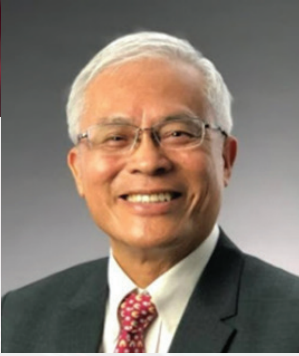


MSIA 2022 E&E Survey

21 February 2023

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MSIA President's Message

Malaysia is one of the key players in the global semiconductor industry with 7% of the total global semiconductor trade flowing through Malaysia and a 13% global market share in chip testing and packaging. Today, the E&E industry is a major contributor to Malaysia's economy:

- E&E is Malaysia's biggest export sector with a total export of RM593 billion in 2022 accounting for 38% of Malaysia's total export
- E&E is a major contributor to Malaysia's External Trade Surplus accounting for 78% of Malaysia's external trade surplus of RM255 billion
- E&E employs about 590,000 Malaysians and indirectly provides employment for millions of Malaysians in other industries
- E&E continues to attract the highest level of investments (FDI and DDI) into Malaysia, with a record-breaking investment of RM148 billion in 2021, comprising 76% of Malaysia's total investment in manufacturing sector

This is why I refer to the E&E industry as the golden goose of Malaysia. It must be constantly nurtured so that the E&E industry remains relevant and competitive.

This Inaugural MSIA 2022 E&E Survey captures the contribution of the MSIA members from semiconductor to electronics, from manufacturing to services, encompassing the profile of the industry, investments, job creation, challenges, priorities and business outlook. The long-term outlook for the semiconductor industry still looks bright with the digital transformation of every industry with technologies such as the internet of things (IoT), artificial intelligence and 5G.

Having posted strong growth of 26.2% in 2021, the Global Semiconductor market is still expected to grow at 4.4% in 2022 with a total size of USD580 billion. However, The World Semiconductor Trade Statistics (WSTS) is forecasting a decline of 4.1% in 2023 due to inflation pressures and weaker demand. Malaysia continues to be an attractive location for E&E

companies. Malaysia has already attracted E&E investments of RM186.2 billion since January 2020 (2020 – RM15.6 billion, 2021 – RM148.0 billion and RM22.6 billion from January to September 2022). Some of the investments have already started operations and more will be operational in 2023 and 2024. The recent semiconductor policy developments in the US has added another layer of uncertainty to the outlook for semiconductor. All E&E companies, US companies, Chinese companies including Malaysian companies are now assessing the potential impact of the US CHIPS+ Act and US export controls restrictions and how they can mitigate the impact.

There is a window of opportunity for Malaysia to capture investments, business opportunities and sales orders. The E&E industry and the Malaysian government should move quickly to seize this window of opportunity. In tandem with the growth of the industry, talent has become the number one challenge for the E&E industry in Malaysia. Globally, there is a war for talent. Malaysia must critically review its education system to encourage more students to pursue STEM, especially engineering. Malaysia is short of professionals such as engineers, IT and even accountants. With a population of only 33 million, we must also look for STEM talent abroad. Undoubtedly, if we want to be the best in the semiconductor and electronics industry, we must have talent that is the best of the best.

I wish to record my sincere thanks to everyone who has been involved in this survey especially the MSIA members who have provided their valuable insights and Deloitte for their assistance in producing this report.

Dato' Seri Wong Siew Hai
MSIA President

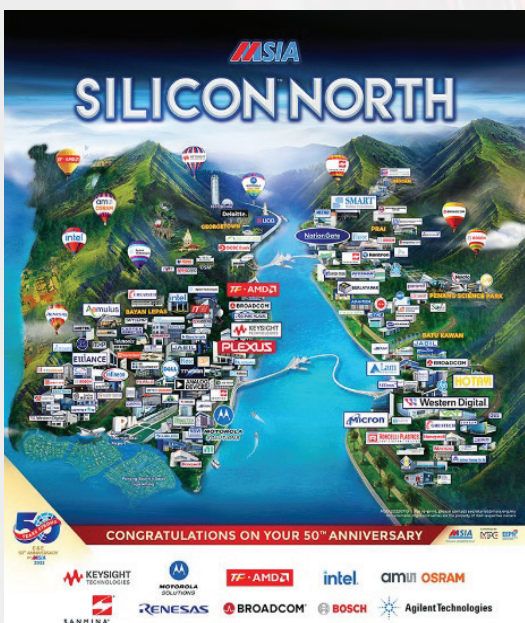
About MSIA

The Malaysia Semiconductor Industry Association is the collective voice of the semiconductor and electronics industry in Malaysia. Established in January 2021, MSIA currently has more than 200 members located in 10 states in Malaysia. In addition to Malaysian-owned E&E companies, we have MNCs members from across 17 countries. Our members encompass the entire value-chain from design to chip fabrication and manufacturing, assembly, packing and testing as well as electronic products including solar technology, automotive components, automation equipment, raw materials (including substrates) and global business services. Our members account for over 50% of Malaysia's E&E sector.

MSIA objectives include:



- **R&D and Technology** – To strategically develop Malaysia's semiconductor industry including electronics and systems by nurturing and growing the complete semiconductor eco-system.
- **Eco-system** – To elevate Malaysia's semiconductor companies' global market position and value chain by enhancing their capabilities and capacities.
- **Advocacy** – To be the collective voice of the semiconductor industry by advocating industry's challenges and building positive relationships with the government and its agencies, and other industry associations and chambers of commerce.
- **Global Competitiveness** – To collaborate with the government on strategies formulation and policy advocacy to enable Malaysia's semiconductor industry, including electronics and systems, to be globally competitive.



StarSpecial
E&E: 50 YEARS IN MALAYSIA

THE STAR, SATURDAY 17 DECEMBER 2022

E&E MALAYSIA

50 YEARS

Logos: amlogic OSRAM, Amkor Technology, infineon, KEYSIGHT, BROADCOM, STMicroelectronics, AMD, RENESAS, Agilent, Carsem, MEMC, intel, IBM, Western Digital, BOSCH

In partnership with **MSIA** MALAYSIA SEMICONDUCTOR INDUSTRY ASSOCIATION

Forging a brighter future > 3

Five decades of excellence > 8, 9 & 10

The Malaysian dream for the E&E industry > 16

Last year, the E&E industry celebrated 50-years in Malaysia. On behalf of the industry, MSIA held several events to celebrate this milestone. Among the events, include the E&E 50th Anniversary Celebration Dinner, which was attended by Dato' Seri Mohamed Azmin Ali, Senior Minister & Minister of International Trade & Industry, Dato' Sri Mustapa Mohamed, Minister in the Prime Minister's Department (Economy) and Senator Datuk Lim Ban Hong, Deputy Minister of Ministry of International Trade and Industry. MSIA also launched the Silicon Malaysia and Silicon North maps and in collaboration with the Star, published the Star Special Pull-Out to commemorate E&E's 50-years in Malaysia.

Executive summary

- **Malaysia is one of the top semiconductor manufacturing players in the world.**
- **Malaysia's E&E industry is a major driver of the economy**
 - 7% of Malaysia's GDP
 - E&E is growing 4x faster than the overall economy
 - Malaysia's biggest exporter, at 38% of total exports
 - 78% of Malaysia's external trade surplus
 - 76% of Malaysia's total investment in manufacturing sector
 - Employs over 590,000 Malaysians
- **>70% of E&E companies are broadening their activities beyond manufacturing into services activities like research, design and development, and global business services. Malaysia is also the regional and global headquarters/centres for many of these manufacturing and services activities.**
- **E&E companies in Malaysia generate multiplier effects within the Malaysian economy with RM23.7 billion spent on over 12,000 suppliers.**
- **E&E companies create both factory production jobs as well as large numbers of high-value & high-skilled jobs such as engineers, technicians, and back-office support jobs.**
 - The average monthly salary in the E&E industry is RM6,450, 2x the Malaysian average
 - However, only 0.3% of E&E workforce hold an advanced degree, indicating potential for further growth
- **Heading into 2023, the changing macroeconomic climate and softening of semiconductor market is driving a shift in the priorities for E&E companies.**
 - 80% of E&E companies remain focused on recruitment to cope with talent shortages and high turnover rates
 - E&E companies remain focused on digitalisation and Industry 4.0 initiatives, supply chain disruptions and ESG initiatives
- **Market Sentiments for 2023.**
 - 50% of E&E companies are expecting a decline in orders. However due to wide-variety of semiconductor product segments, 25% of E&E companies still expect an increase in orders
 - 65% of E&E companies are still pushing ahead with capital expenditures and investments as planned
- **For Malaysia's E&E industry to be globally competitive, E&E needs to have a closer partnerships between government, industry, and universities, especially on:**
 - War For Talent
 - Government - Industry Collaboration
 - Industry - Academia Collaboration

About the survey



Duration

Conducted within the period of Feb till Jun 2022 with a refresher survey in Dec 2022.



Objective

- Demonstrate significance of the E&E industry towards the Malaysian economy.
- Narrate market sentiments of the semiconductor industry players in Malaysia.
- Share insights on potential approaches in further enhancing the robustness and global competitiveness of Malaysia's E&E industry.



