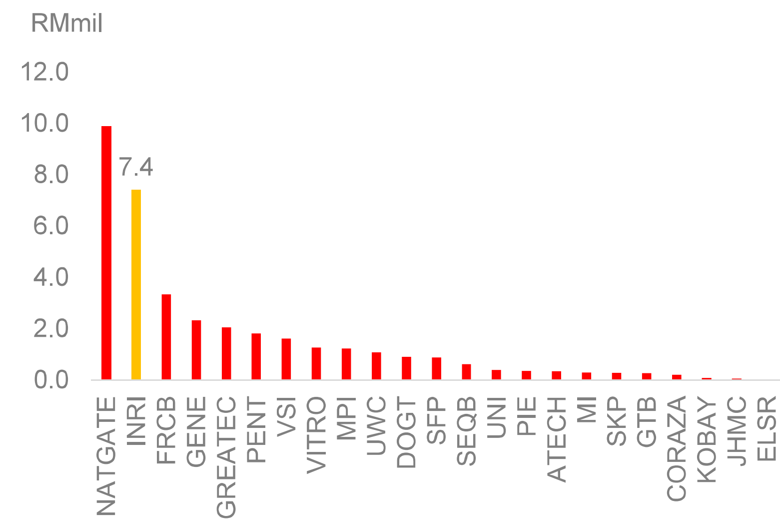
New customer contributions have been slow. As RF growth normalises, the group has to secure new customers/products to sustain its historical growth rate. While it is well positioned to benefit from supply chain relocation activities, new customer contributions have been slow to translate.

Valuation. We value Inari based on a target PE of 21.5x and CY26 EPS. Our target PE is 1sd below its 5-year average.

RF growth has normalised



Most liquid Malaysia Tech stock



MPI (HOLD, TP: RM13.00)

Malaysian Pacific Industries Berhad (MPI) is an **OSAT (outsourced semiconductor packaging and test) company**. It is part of the Hong Leong Group, which collectively owns 58% of MPI.

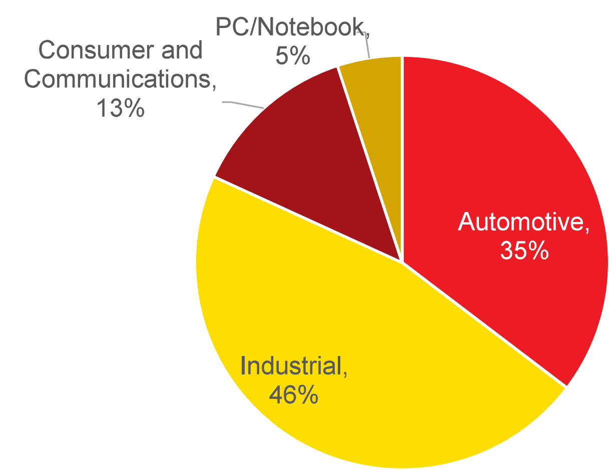
Product portfolio geared to high growth segments. 36% and 45% of the group's revenues stem from the automotive and industrial segment. Automotive and industrials are forecasted to be the fastest growing end markets in semiconductors, due to electrification of vehicles and AI (artificial intelligence).

High operating leverage. We estimate every 1% increase/decrease in sales can increase/decrease earnings by 4%.

Strong balance sheet. The group is conservatively operated and sits on a strong net cash position of RM1.0bil. This allows it to confidently weather the fluctuations in the semiconductor cycle. We also do not discount the potential for future M&A opportunities.

Valuation. We use a target PE of 17.5x and CY26 EPS. Our target PE is pegged to 1sd below its 5-year average.

Geared to high growth segments



Strong net cash position

Vitrox (U-WT, TP: RM2.40)

AmInvestment Bank

Vitrox is a **machine vision company**. Through its MVS (machine vision solution) and ABI (automated board inspection) segments, the group serves the top 10 OSAT (outsourced semiconductor assembly and test) and EMS (electronics manufacturing services) customers.

Trade war related uncertainties. As uncertainties continue, we believe companies will likely delay their capex plans. Due to its diversified customer base and end market exposure, revenues are correlated to the ups and downs on the semiconductor cycle.

Advanced packaging. Semiconductor packages are becoming more complex. These packages require X-ray inspection to detect defects like solder voids or hidden joints, which optical inspection alone cannot reveal.

Rising quality standards. Certain industries such as automotive, aerospace and healthcare demand high quality and defect free products. AOI and AXI machines help manufacturers achieve these demands, by providing a precise and non-destructive way of testing.

Valuation. We value Vitrox based on a target PE of 31x and CY26 EPS. We peg valuations to 1sd below its 5-year average due to the ongoing trade war.

Spike in order book could be due to frontloading