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RISING DEMAND, SHRINKING TALENT

BY SREEREMA BANOO

The battle for skilled talent — engineers and technicians — in the electrical and electronics (E&E) sector, particularly semiconductors, often dominates the conversation with and among industry players and policymakers alike. This is not surprising, given the bottlenecks in the talent pipeline, which has been exacerbated by a combination of the sector's exponential growth and declining interest in science, technology, engineering and mathematics (STEM) among students.

At *The Edge*-HSBC New Era for E&E Industry Forum 2024 held in Penang on Sept 9, the talent shortage, along with funding and supply chain advancement, featured prominently in the speeches and discussions among the speakers and audience members.

The forum, titled "Riding the Next Wave" was organised in collaboration with HSBC Bank Malaysia and supported by IJM Corp. Presentations and discussions during the half-day event centred on the path ahead for the E&E sector, particularly in seizing opportunities from the resulting rebound in the semiconductor industry.

Held at the Eastern & Oriental Hotel, the event at-

tracted some 140 participants from the semiconductor industry, industry associations as well as policymakers. Some 100 participants attended the event virtually.

Many of the participants, most of whom are based in Penang, were engaged throughout the speeches and the panel discussion that closed the event. It was an overall collegial atmosphere, especially during breakfast and the tea break, which also featured a booth from Colombian speciality coffee and handcrafted cocoa purveyor, Miss Coco.

Minister of Investment, Trade and Industry Tengku Datuk Seri Zafrul Aziz in his keynote address spoke of the pivotal transformation in the global semiconductor market. He pointed out that just as oil drove industrialisation and economic growth in the 20th century, semiconductors are playing the same role today, and have in fact overtaken oil in strategic importance — reshaping global trade, supply chains and even geopolitics.

After a challenging 2023, global chip sales — led by the widespread use of generative artificial intelligence (AI) — look set to bounce back in 2024. According to the Semiconductor Industry Association (SIA), the global semiconductor industry is experiencing a surge in sales, with May 2024 marking a 19.3% year-on-year increase. The upward trajectory is also not expected to abate an-

ytetime soon, and it has been predicted that the global semiconductor market will exceed US\$1 trillion by 2030.

In the face of this growth, Penang State Executive Councillor for Infrastructure, Transport and Digital Zairil Khir Johari in his welcome address said it was "incumbent upon us here in Malaysia, particularly in Penang, to get as big a slice as we can". The state, he added, has experienced an exciting few years — attracting record foreign direct investments (FDIs), which in turn have generated thousands of jobs in the E&E sector. Outlining some of the initiatives and investments in utilities and infrastructure as well as the provision of adequate industrial land, the state government, he said, remains committed in ensuring the sector continues to grow and develop.

Although Malaysia — Penang in particular — has its strengths in the outsourced semiconductor assembly and test (Osat) segment, it is time to shift the focus towards higher-value segments in the semiconductor industry.

"When you look at the global value-add share, Osat makes up 6%, whereas for fabrication and IC design, the global value-add share is much larger (at 24% and 50% respectively). So, we must shift from a low-cost manufacturing hub to one that focuses on advanced know-how and intellectual property (IP) capabilities," said Zafrul,

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who noted that this is where the National Semiconductor Strategy (NSS), unveiled in May, comes in.

Funding and intensifying linkages

A considerable part of the minister's address was dedicated to the NSS, and many of the participants listened with rapt attention as he outlined the plan's salient features and targets. During the fireside chat with Datuk Ho Kay Tat, publisher and CEO of The Edge Media Group, the minister fielded questions from the floor about the NSS, including the disbursement of the RM25 billion allocated in fiscal support.

While the funds are earmarked for research and development (R&D), incentives and talent development, the minister acknowledged that the amount alone was insufficient to fully drive the industry's growth.

The issue of fiscal incentives to attract FDIs is pertinent as countries around the world race to expand their respective E&E and semiconductor ecosystem.

As Zairil described in his speech, the sector is "very à la mode".

HSBC Malaysia CEO Datuk Omar Siddiq in his welcome note said developing and developed countries have been looking to broaden and deepen their own E&E sectors.

"Malaysia's more than five-decade-old electrical and electronics (E&E) industry, in particular semiconductors, is poised for exponential growth bolstered by early on-shoring efforts and the ongoing US-China trade war, Minister of Investment, Trade and Industry Tengku Datuk Seri Zafrul Abdul Aziz said in his keynote address at *The Edge*-HSBC New Era for E&E Industry Forum 2024.