Methodology

- The survey was designed and carried out using an online questionnaire by MSIA.
- The survey data was then collated by MSIA.
- The survey was further analyzed and summarized into the following report by MSIA in collaboration with Deloitte.
- To preserve the confidentiality of the participants and the data collected, only aggregated data was used in the analysis and in the report. No identifying data is included in the survey analysis or report.
- The survey is further supported by publicly available economic data. Due to varying publishing dates, the reported economic data is for 2021 except for the total export which is for 2022.

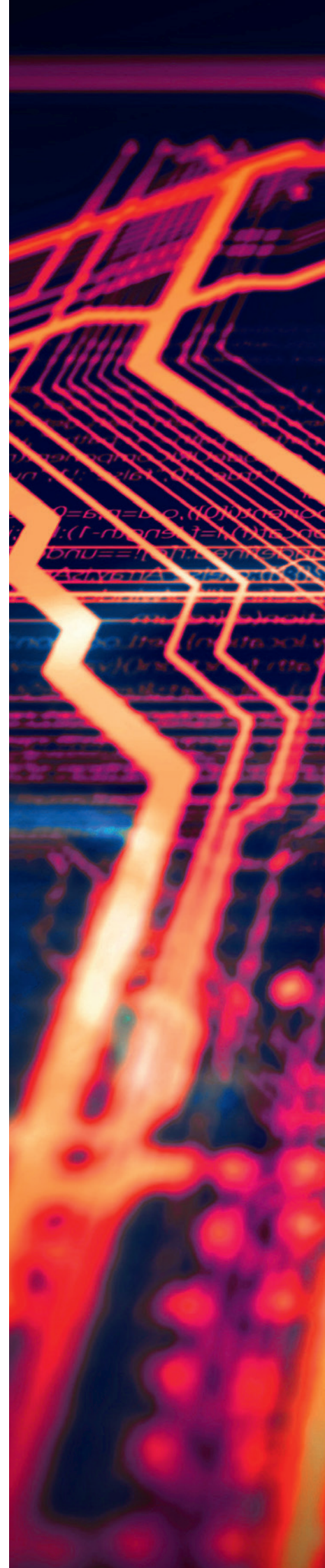


Sample & Size

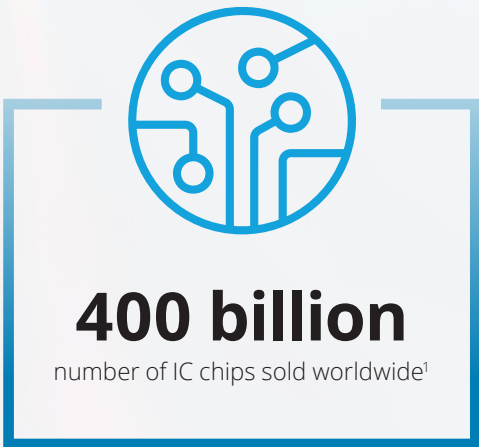
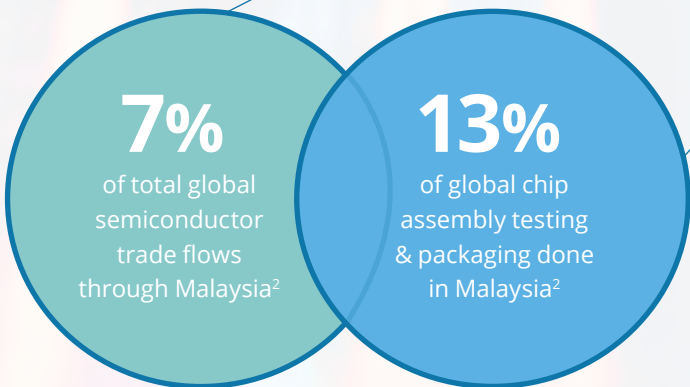
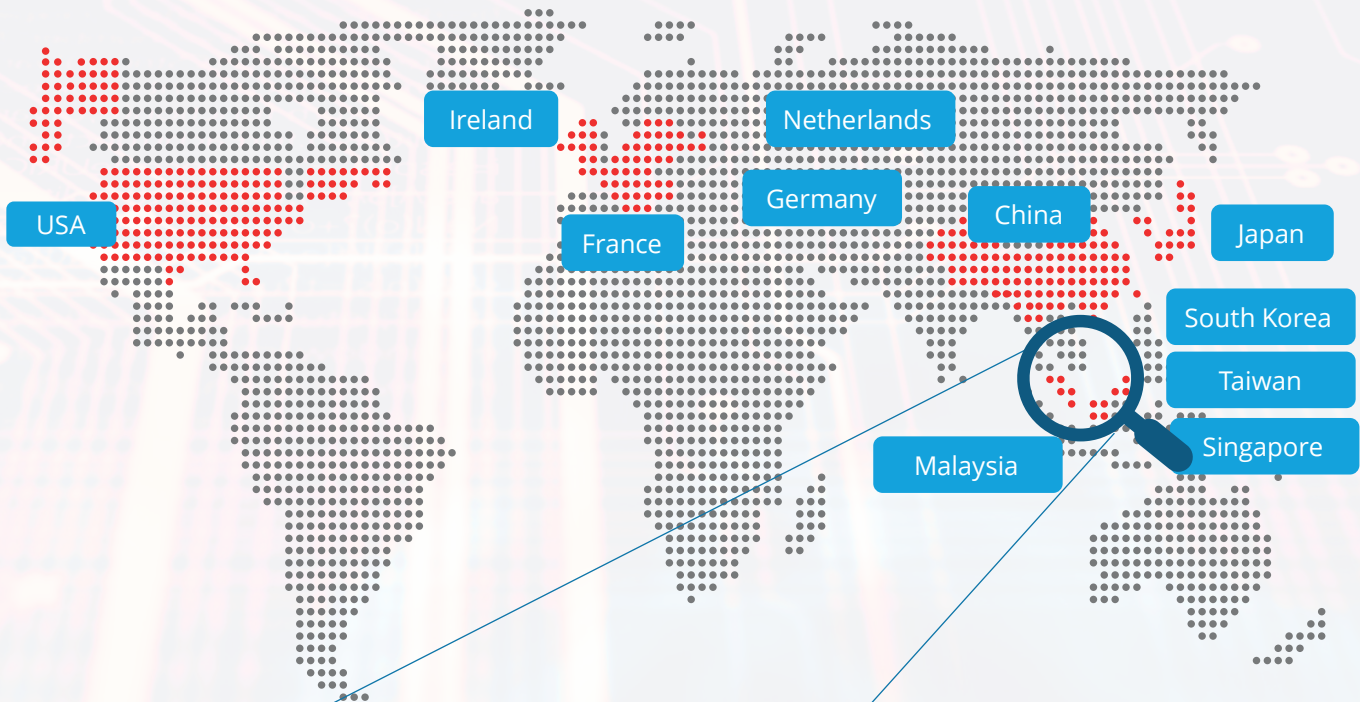
93 MSIA members.



E&E Industry Profile



Malaysia is one of the top semiconductor manufacturing players in the world.



Malaysia is one of the very few countries in the world with leading semiconductor manufacturing capabilities.

● Leading countries in semiconductor manufacturing

Source: ¹ The McClean Report 2022 – January Semiconductor Industry Flash Report, ²Malaysia Electrical and Electronics Subsector Productivity Report 2022 Made in the USA - Revitalizing the Domestic Semiconductor Industry (2020) by Belfer Center for Science and International Affairs, Harvard Kennedy School.

The E&E industry is a major driver of Malaysia's economy, accounting for nearly 7% of GDP and is growing at a faster pace than the overall economic growth.



6.9% is E&E contribution with total of **RM95 billion**

1.3%

Malaysia's GDP CAGR
2017 – 2021

VS

5.7%

Malaysia's E&E CAGR
2017 – 2021

E&E is growing 4x faster than the overall economy

Note: CAGR is the Compound Annual Growth Rate, includes contraction due to Covid-19
Source: Department of Statistics Malaysia

The E&E industry contributed total exports of RM593 billion, larger than the next 5 top export categories combined and accounted for 78% of Malaysia's trade surplus.



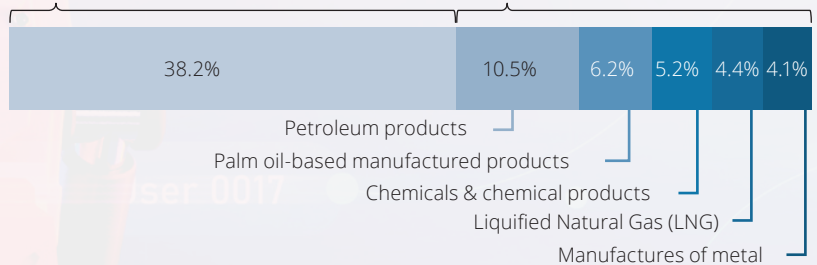
38%

is E&E contribution
with total of
RM 593 billion*

VS

30%

from other Top 5 export
categories with total of
RM 472 billion*



E&E's contribution is over 3 times larger than the 2nd largest export category (petroleum products).

The E&E industry makes up 78% of the RM 255 billion trade surplus.

Note: *Provisional data.
Source: Department of Statistics Malaysia and MATRADE.

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The E&E industry accounts for over three quarters of Malaysia’s manufacturing investments and employs a significant number of Malaysians.



