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Global Economics & Market Strategy

Malaysia's E&E Sector: Trend, Competitiveness and Strategy

- **The manufacturing sector will be Malaysia's key engine of growth in the next decade. We see immense potential for progress towards these high-value segments such as semiconductor manufacturing, advanced electronics (such as artificial intelligence), medical & pharmaceutical related and renewable energy technologies.**

- **We see five key growth potential in Malaysia's electrical & electronics (E&E) sector: (1) drive to attract more inward foreign direct investment (FDI), (2) development of essential supply chain capabilities, (3) adoption of key digital capabilities, (4) support of SMEs and start-ups in tomorrow's industries, and (5) skill & re-skill of its workforce.**

- **We observe four challenges for Malaysia's E&E development: (1) highly competitive global market trends, (2) technological changes, (3) shift in consumer preferences, and (4) emergence of (very) low cost producers.**

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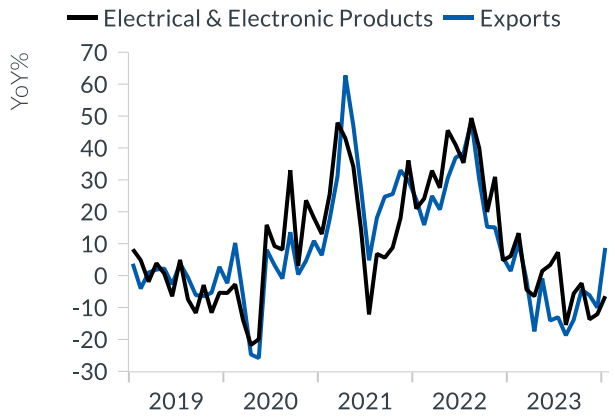
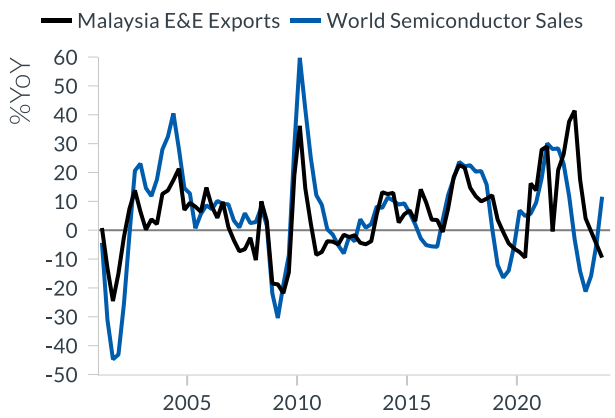
Figure 1: The exports earnings is closely linked to E&E exports…



Source: Macrobond, RHB Economics & Market Strategy

Figure 2:..where semiconductors gain importance over the years



Source: Macrobond, RHB Economics & Market Strategy

We see growth potential in high-value segments

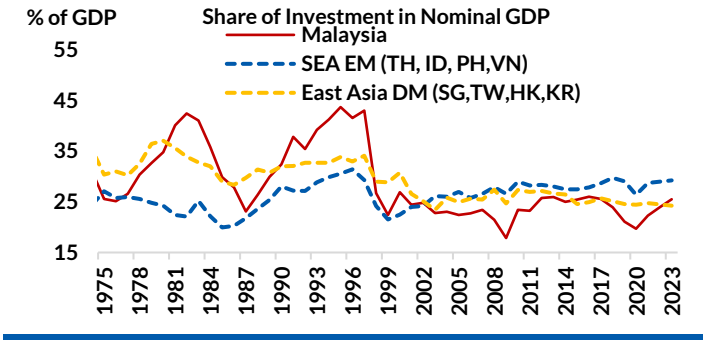
The global industrial production backdrop has been moving towards high-value segments such as semiconductor manufacturing, advanced electronics (such as artificial intelligence), medical & pharmaceutical-related and renewable energy technologies. We view Malaysia's industrial production blueprint for the next decade as no exception; manufacturing and its activities will be Malaysia's key engine of growth. We see immense potential for progress towards these high-value segments. Malaysia's New Industrial Master Plan 2030 (NIMP 2030)[1] identified its top three missions as (1) advanced economic complexity, (2) tech up for a digitally vibrant nation, and (3) pushing for net zero (emissions). These missions are in line with the global push for economies to stay relevant in tomorrow's manufacturing landscape.

We see five key growth potentials in Malaysia's electrical & electronics (E&E) sector. The enhancement of E&E competitiveness in Malaysia might require a coordinated strategic approach, with the involvement of various stakeholders, including the government, industry players, educational institutions, and research organisations. In short, the development of the E&E sector will mean Malaysia's (1) drive to attract more inward foreign direct investment (FDI), (2) development of essential supply chain capabilities, (3) adoption of key digital capabilities, (4) support of SMEs and start-ups in tomorrow's industries, and (5) skill & re-skill of its workforce. We discuss these growth potentials below.