BY SREEREMA BANOO

For more than 50 years Malaysia has been a global leader in the semiconductor industry, with Penang even being dubbed the Silicon Valley of the East for its excellence in back-end manufacturing. We have home-grown champions here such as Inari Amerton Bhd (KL:INARI), ViTrox Technologies Sdn Bhd, Oppstar Technology Sdn Bhd and Pentamaster Corp Bhd (KL:PENTA) to name a few who have risen to the forefront not just as participants but as leaders in the global semiconductor value chain.

"We want to maintain this trajectory, so we must shift from being a low-cost manufacturing hub to one that focuses on advanced know-how and intellectual property, and by doing so, we can continue to solidify our position as a key player in the semiconductor industry. We want to drive innovation and growth for the next century.

"We have the opportunity. We know what's happening geopolitically — the trade war between the US and China which we know to be a tech war — and companies [are] looking at realigning and redesigning the supply chain and at the security of the supply chain. So, we are in a good spot today, as are our neighbours. This is a once-in-a-generation opportunity, so we need to act now or lose out," he said.

The National Semiconductor Strategy (NSS), unveiled in May this year, reaffirms these aspirations, he says. "We excel in Osat (outsourced semiconductor assembly and test) but it's time for us to shift our focus to higher value segments in the semiconductor industry. When you look at the global value-add share, Osat makes up 6% whereas for fabrication and IC (integrated circuit) design, the global value add share is much larger (at 24% and 50% respectively) so we must shift from a low-cost manufacturing hub to one that focuses on advanced know-how and intellectual property (IP) capabilities. That's why we have the NSS, which has been designed to position Malaysia not only as a leader in assembly and advanced packaging but also in IC design, high-end manufacturing and semiconductor equipment manufacturing."

The government has allocated RM25 billion in fiscal support over the next 10 to 15 years to support initiatives under the NSS, which has been described as a pragmatic but ambitious plan.

Dedicating a considerable chunk of his keynote address to the NSS, Zafrul outlined the salient features of the plan as well as the targets. "Phase 1 focuses on building our foundation, namely on the current strength in Osat, attracting foreign direct investment (FDI), supporting Malaysian creation of IP, especially in design, and capturing emerging opportunities in areas such as electronic design, automation and computer-aided design."

Phase 2, he added, focuses on moving Malaysia to the technological frontier by attracting not only advanced chip manufacturers but building local chip champions capable of competing globally as well as developing home-grown users of power chips in segments such as electric vehicles. The goal in the third and final phase, he said, would be for Malaysia to innovate and develop cutting-edge capabilities in semiconductor design, packaging and manufacturing equipment and attract buyers of advanced chips to pursue advanced manufacturing in the country.

"We want to secure RM500 billion in investments in Phase 1, create 10 Malaysian companies in design and advanced packaging with revenue of at least RM1



In foreign investments, we need to focus on high-tech memory, wafer fabrication, IC design and manufacturing, which are critical sectors where Malaysia can build on our strengths; there will be spillover into the entire ecosystem and we can be a key player in the global semiconductor value chain."

Zafrul

billion and at least 100 high-revenue semiconductor-related companies. We want to establish Malaysia as a global semiconductor R&D (research and development) hub and train 60,000 high-skilled engineers, and we're happy that the Penang government is working closely with us on this," he said.

Critical to Malaysia achieving these aims, he added, are agility and resilience, especially given the shortened technology cycles. Moving to the

frontier phase, for example, will not happen overnight but the country, especially Penang, has the foundations in place to make the shift. "We have built the foundation over the last 50 years, so we focus on specific parts of the value chain where we have a competitive advantage (rather than compete in all the verticals).

"We are committed to investing in this issue and at the same time we want to nurture our talent to be entrepreneurs as well ... if you look at the Malaysian companies that have been successful in this field, they were all from [the] industry itself and had the courage and passion to become entrepreneurs," he said.

Strengthening the country's semiconductor industry is vital, not only to realise the goals set out in the NSS but also for the country to lead the way towards an inclusive tech-driven future for the good of all, including becoming a so-called third force champion to foster technological collaboration.

"We need to strengthen Malaysia's semiconductor ecosystem. In foreign investments, we need to focus on high-tech memory, wafer fabrication, IC design and manufacturing, which are critical sectors where Malaysia can build on our strengths; there will be spillover into the entire ecosystem and we can be a key player in the global semiconductor value chain," he said.