75.9%
is E&E investment with a total of **RM148 billion**



94
currently approved projects in the E&E industry

590,000
Total E&E employment

- The E&E industry has a labor productivity that is double the national productivity and employs roughly 4% of Malaysia’s workforce
- Based on SIA research, the global E&E industry creates an employment multiplier between 6.7x and 12.2x

Sources: Department of Statistics Malaysia, MIDA, Malaysia Electrical & Electronics Subsector Productivity Report (2022) and SIA Chipping In (2021).

19 leading E&E companies celebrated 50 years in Malaysia in 2022.



- While Penang is frequently seen as the hub of E&E, and remains the largest state for investment, the impact and presence of the industry spans nearly every state in Malaysia
- Key E&E economic activities include product manufacturing, research, design and development, engineering services, logistics hub, procurement centres, sales and marketing, etc.

MSIA 2022 E&E Survey



The survey gives a representative industry outlook as it samples local and global E&E companies in Malaysia that contribute roughly 40% of Malaysia's total E&E exports.



93

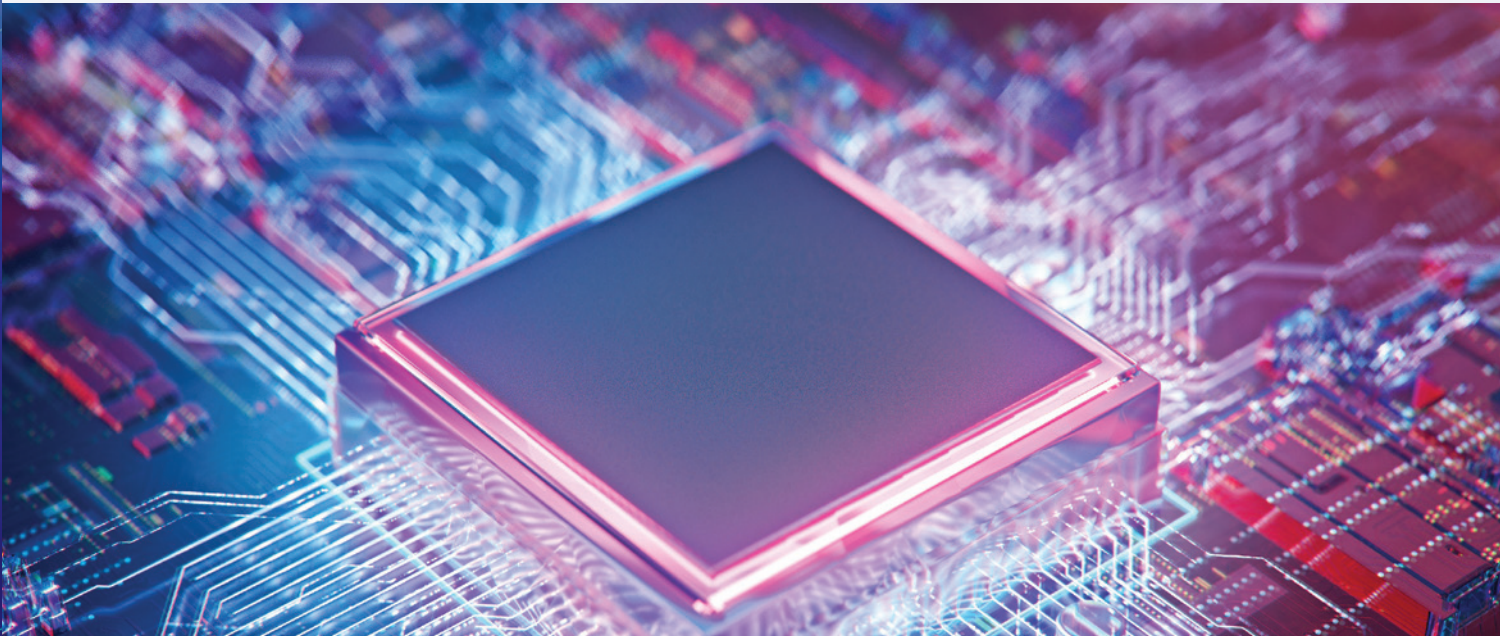
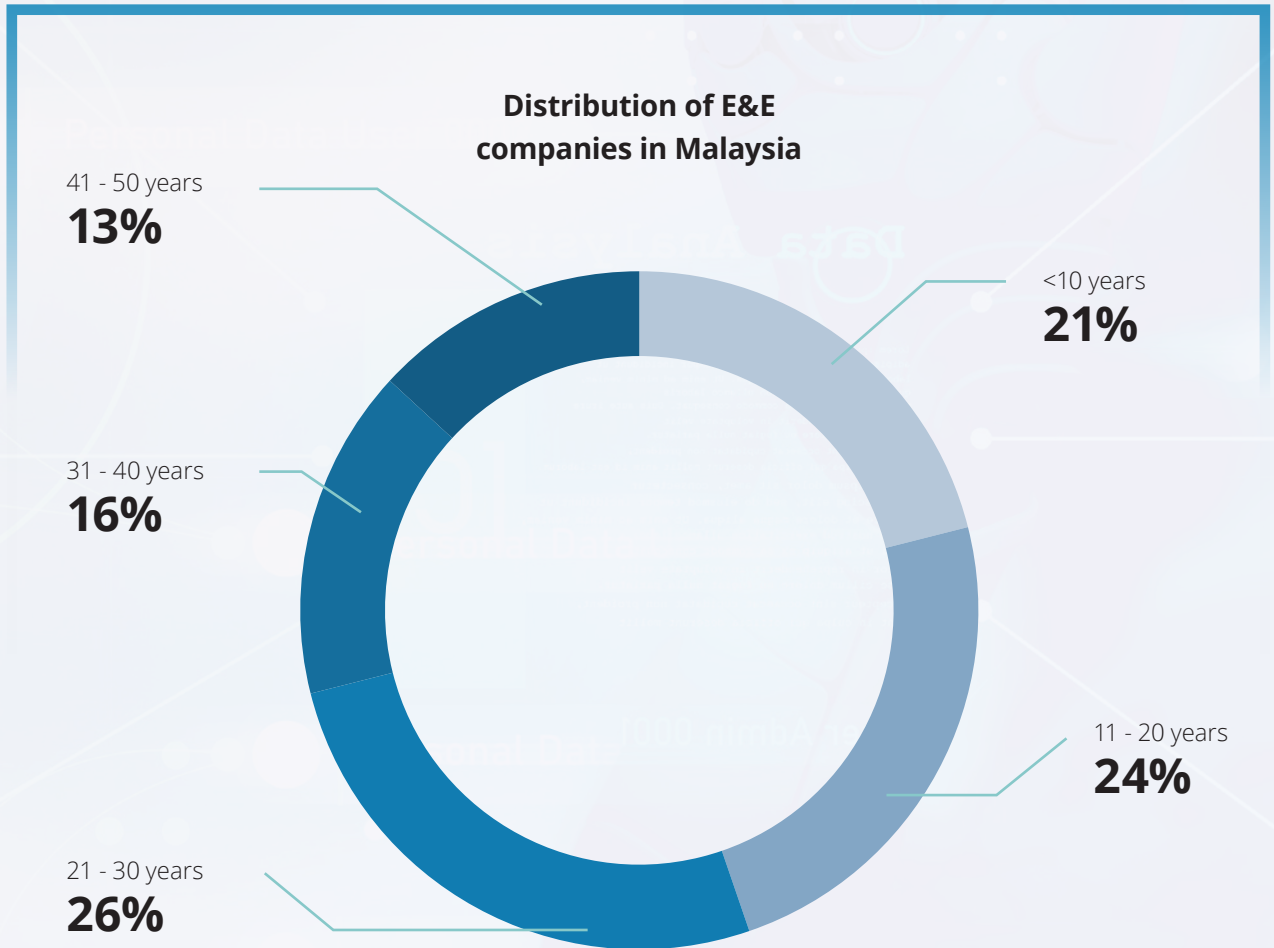
companies completed this year's survey



These companies constitute **RM188 billion** for Malaysia's total exports

Respondents represent companies with operations in Malaysia and headquarters in Malaysia, China, India, Japan, Singapore, Taiwan, Germany, Netherlands, Norway, Sweden, Switzerland, Canada and the USA.

More than half of E&E companies in Malaysia have been operating over two decades, signifying both the stability and sustainability of the E&E industry.



E&E companies are creating value in manufacturing and other key corporate areas covering global and regional responsibilities.

P&L Responsibility



69%
of respondents have P&L
responsibility located in Malaysia

Nearly two-thirds of the E&E companies have the autonomy on how they generate profit and allocate budget.

Global and Regional Responsibility



35%
of respondents have global and
regional responsibility that is
managed from Malaysia

More than one-third of the companies in Malaysia have global centres and regional headquarters for many activities such as procurement, R&D and shared services.

Key areas within global and regional responsibilities



Global Supply Chain /
Commodity Management



Design &
Development



Global Business Services



Specialized Centres
of Excellence

E&E companies create high spending for Malaysia-based suppliers, generating a large economic spillover effect beyond the E&E companies themselves.