Drive to attract more inward FDI:

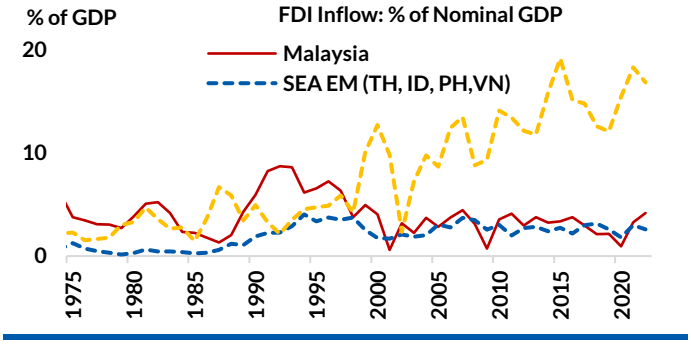
Malaysia has actively sought to attract foreign direct investment (FDI) in various sectors, including manufacturing, services, and technology. The government has implemented various initiatives and incentives to encourage foreign investment, such as tax breaks, reinvestment allowances, relocation incentives to Malaysia and streamlined regulations. The encouragement is that Malaysia's FDI inflows as a per cent of nominal GDP have broadly surpassed SEA EM[2], suggesting its growth potential perceived amongst international investors. The path towards developing high-value segments in the next decade would then suggest Malaysia's increased FDI inflows towards the levels seen in EA DM[3] currently at around 15 – 20% of GDP (against Malaysia's 4.2% of GDP as of 2022).

Figure 3: Malaysia's share of investment has surpassed its EM peers…



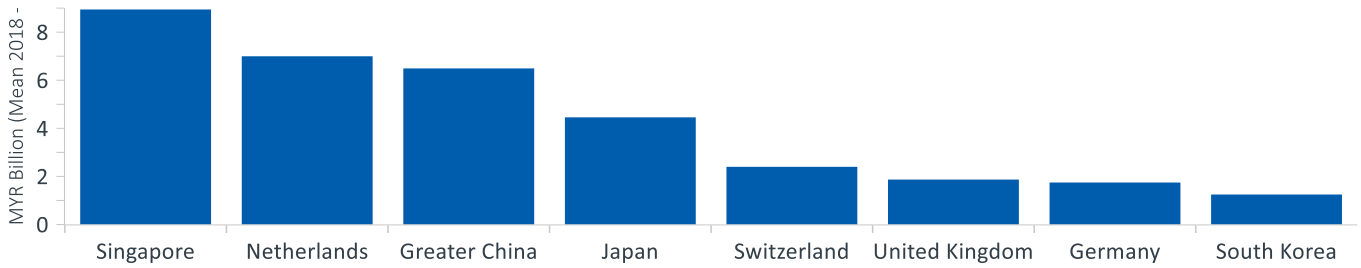
Source: CEIC, RHB Economics & Market Strategy

Figure 4: … and further development of its E&E sector could mean a move towards DM levels



Source: CEIC, RHB Economics & Market Strategy

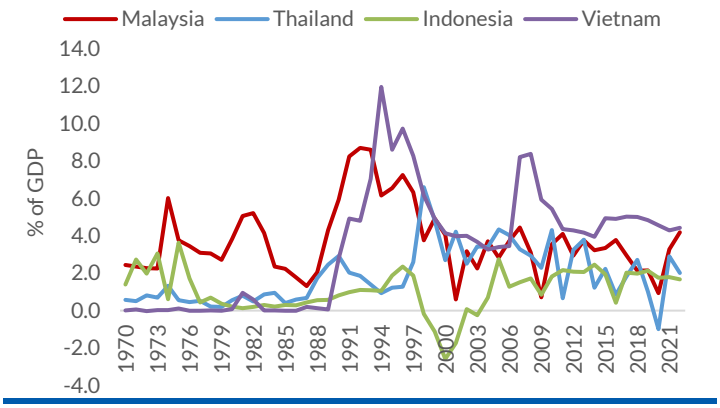
Figure 5: Singapore, Europe and China remain to be Malaysia's top FDI sources



Source: CEIC, RHB Economics & Market Strategy

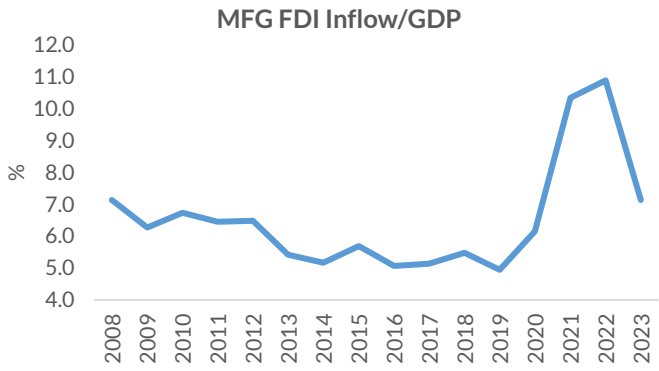
[1] Ministry of Investment, Trade and Industry, New Industrial Master Plan 2030, 2023
[2] SEA EM stands for South East Asia – Emerging Markets
[3] EA DM stands for East Asia – Developed Markets

Figure 6: FDI % GDP has picked up in recent years, suggesting the growth potential amongst investors…



Source: CEIC, RHB Economics & Market Strategy

Figure 7: … suggesting the potential of higher manufacturing FDI inflow in the years ahead



Source: CEIC, RHB Economics & Market Strategy

Development of essential supply chain capabilities:

We identify Malaysia's supply chain capabilities as the next sector to stay positive on. On the back of NIMP 2030, we observe the economy's push to adopt technology and innovation in the effort to move up to higher value segments and chain of production. Essentially, we anticipate the gradual move away from labour-intensive assembly work towards more technologically advanced and innovation-driven activities such as research, design, engineering, and development of cutting-edge technologies. The move to develop Malaysia's manufacturing capabilities is essential given the intensifying competition as well as the global technology trend.