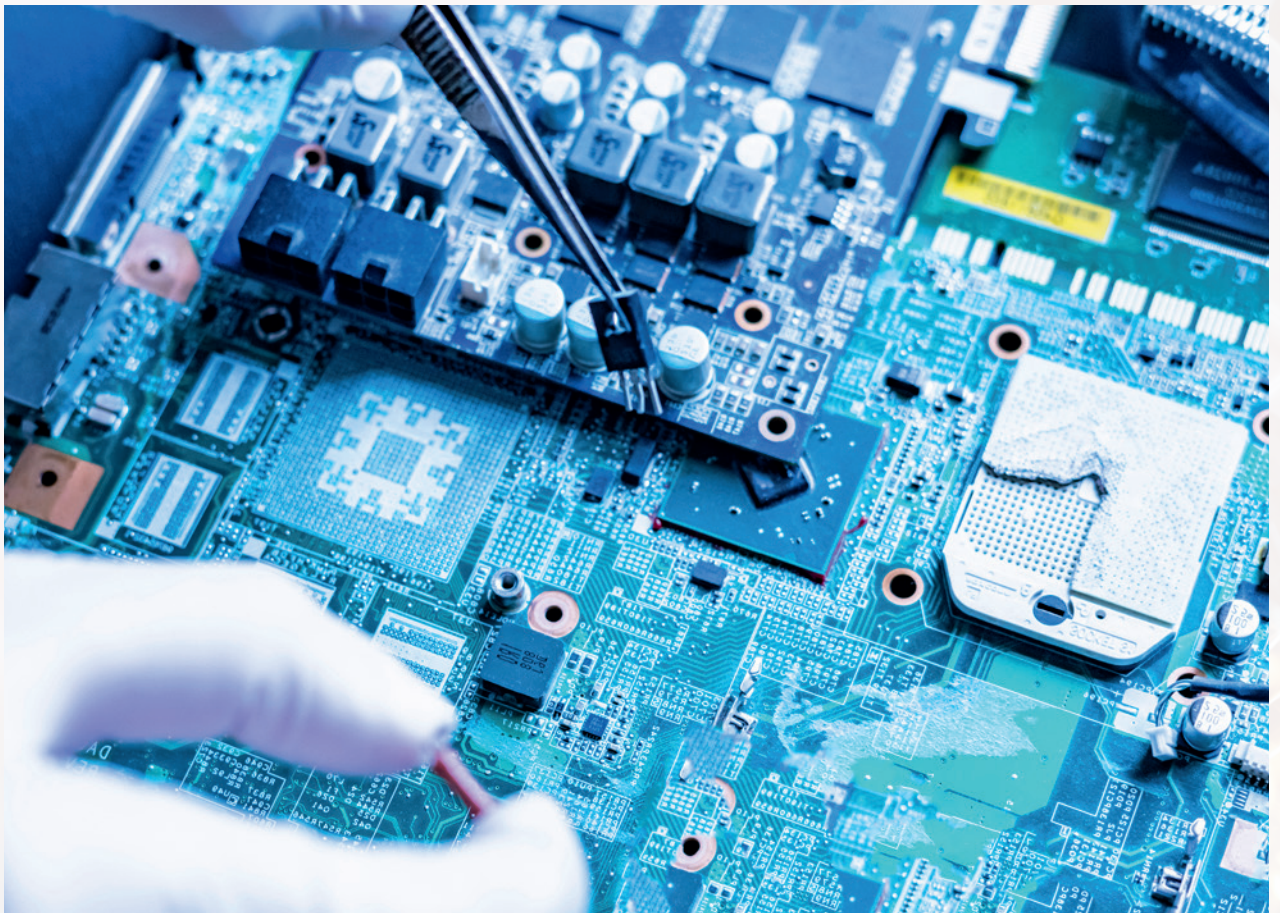


RM 23.7 billion

payments made to Malaysia-based suppliers in 2021.

Survey respondents identified **12,000 suppliers** with annual spend on goods and services of at least RM 100,000.

The average estimated annual spend per supplier is **~RM 2 million.**



E&E companies create factory production jobs and many high-value, high-skilled jobs such as engineers, technicians, and back-office supports.

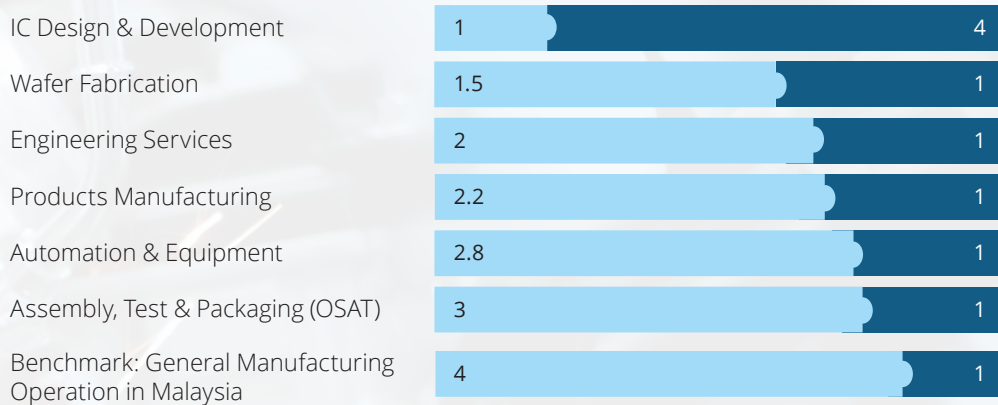


25,110

estimated new employment opportunities for 2022.

The E&E industry drives a high proportion of high-value and high-skilled **indirect employees**¹ per direct (production) employee.

Ratios of direct and indirect workers by different E&E segments.



Various employment positions estimated



13,697
Factory workers & operators



3,763
Technicians



3,411
Manufacturing engineers



2,252
Design & development engineers



1,385
Office workers



602
Shared services team

Note: ¹Direct labor includes manufacturing production workers, Indirect labor includes engineers, technicians, and office staff not performing manufacturing production work.

The E&E industry provides salaries totaling over RM14 billion to over 187,000 employees.



> RM 14 billion

total salary paid across
187,000 E&E employees

On average E&E employees
earn **RM 6,450 per month**,
roughly double the national
average of RM 3,037.



However, only 0.3% hold advanced degrees, which falls significantly below the global trend.

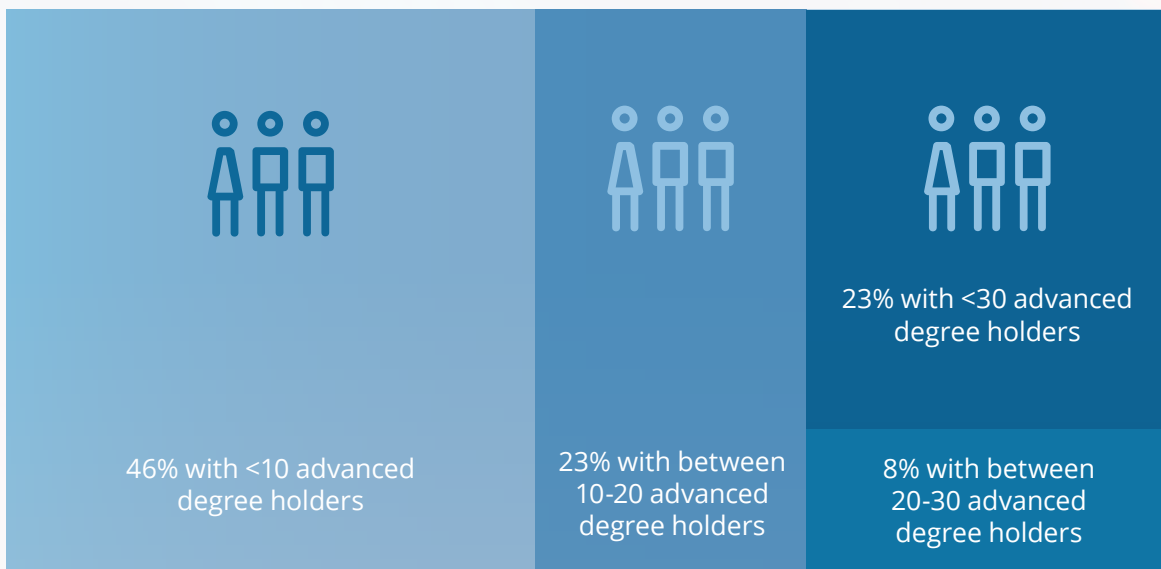


Only ~560 employees

in the E&E workforce have advanced degrees*

Note: *Advanced degrees include Masters and PhD

Distribution of companies with total employees holding advanced degrees.



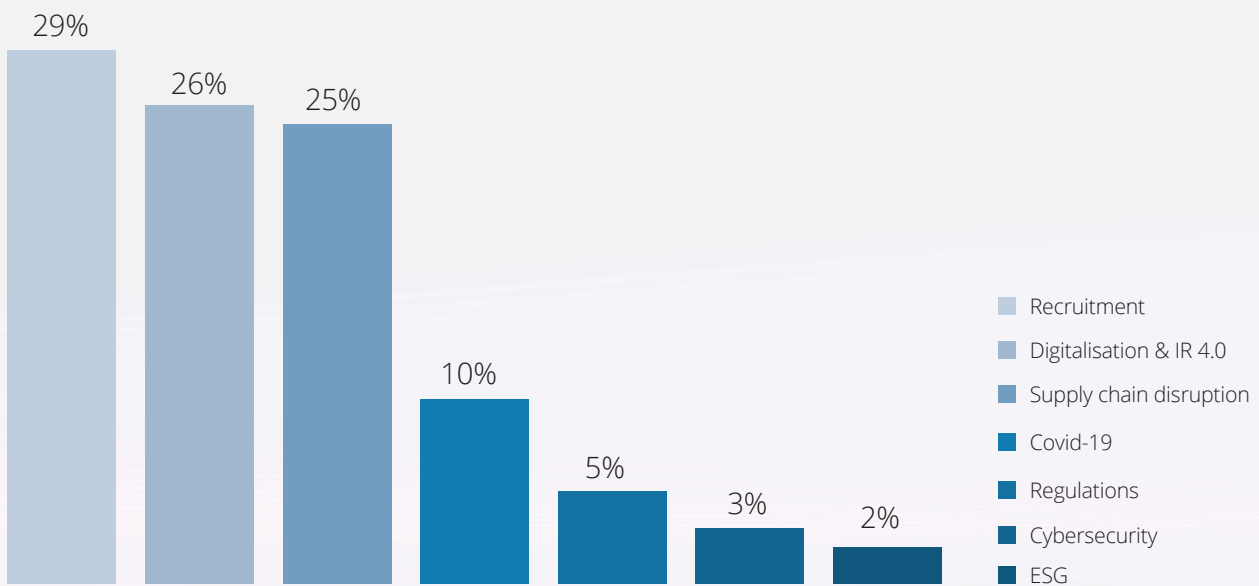
Note: *Advanced degrees include Masters and PhD

E&E Industry Priorities

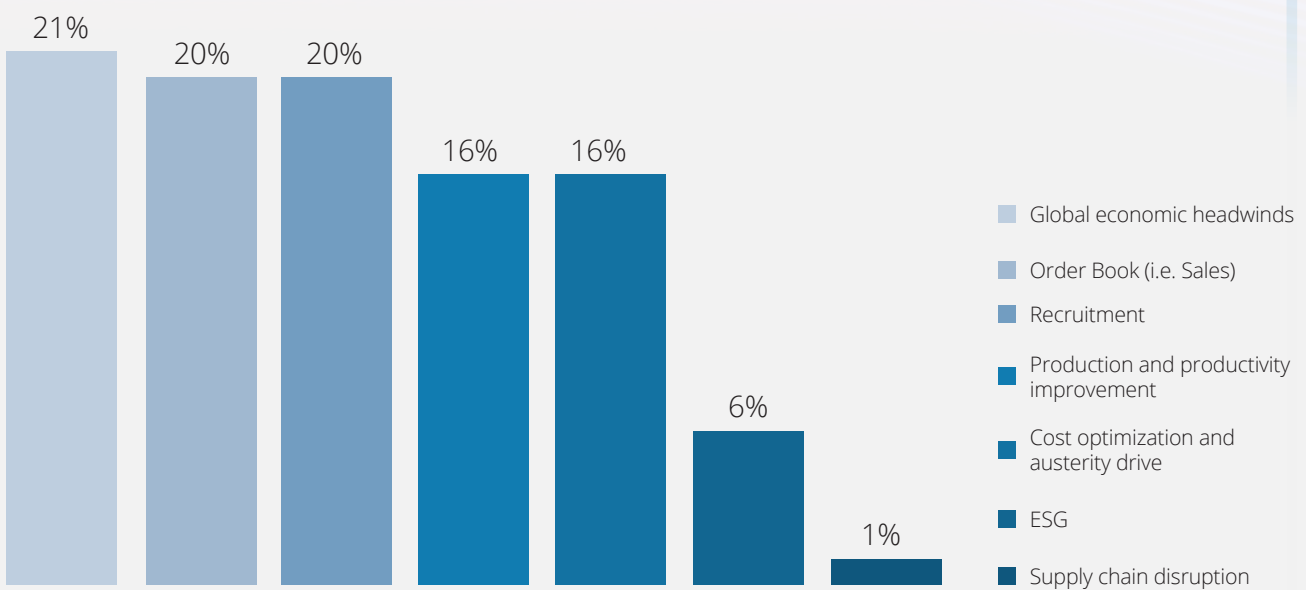


Heading into 2023, the changing macroeconomic climate and softening of global E&E market is driving a shift in respondents' focus area.

Focus Areas for 2022

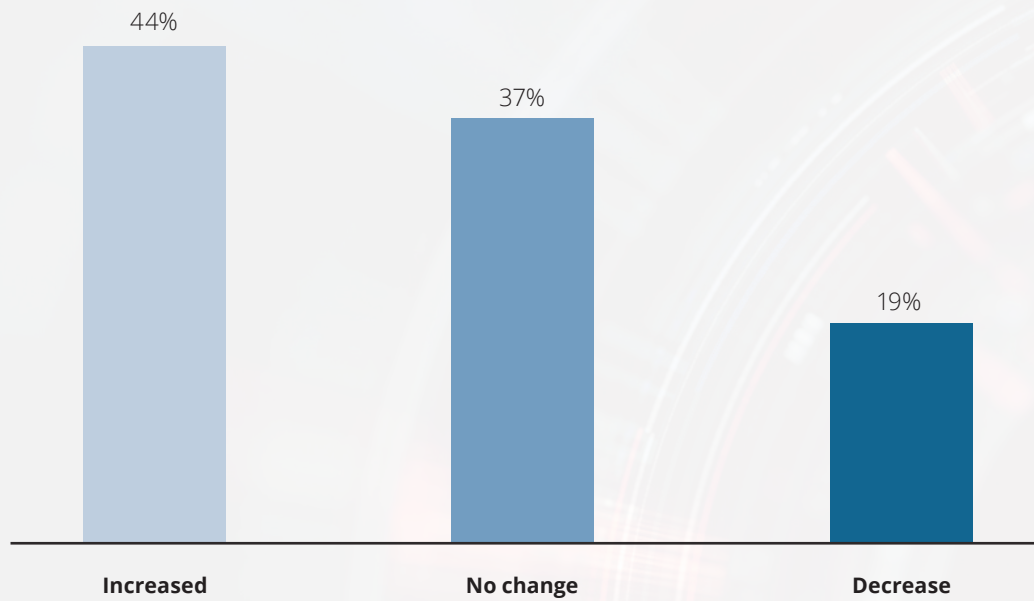


Focus Areas for 2023

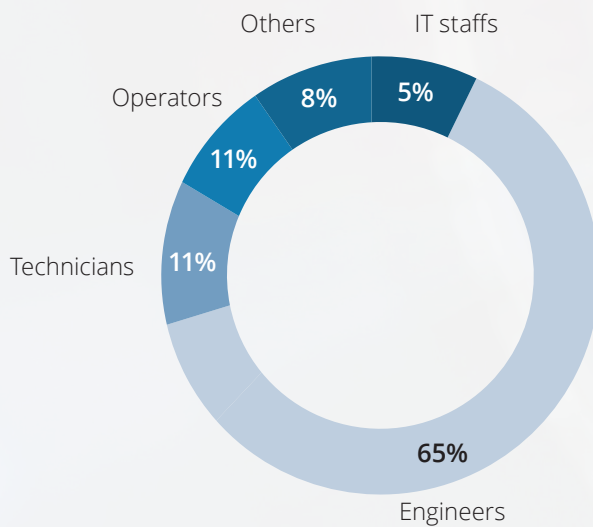


Despite expectations of a global economic slowdown, almost half of E&E companies in Malaysia remain focused on recruitment to cope with talent shortages and high turnover rates.