The potential is enhanced against the current manufacturing landscape seen in Malaysia. We found that most industry players are focused on the back-end activities of the value chain, such as assembly, testing and packaging. Meanwhile, the E&E industry players in Malaysia have limited participation in higher value-added activities, i.e. research and development (R&D) as well as design. To enhance their competitiveness in the global market, Malaysian exporters need to embrace technology and innovation.

Figure 8: E&E industry players in Malaysia have limited to moderate participation in R&D, design and manufacturing activities

	Value Chain	Research and Development (R&D)	Design	Manufacture (of components)	Assembly, Test and Packaging
Subsectors	**Electronic Components**	Low Presence	Medium Presence	Low Presence	High Presence
	Consumer Electronics	Low Presence	Low Presence	Low Presence	High Presence
	Computer Equipment	No Presence	Low Presence	Low Presence	High Presence
	Communication Equipment	No Presence	No Presence	High Presence	Medium Presence
	Electrical	Low Presence	Medium Presence	High Presence	High Presence

Source: NIMP 2030 report, RHB Economics & Market Strategy

Adoption of key digital capabilities:

While there are limited R&D and design activities in Malaysia's E&E sector, it also suggests room for higher development and adoption of these capabilities in the next decade. The ability to adapt and adopt new technologies would affect Malaysia's E&E competitiveness in the global value chain, especially in the areas of semiconductor manufacturing, advanced electronics (such as artificial intelligence), medical & pharmaceutical-related and renewable energy technologies. The move up the value chain will mean a higher pace of technology adoption and investment level in automation for the manufacturing sector, coupled with the increased relevancy and investor confidence that may entail from Malaysia's E&E development.

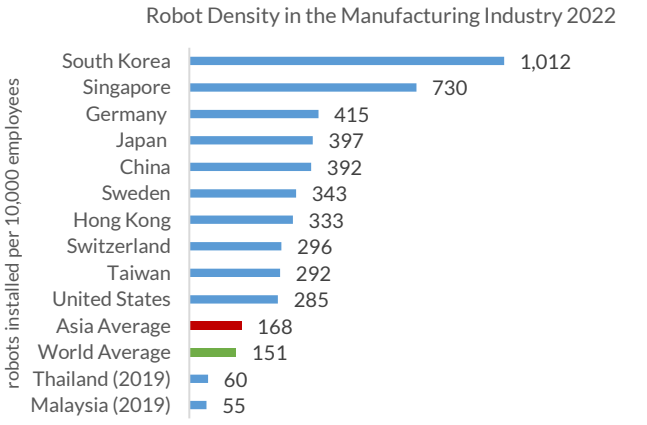
We expect more government initiatives and support programs to help with this thrust. The pace of technology adoption, perhaps, is relatively slow when compared to other regional peers. The concern, perhaps, is that automation capabilities proxied by robot density in Malaysia's manufacturing sector pale against the world's average. Furthermore, Malaysia's R&D activities are likely insufficient, with R&D expenditure accounting for only 1.0% of GDP against Thailand's 1.3% of GDP, Singapore's 2.2% of GDP, and China's 2.4% of GDP. We think that the improvement in Malaysia's technological capabilities and the narrowing of the innovation gap with the competitors is imperative to develop Malaysia's ability to manufacture high-value-added E&E products.

Figure 9: Malaysia has huge potential to see more R&D in the next decade, and thus, …

R&D expenditure (% of GDP)	2000	2016	2020
South Korea	2.1	4.0	4.8
United States	2.6	2.9	3.5
Japan	2.9	3.1	3.3
China	0.9	2.1	2.4
Singapore	1.8	2.1	2.2
Thailand	0.2	0.8	1.3
Malaysia	0.5	1.4	1.0
Indonesia	0.1	0.2	0.3

Source: World Bank, RHB Economics & Market Strategy

Figure 10: … raising the likelihood for the adoption of automation capabilities in the manufacturing industry



Source: International Federation of Robotics, RHB Economics & Market Strategy

Support of SMEs:

Small-to-medium enterprises (SMEs) are Malaysia's economic backbone, accounting for 98.5% of business establishments, contributing over 35% of the country's GDP and employing over 66% of total employment.[4] Across the industries, almost 90% of SMEs are in the services sector, while 5.3% and 4.3% are in the manufacturing and construction industries, respectively. The development of Malaysia's E&E sector thus requires public and private support to develop the SME's manufacturing sector. Malaysia's export share of electric components has been stagnant at around 6.0% of total global exports over the study period of 2000-2020. Currently, most of Malaysia's semiconductor industry participants are predominantly engaged in the downstream segment of the supply chain, i.e. semiconductor assembly and test (OSAT) as well as automated test equipment (ATE) manufacturing.

We note that the NIMP 2030 aspires to see more involvement in front-end activities, such as integrated circuit design and wafer fabrication, which confer higher profit margins and greater specialisation within the global semiconductor value chain. Examples of growth areas that are already seen in other economies also include Taiwan (semiconductor manufacturing, research and design), Vietnam & Thailand (low-cost manufacturing production and back-end operations) and China (fabrication, design, and packaging). Essentially, the identification of emerging manufacturing chains and future adoption of technologies is essential to guide Malaysia's relevancy in tomorrow's manufacturing backdrop.