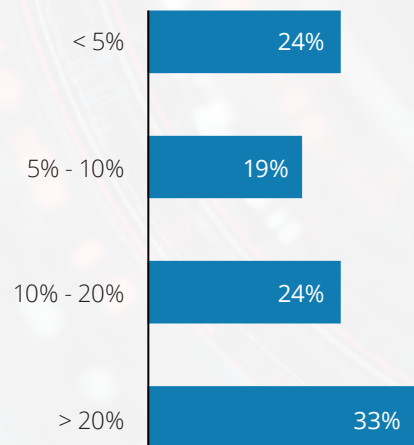
Projected Hiring Outlook



Key Position of Talent Shortages

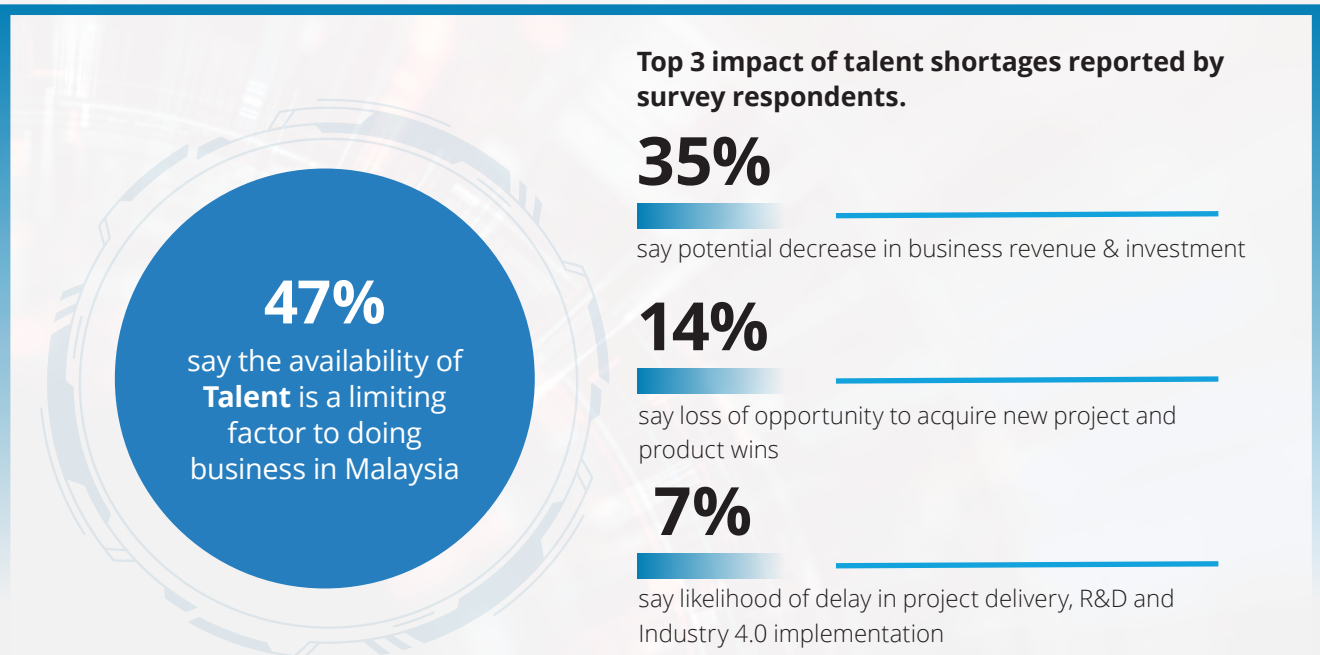


Projected Average Employee Turnover Rates

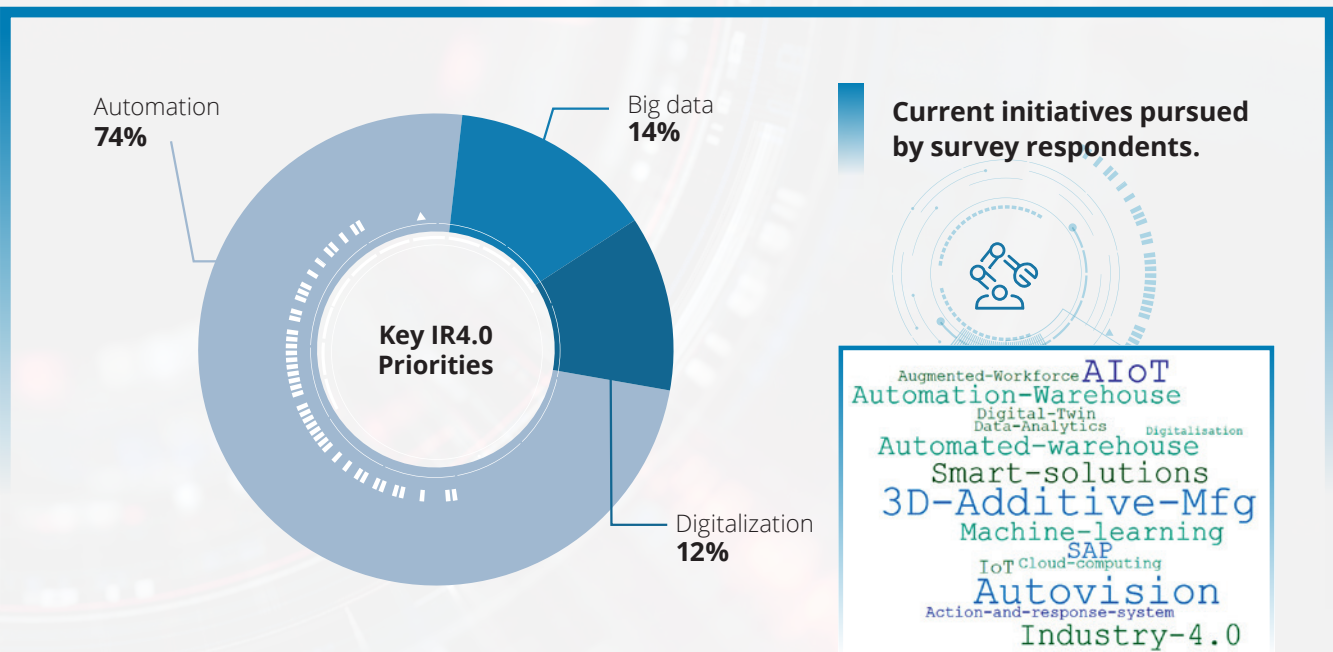


With the endemic of talent shortages, majority of respondents are still struggling to attract new talent (specifically engineers) while more than half of the companies expect to suffer from high employee turnover rates that go beyond 10%.

Close to half of E&E companies are prioritizing talent, an indication of strong continuous demand for high-value and high-skilled employment.



Another area of interest for E&E companies are corporate initiatives such as digitalization and Industry 4.0.



E&E companies are still concerned about supply chain disruptions due to its significant impact on business.



Companies are still seeing various

Supply Chain Disruptions

Top 3 impact of global supply chain disruptions reported by survey respondents.

20%

say rise in material, logistics and manufacturing costs

13%

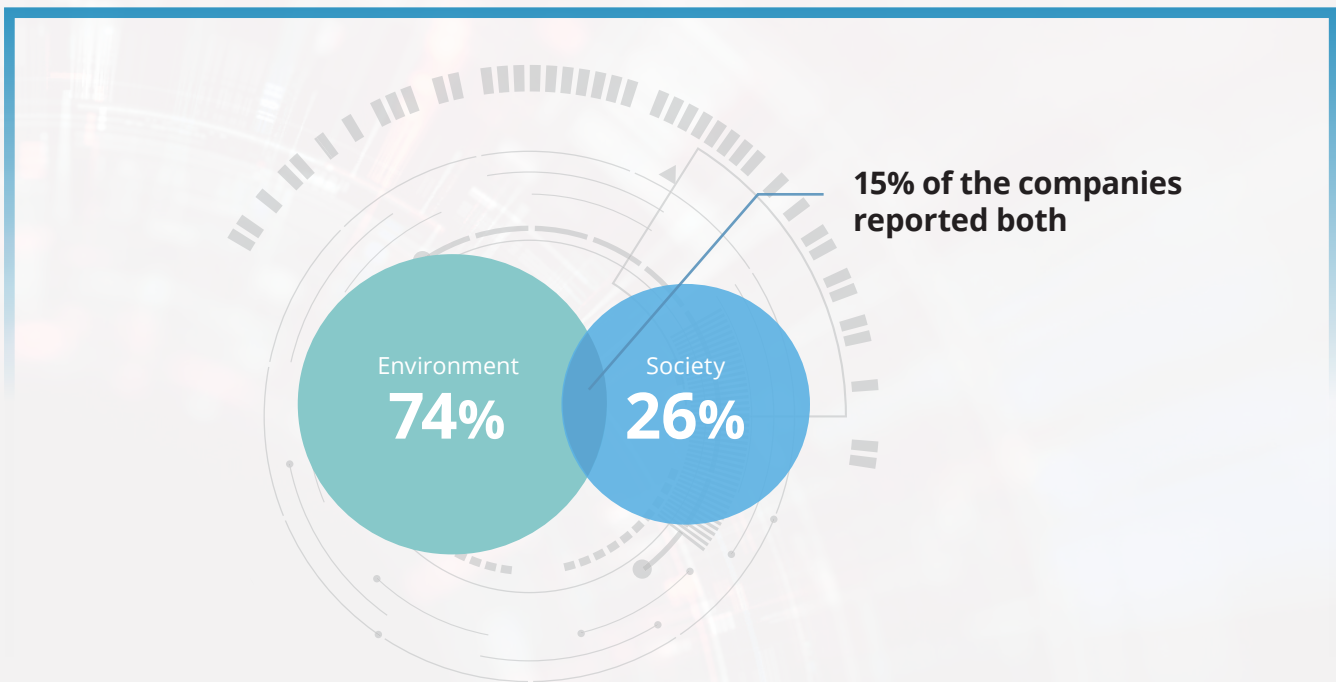
say potential decrease in business revenue

7%

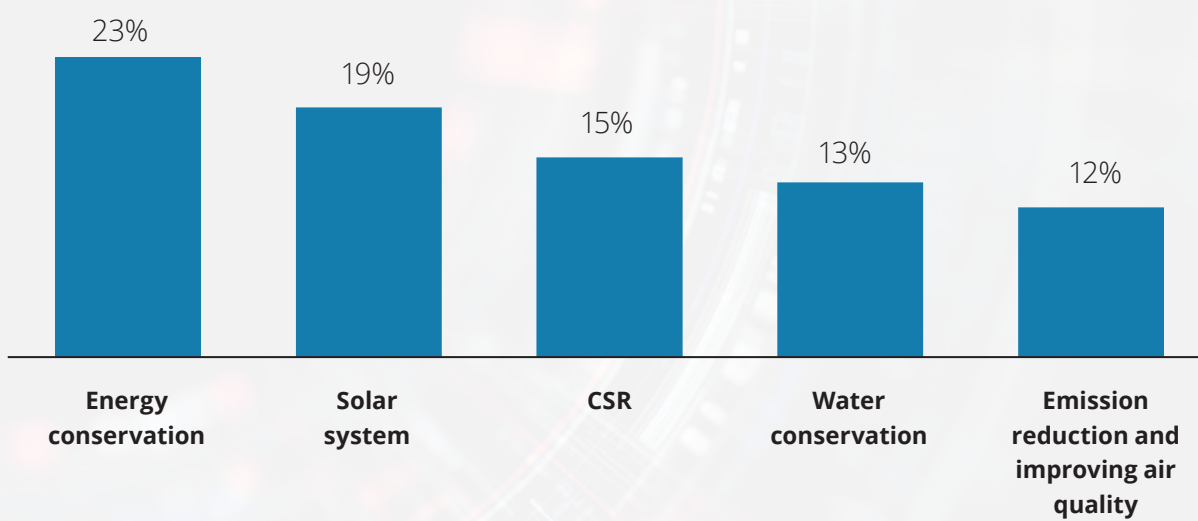
say material shortage for backend production



Additionally, E&E companies are increasingly focused on Environment, Social and Governance (ESG) initiatives with the highest emphasis on environmental initiatives.



Top 5 key initiatives related to ESG.



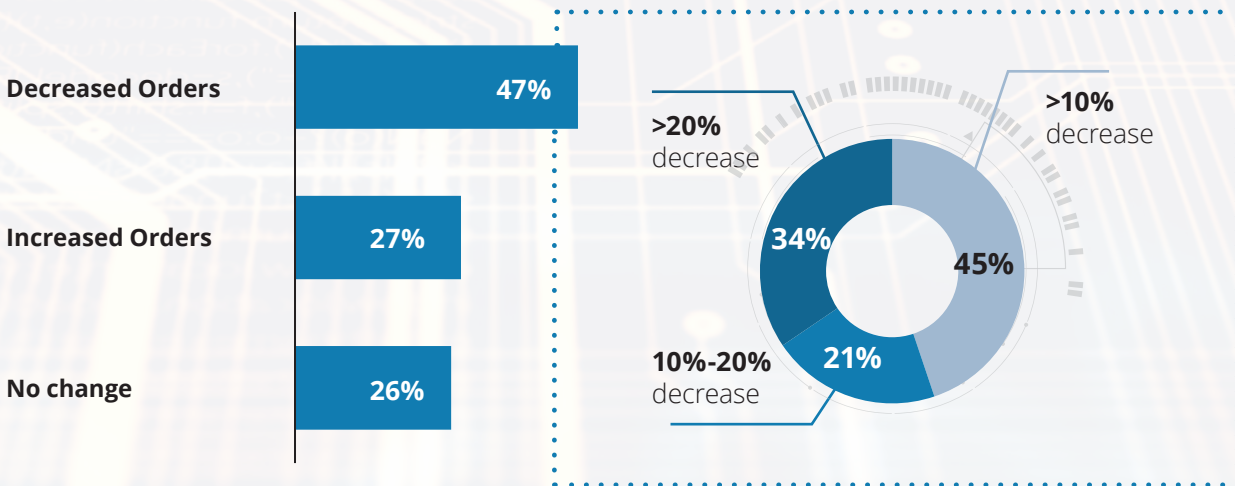
As for governance initiatives, most E&E companies are part of the Responsible Business Alliance (RBA), an indicator of a strong commitment in promoting social, environmental, & business ethics.

Market Sentiments



Heading into 2023, half of the respondents expect a decline in orders; however due to the wide variety of E&E product segments, a quarter of respondents still expect an increase in orders.

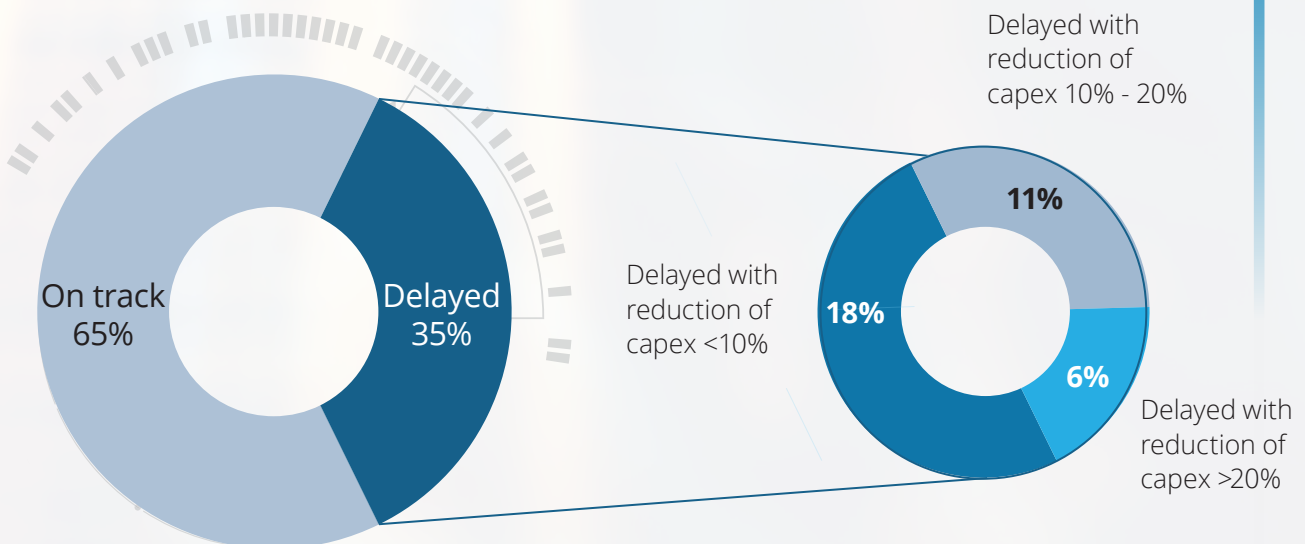
Projected Order Bookings Trend



Of the respondents expecting a decline in order bookings, only one-third anticipate a decrease of more than 20%.

Despite an expected global slowdown, two-thirds of respondents indicated that they are still pushing ahead with capital expenditures and investments as planned.

Projected Capital Expenditure & Investment Plans



MSIA Recommendations



To further elevate the robustness and global competitiveness of Malaysia's E&E industry, respondents propose closer partnerships between government, industry, and universities.



War for Talent

- Strategies to use other countries' talents
 - Allow both foreign students studying in Malaysia and foreign talents to complement local talents
 - Incentivise foreign talents to work in Malaysia
- Talent development by industries (e.g., upskilling and training initiatives)
- Professional development support by industries (e.g., student loans, scholarships, tuition reimbursement)
- Talent development through government initiatives (e.g., MyBrain scholarships for Masters and PhD)



Government-Industry Collaboration

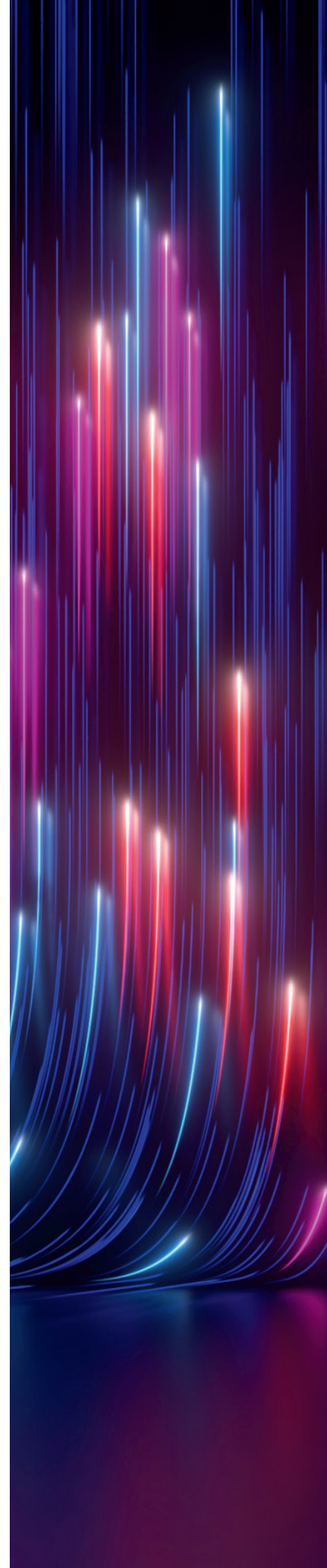
- Additional enhancements of existing incentives & policies (e.g., incentive application, employment pass, Customs related issues)
- Policies that define Malaysia as the easiest country in SEA for high-tech companies to do business
- Incentive programs that are augmented to attract further high impact investments
- Move up the value chain and enhance the ecosystem with growing both design & development centres, FDI wafer fabs, and supply chain
- Improve public infrastructure to ease travelling to work