Skill & re-skill of the workforce:

Thus, in order to upscale Malaysia's E&E sector and fuel the adoption of new technologies, there is a vital need to skill & re-skill its workforce. In order to implement and optimise the automation systems across the E&E industry, the development of skilled professionals is vital. In fact, E&E and mechanical engineering are among the highly sought-after professions in the E&E sector. The aforementioned professions have always been listed in Malaysia's Critical Occupations list since its first publication in 2015. There exists a noticeable gap between the number of engineering students graduating and those officially registered with the Board of Engineers Malaysia (BEM), the regulatory body overseeing the engineering profession in Malaysia, which might be attributable to engineers practising without BEM registration or engineering graduates pursuing different career paths.

[4] CompareHero.my, SME Landscape of Malaysia, 12 Feb 2020.

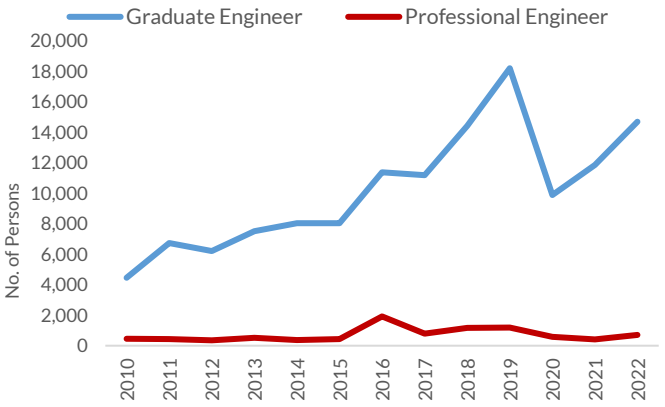
Meanwhile, Malaysia's manufacturing sector is comprised mainly of a semi-skilled workforce, i.e., plant and machine operators and assemblers, which raises the issue to skill (and re-skill) Malaysia's labour force. As highlighted in our previous thematic report on productivity, Malaysia's production is primarily driven by labour inputs.

Figure 11: Engineers are identified to be the most demanded of talents in Malaysia…

MASCO 4D	Job Title
2141	Industrial and Production Engineers
2144	Mechanical Engineers
2182	Manufacturing Professionals
2512	Software Developers
3115	Mechanical Engineering Technicians
2151	Electrical Engineer
2426	R&D Professionals
3113	Electrical Engineering Technicians

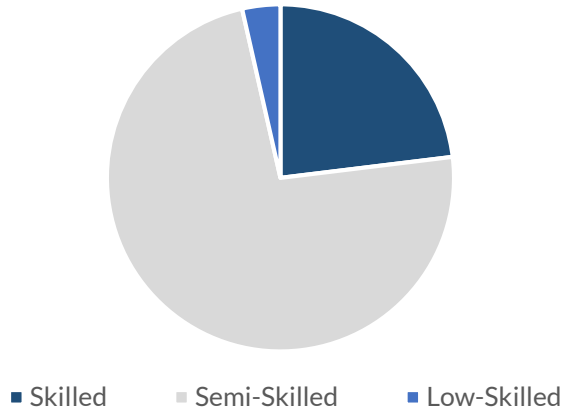
Source: TalentCorp Malaysia, RHB Economics & Market Strategy.

Figure 12: … against a gap of graduated engineering students and registered professional ones



Source: Board of Engineers Malaysia, RHB Economics & Market Strategy

Figure 13: Most of the labour force in manufacturing sector are semi-skilled labours…



Source: CEIC, RHB Economics & Market Strategy.

Figure 14: … thus suggesting the need to upskill Malaysia's labour force

Skills	Category of Occupation
Skilled	1. Managers 2. Professionals 3. Technicians and associate professionals
Semi-Skilled	4. Clerical support workers 5. Service and sales workers 6. Skilled agricultural, forestry, livestock and fishery workers 7. Craft and related trades workers 8. Plant and machine operators and assemblers
Low-skilled	9. Elementary occupations

Source: DOSM, RHB Economics & Market Strategy.

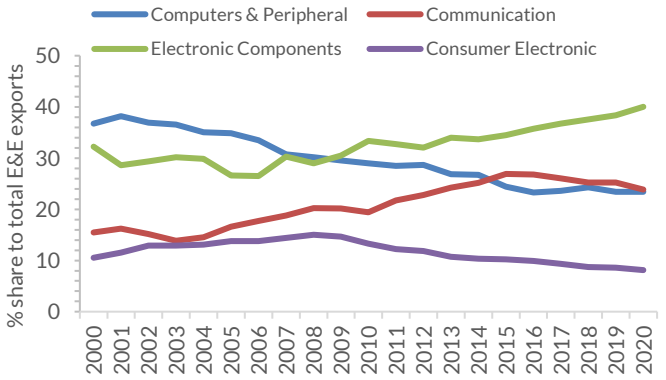
Challenges for Malaysia's E&E Industry Landscape

Malaysia's E&E export market structure is affected by the following factors:

1. **Global Market Trends:** The global E&E export market has become increasingly competitive, with an increased concentration in market share by top E&E exporters. For instance, the world's top 5 E&E exporters constituted around 46% of world E&E exports in early 2000, and the share has expanded to 62% in 2020. In the last two decades, China has emerged as a dominant player in the global E&E market, exporting a wide range of products, including consumer electronics, components, and industrial equipment. Other emerging economies such as Malaysia, Vietnam, and Thailand have become significant players in the E&E industry as well, gaining traction as attractive destinations for E&E investments, which has contributed to the competition intensity in the E&E industry.