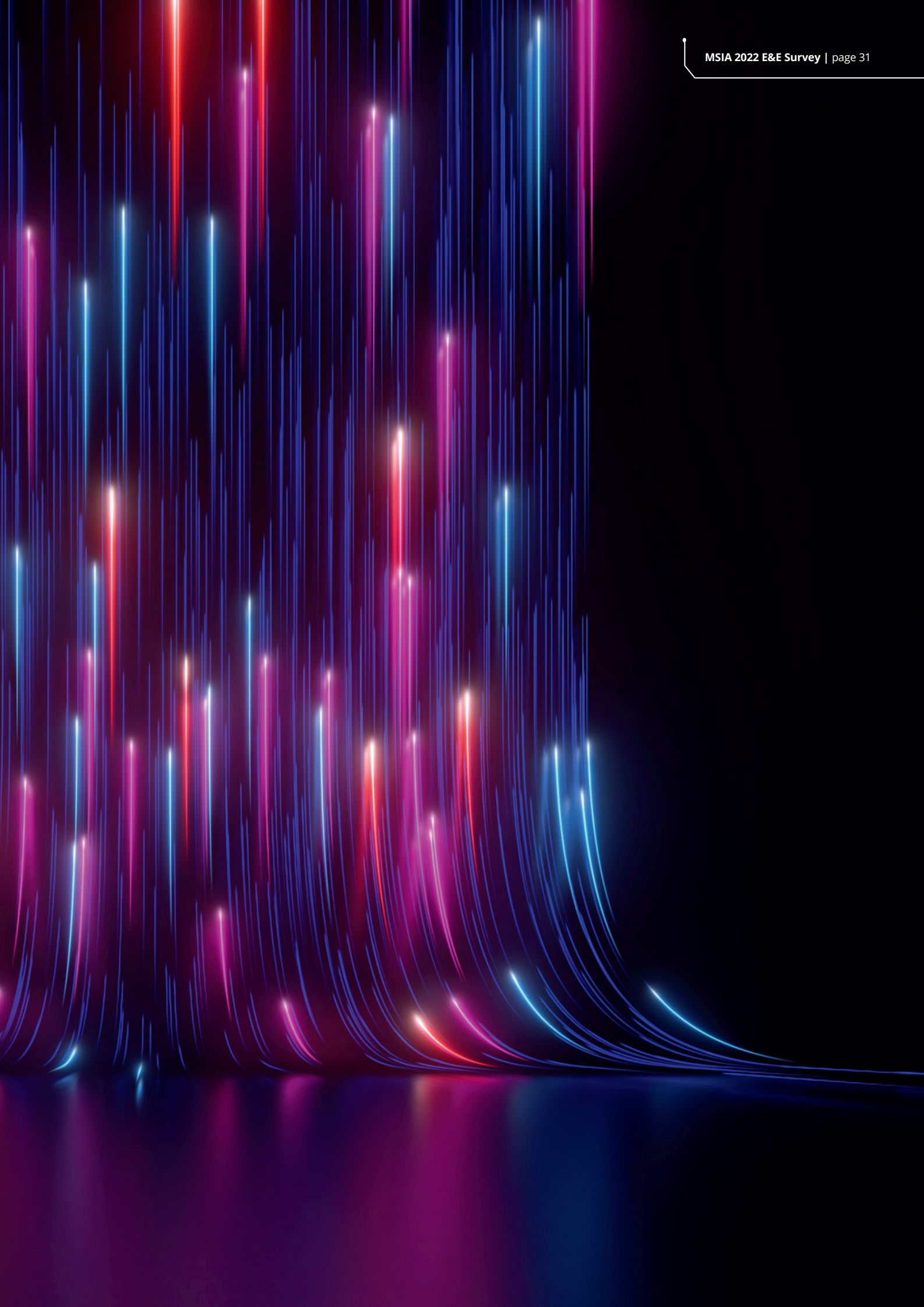


Industry-Academia Collaboration

- Accelerate adoption of industry recommended curricula and syllabus by universities
- Elevate further focus on STEM within current education system
- Include representatives from industries within University Board of Directors
- Boost quality of both vocational and technical skill development centres

Appendix





References

- Crowley, B. J., Davis, R., Rong, H., Brooks, H., Blackwill, R. D., Crowley, B. J., & Davis, R. (2020). Made in the USA: Revitalizing the Domestic Semiconductor Industry. *Harvard Kennedy School - Belfer Center for Science and International Affairs*. <https://www.belfercenter.org/publication/made-usa-revitalizing-domestic-semiconductor-industry>
- Department of Statistics Malaysia. (2022). Malaysia Economic Performance 2021. *Department of Statistics Malaysia Official Portal*. https://www.dosm.gov.my/v1/index.php?r=column/cthemedByCat&cat=153&bul_id=UWFBZkhFZDBhanN5ZEUxRS96T2VRdz09&menu_id=TE5CRUZCbIh4ZTZMODZlbnk2aWRRQT09
- IC Insights, Inc. (2022). *The McClean Report 2022 – January Semiconductor Industry Flash Report*.
- Malaysian Investment Development Authority. (2021). *Malaysia's E&E Industry*. MIDA Central. https://www.mida.gov.my/wp-content/uploads/2020/12/E_E-High-Res-Flnal-2021.pdf
- Semiconductor Industry Association (SIA) & Oxford Economics. (2021). *CHIPPING IN: The positive impact of the semiconductor industry on the American workforce and how federal industry incentive will increase domestic jobs*. Semiconductor Industry Association (SIA). https://www.semiconductors.org/wp-content/uploads/2021/05/SIA-Impact_May2021-FINAL-May-19-2021_2.pdf
- Subsector Productivity Report Electrical and Electronics*. (2022). Malaysia Productivity Corporation.
- Trade Performance 2022 - MATRADE*. (2022). <https://www.matrade.gov.my/en/digital-free-trade-zone-dftz/208-malaysian-exporters/trade-performance-2022>



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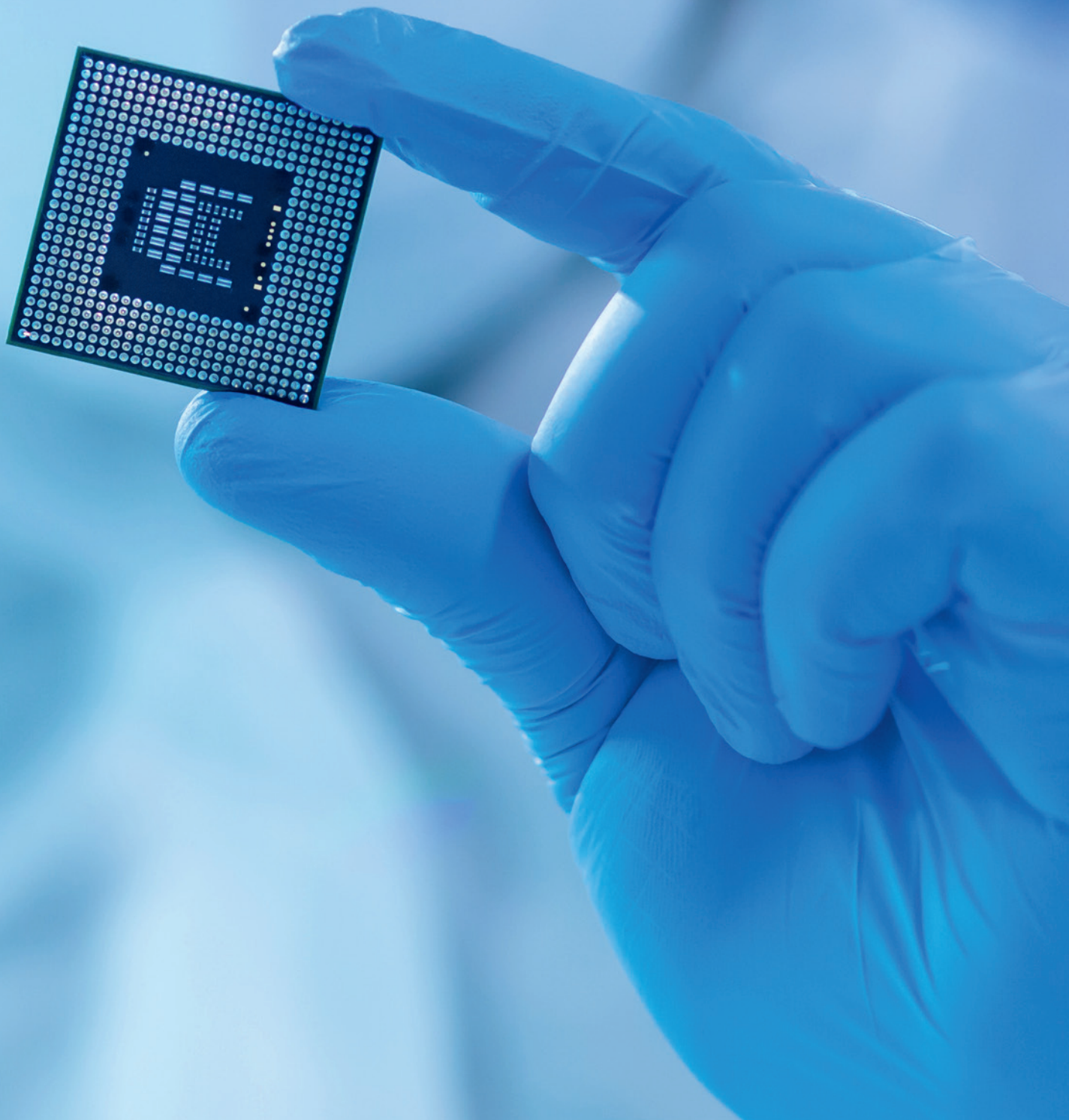
For more information, please visit:

 <http://www.msia.org.my>

 https://www.youtube.com/@my_E-E_industry_association

 <https://www.linkedin.com/company/malaysia-semiconductor-industry-association/>

For enquiries, please contact:
secretariat@msia.org.my





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