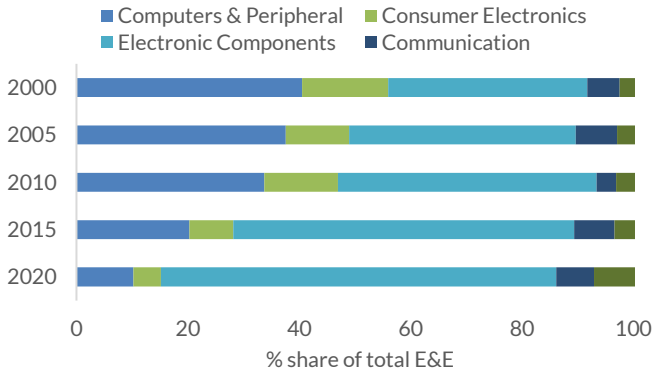
2. **Technological Changes:** The emergence of new technologies such as 5G, artificial intelligence (AI), the Internet of Things (IoT), and electric vehicles (EVs) are driving current and future growth in the E&E sector. The surge of new technological innovations has spurred the demand for electronic components, i.e. semiconductors, integrated circuits, and microchips, for use in various industries such as automotive, telecommunications, industrial automation and consumer electronics.

Figure 15: There is a shifting in the global landscape of E&E



Source: CEIC, RHB Economics & Market Strategy

Figure 16: Malaysia E&E exports have moved from PCs and consumer electronics to electronic components

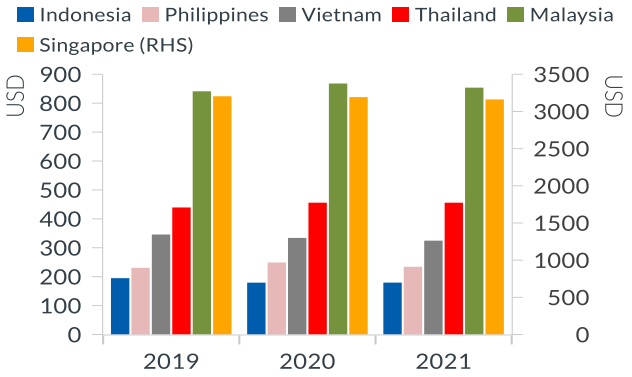


Source: CEIC, RHB Economics & Market Strategy

3. **Shift in Consumer Preferences:** The global E&E market has seen a shift in preferences towards smartphones, tablets, and other mobile devices, leading to decreasing demand for traditional PCs and other consumer electronics such as televisions and audio systems. As illustrated in Figure 15, the global exports of PCs and consumer electronics have been on a declining trend since 2004, while the export share of the communication sub-category has picked up during the same period. Meanwhile, there is an uptrend in the export of electronic components as well. This change in consumer behaviour might have affected Malaysia's exports of these products.

4. **Emergence of Low-Cost Producers:** Malaysia faces stiff competition from other countries, particularly in East Asia, that offer similar manufacturing capabilities and cost advantages in producing PCs, consumer electronics and telecommunication products. Countries such as Vietnam and Thailand are competing for market share in the E&E industry, with lower costs of production and labour costs. For instance, manufacturing wages in Malaysia are relatively high compared to those of emerging ASEAN peers. Hence, the need to move up the value-added chain has become more crucial now.

Figure 17: Manufacturing wages in Malaysia are relatively high compared to ASEAN peers…



Source: Macrobond, RHB Economics & Market Strategy

Figure 18: The minimum wage required in Malaysia is higher than other ASEAN peers as well

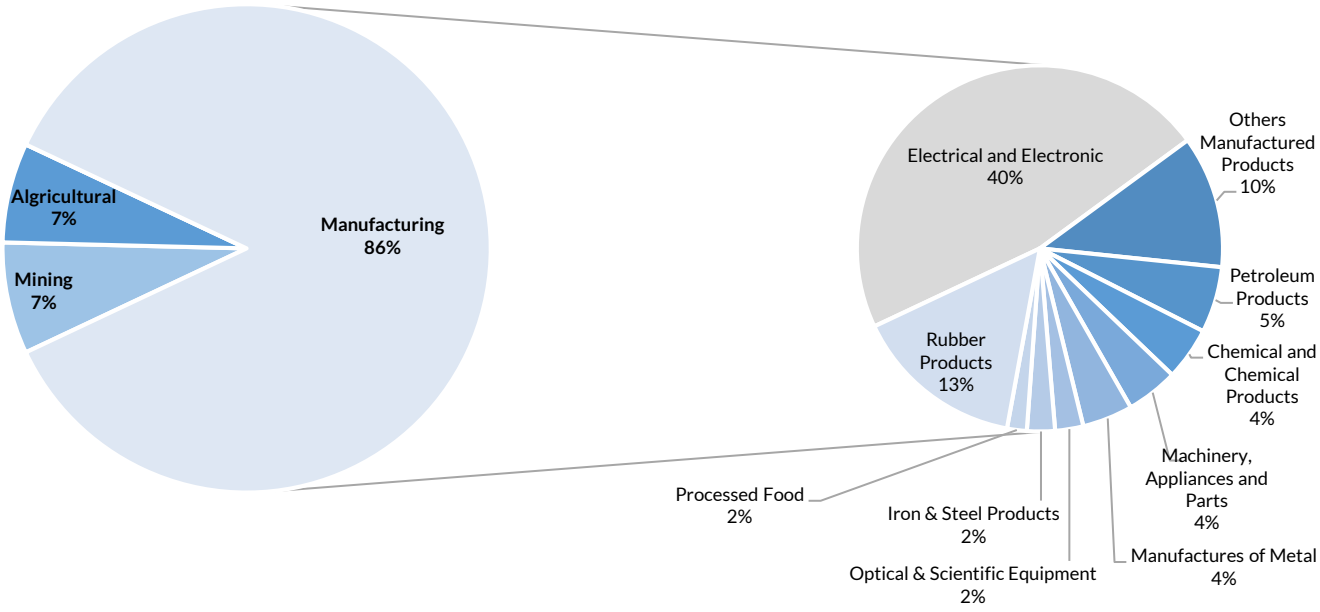
Country	Minimum Wage (US$ per month)
Malaysia	331
Thailand	330
Brunei	290
Indonesia	277
Philippines	202
Vietnam	176
Myanmar	130
Laos	128
Cambodia	98

Source: Media Source, RHB Economics & Market Strategy

Malaysia's Position in the Global Electrical and Electronics (E&E) Market

We know focus on Malaysia's current E&E backdrop. The E&E industry is Malaysia's largest export-oriented sector and encompasses a 40% share of Malaysia's exports. Malaysian E&E products are exported worldwide, with key markets including the United States, Europe, China, Singapore and other Asian countries. As illustrated in Figure 19, the export earnings are closely linked to E&E exports due to its heavy presence in the export basket. The E&E exports portfolio is widely diversified and incorporates a wide range of products, including semiconductors, integrated circuits, consumer electronics, telecommunications equipment, and industrial electronics.

Figure 19: Exports is mainly comprised of manufactured goods, where E&E is the largest component



Source: CEIC, RHB Economics & Market Strategy

Figure 20: The E&E industry in Malaysia is classified into four sub-sectors

Sub-sectors	Products/Activities	
Electronic Components	Integrated circuit (IC) design	Epitaxy manufacturing
	Water fabrication	Printed circuit board (PCB)
	LED substrate	Precision plastic parts
Consumer Electronics	TV/Radio receivers	Electronic games
	Media players	Embedded systems
	Speakers	
Industrial Electronics	Computers and peripherals	Telecommunication devices
	Data storage	Transmitters and routers
	Office equipment	
Electrical products	Electric motors, generation and transformers	Wire, cables and batteries
	Solar cells, modules and Balance of Systems (BoS)	Lighting equipment and luminaires
	Domestic appliances	

Source: MOSTI, RHB Economics & Market Strategy

As the world's 8th largest E&E exporter, Malaysia's E&E outbound shipments accounts for 3.4% (as at 2020) of global E&E exports. Over the years, plenty of multinational manufacturers have established their production facilities in Malaysia, leveraging on the skilled workforce, infrastructure, and favourable business environment**.** The industry is well integrated into the global E&E supply chain, where the manufacturers participate in various stages of production, i.e., from component manufacturing to assembly, testing, and distribution.

Figure 21: World Top E&E Exporters

Top 15 E&E Exporters						
% share in world E&E exports		2000		2010		2020
1	United States	15.7	China	26.7	China	29.3
2	Japan	10.9	Hong Kong SAR (China)	10.3	Hong Kong SAR (China)	13.3
3	Singapore	7.6	United States	7.8	Taiwan	7.6
4	Taiwan	6.3	Singapore	7.0	South Korea	6.2
5	South Korea	5.9	South Korea	5.8	United States	5.8
6	**Malaysia**	**5.2**	Taiwan	5.5	Singapore	5.3
7	United Kingdom	5.2	Japan	4.8	Vietnam	4.6
8	Hong Kong SAR (China)	5.0	**Malaysia**	**3.9**	**Malaysia**	**3.4**
9	Germany	4.6	Germany	3.9	Germany	3.0
10	China	4.4	Netherlands	3.6	Mexico	2.8
11	Netherlands	3.8	Mexico	3.5	Netherlands	2.6
12	Mexico	3.5	Thailand	2.1	Japan	2.4
13	France	3.2	United Kingdom	1.4	Thailand	1.6
14	Ireland	2.8	Hungary	1.4	Czech Republic	1.4
15	Canada	2.1	France	1.3	Philippines	1.4
Share of Top 5 Exporters		**46.4**		**57.6**		**62.2**
Share of Top 15 Exporters		**86.1**		**89.1**		**90.5**

Source: CEIC, RHB Economics & Market Strategy.

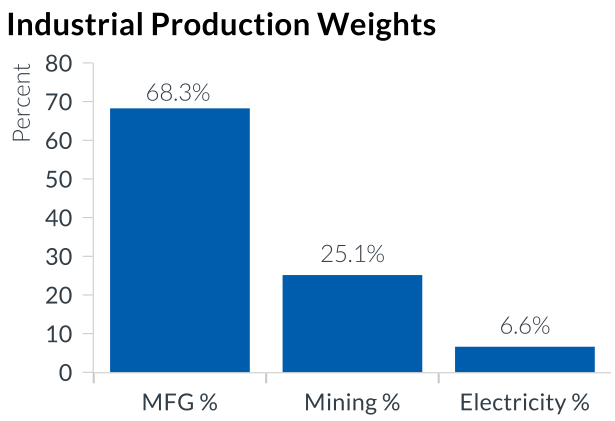
The current phase of Malaysia's E&E industry is characterised by stagnant contribution to the world's E&E exports, a structural shift from personal computers (PCs) & parts and consumer electronics to semiconductors and a gradual transformation towards higher-value-added activities. Over the years, there has been a structural shift in the E&E export composition. The share of electronic components has expanded to 71% of total E&E exports in 2020, double the 35% in 2000. Conversely, the export share of computers and peripherals, as well as consumer electronics, has decreased to 10% (2000: 41%) and 5% (2000: 15%) in 2020, respectively. The export share of communication products remains relatively stable at approximately 7% in 2020 versus 6% in 2000.

Malaysia's E&E export share in the global market has declined over the years (from 5.2% in 2000 to 3.4% in 2020), dragged by a lower market share of computers & peripherals as well as consumer electronics exports. As of 2020, the market share of computers & peripherals, as well as consumer electronics in the global E&E export market, has declined to 1.5% (2000: 5.7%) and 2.1% (2000: 7.6%), respectively. Similarly, the export share of communication equipment has decreased to 1.0% in 2020 (2000: 2.0%). Meanwhile, Malaysia's global share of electronic components outbound shipments has expanded marginally to 6.0% in 2020 (2000: 5.7%).

Malaysia's E&E industry, at this juncture, is neither a low-cost nor a high-value-added producer. In recent years, Malaysia has lost its position as a low-cost manufacturing hub for consumer electronics and PCs to other cheaper locations such as

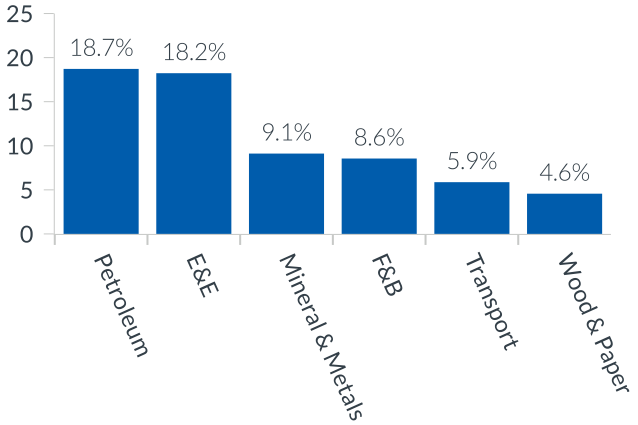
Vietnam and Thailand. With intensifying competition from low-cost producers, Malaysia aims to move up the value chain in the E&E sector by focusing on producing higher value-added products and components. As outlined in the New Industrial Master Plan (NIMP) 2030, the E&E sector was identified as one of the high-growth and high-value industries (HGHV).

Figure 22: Industrial production is largely concentrated in the manufacturing sector…



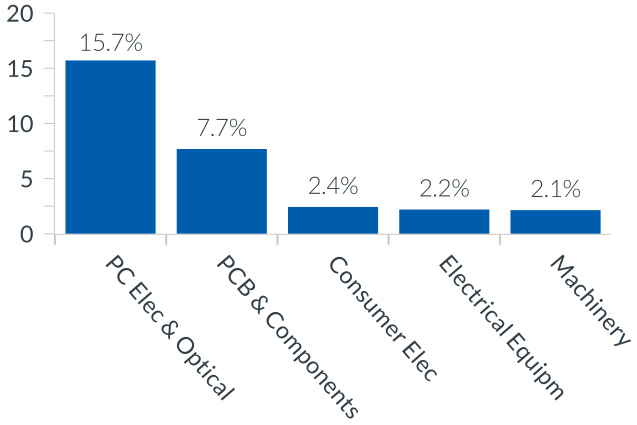
Source: Macrobond, RHB Economics & Market Strategy

Figure 23: … whereby E&E activities (ex-petroleum) is the biggest sector



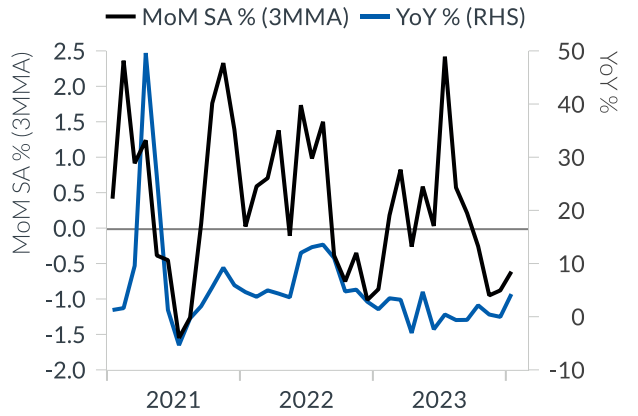
Source: CEIC, RHB Economics & Market Strategy

Figure 24: PC, electronics, optical and PCB are Malaysia's top E&E output, which are semiconductors in nature…



Source: Macrobond, RHB Economics & Market Strategy

Figure 25: … and future development of Malaysia's E&E sector will help IPI's momentum and growth



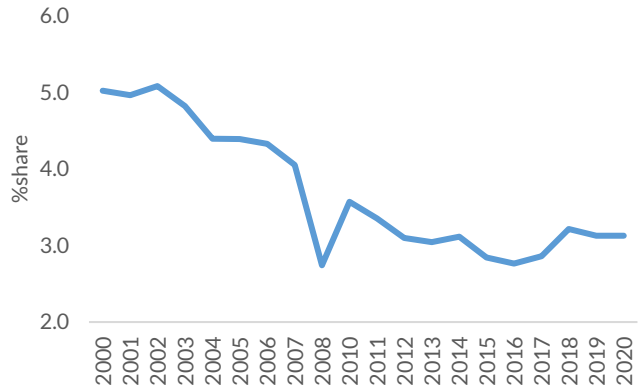
Source: CEIC, RHB Economics & Market Strategy

Figure 26: Declining exports share for PCs and consumer electronics; flat exports share for electronic components

% share in global E&E exports					
2000		2010		2020	
Computers & Peripheral					
United States	15.2	China	39.5	China	39.4
Japan	8.6	United States	8.2	Hong Kong SAR (China)	9.1
Singapore	8.3	Hong Kong SAR (China)	7.1	United States	7.1
Taiwan	7.9	**Malaysia**	**4.6**	Mexico	6.0
Malaysia	**5.7**	Singapore	4.4	Taiwan	4.1
South Korea	5.3	Germany	3.9	Germany	4.1
China	4.9	Thailand	3.6	Thailand	2.9
Germany	4.3	Mexico	3.1	South Korea	2.6
Hong Kong SAR (China)	4.0	South Korea	2.8	Singapore	2.2
Mexico	3.2	Taiwan	2.2	Vietnam	2.1
Thailand	2.5	Japan	1.6	**Malaysia**	**1.5**
Vietnam	0.1	Vietnam	0.4	Japan	0.8
Communication					
United States	13.5	China	31.9	China	39.2
Germany	7.4	Hong Kong SAR (China)	11.3	Hong Kong SAR (China)	11.9
Mexico	5.6	United States	7.8	Vietnam	10.9
Japan	5.0	South Korea	7.8	United States	5.1
South Korea	4.2	Mexico	5.6	South Korea	3.2
China	3.8	Germany	3.3	Germany	2.5
Hong Kong SAR (China)	3.5	Taiwan	3.0	Mexico	2.2
Taiwan	2.1	Singapore	1.9	Singapore	2.1
Malaysia	**2.0**	Japan	1.6	Taiwan	1.6
Singapore	1.8	**Malaysia**	**0.7**	**Malaysia**	**1.0**
Thailand	0.4	Vietnam	0.6	Thailand	0.9
Vietnam	0.01	Thailand	0.5	Japan	0.5
Consumer Electronics					
Japan	18.1	China	28.3	China	35.9
China	10.7	Mexico	10.1	Mexico	8.4
Hong Kong SAR (China)	9.9	Hong Kong SAR (China)	7.4	Hong Kong SAR (China)	5.4
Mexico	8.6	United States	5.5	Vietnam	5.2
Malaysia	**7.6**	Japan	5.2	United States	4.4
United States	6.2	**Malaysia**	**3.9**	Germany	4.2
South Korea	5.4	Germany	3.9	Japan	3.3
Singapore	3.5	Thailand	2.1	**Malaysia**	**2.1**
Germany	2.7	South Korea	1.8	Thailand	1.9
Thailand	2.3	Singapore	1.4	Taiwan	1.2
Taiwan	2.0	Taiwan	1.2	Singapore	1.2
Vietnam	0.1	Vietnam	0.4	South Korea	1.1
Electronic Components					
United States	20.6	Singapore	15.2	Hong Kong SAR (China)	18.5
Japan	14.2	China	12.9	China	17.6
Singapore	11.0	Hong Kong SAR (China)	12.6	Taiwan	13.9
Taiwan	8.1	Taiwan	11.5	Singapore	10.0
South Korea	7.9	Japan	8.9	South Korea	9.7
Malaysia	**5.7**	United States	8.7	**Malaysia**	**6.0**
Hong Kong SAR (China)	4.9	South Korea	8.0	United States	5.4
Germany	4.3	**Malaysia**	**5.5**	Japan	4.3
Thailand	2.2	Germany	4.0	Germany	2.2
China	2.1	Thailand	1.8	Vietnam	2.0
Mexico	1.1	Mexico	0.4	Thailand	1.2
Vietnam	0.1	Vietnam	0.1	Mexico	0.4

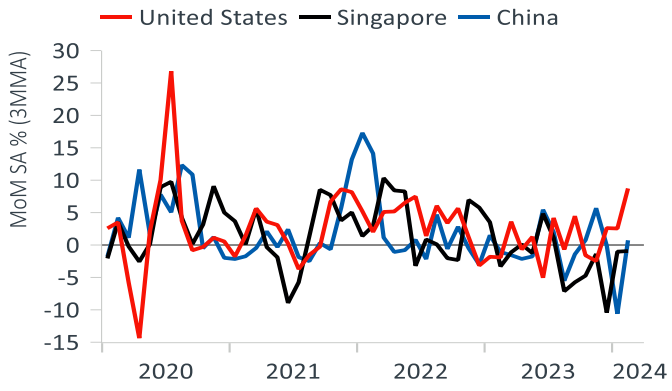
Source: CEIC, RHB Economics & Market Strategy.

Figure 27: Malaysia E&E exports share in global market has declined



Source: Macrobond, RHB Economics & Market Strategy

Figure 28: Uptrend in E&E exports to main economies in recent months



Source: Macrobond, RHB Economics & Market Strategy

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