Equally important are the incentives, particularly in ensuring that incentives continue to be competitive and focused on areas such as technology transfer, local supplier growth, talent and IP development.

"On domestic investments, we want to work with MNCs in advanced IC design, equipment manufacturing and materials," he said, adding that the government has also engaged local funds and private equity players who are increasingly focused on the industry. **E**

CONTINUES NEXT PAGE

Grabbing a big share of the growing market

BY SREEREMA BANOO

The Penang government has reiterated its commitment to ensuring that the state's electrical and electronics (E&E) industry continues to grow and develop by ensuring the needs of the industry are met, from the provision of industrial land to the improvements in supporting infrastructure and utilities.

Penang state executive councillor for infrastructure, transport and digital Zairil Khir Johari, in his welcome address at *The Edge*-HSBC New Era for E&E Industry Forum 2024, affirmed the importance of the E&E industry to the state's economy and outlined some of the plans to boost the infrastructure there.

"It's been a very exciting last few years for Penang where we've seen record investments. The RM170 billion in FDI (foreign direct investment) between 2019 and 2023 is a staggering number [representing] more than double the amount of investments of the preceding decade," he said, adding that this has resulted in the generation of some 78,000 jobs, more than half of which are in the E&E industry.

Penang, which has long been known as the Silicon Valley of the East for its E&E industry that stretches back to more than five decades, contributes half of the country's E&E exports and constitutes 6% of the global market share in semiconductors. Notwithstanding some recent market corrections, the E&E industry remains current, he said.

"The global market for semiconductors stands at about US\$540 billion (RM2.3 trillion) and it's only growing, with projections putting the market at US\$1 trillion by 2030. With such a large, growing pie, it is incumbent upon us here in Malaysia, particularly in Penang, to get as big a slice as we can," he added.



LOW YEN YEING / THE EDGE

“It is an exciting time for the industry. There are many challenges that lie ahead, and success will definitely require the cooperation and collaboration of all stakeholders.”

Zairil

Penang, he pointed out, is very well poised to take advantage of what's to come. "We have our comparative advantages — geographical, logistics and, more importantly, because we have managed to cultivate in the more than 50 years a very mature supply chain ecosystem, which means shorter development cycles, shorter learning curve, more cost efficiencies and quicker time to market. All these are important for the industry.

"Penang also encapsulates the entire value chain in the industry, from wafer fabrication to chip design, final assembly and testing, including back-end manufacturing, advanced packaging, Osat (outsourced semiconductor assembly and test) and manufacturing equipment," he said, adding that the state's success has been attributed to the availability of talent with strong work ethic and global experience developed over five decades.

To safeguard the industry's future, the state government has taken steps to see to the provision of adequate infrastructure, supporting infrastructure such as the availability of land, logistics, electricity and water supply, Zairil said.

Tenaga Nasional Bhd's monopoly transmission power project, which is nearing completion, will bolster the island's electricity supply. The 8.5km overhead transmission lines from the Prai Power Station to Penang island will supply a peak of 2,000MW of electricity.

"We are also in the midst of strengthening all of our infrastructure," said Zairil, pointing to the recent memorandum of understanding (MoU) between the state — through Penang Development Corporation — and Tenaga to redevelop the Gelugor Power Station.

"Currently a 300MW gas turbine power plant, we're looking to upgrade [the plant] to an aeroderivative gas turbine and battery energy storage system. So, we're looking at doubling the capacity to 600MW, ensuring not only adequate supply but stable supply to the industry."

In terms of water supply, which he described as experiencing some "hiccups" in the last few years due to the growth in the industry, the state government has committed RM1.18 billion to water supply projects. These include the construction of four new water treatment plants, which will produce an additional 600 million litres of water per day.

"In addition to building new treatment plants to provide potable water supply, we have also an MoU with IWK (Indah Water Konsortium) to look into the reclamation of wastewater for industrial reuse," he said, adding that if successful, this will free up 200 million to 250 million litres of water per day, which will reduce the strain on the domestic water supply. "And industry will also have a dedicated water supply."

In his speech, Zairil also touched on the upcoming 2,800-acre Silicon Island which, among others, boasts an industrial park designed with sustainability in mind. This upcoming development, along with the planned expansion of Penang International Airport as well as a recently launched roadmap to address issues with the talent pipeline, will boost the state's manufacturing sector, and E&E industry in particular.

"It is an exciting time for the industry. There are many challenges that lie ahead, and success will definitely require the cooperation and collaboration of all stakeholders to ensure that we can create lasting and strong growth in the E&E industry for the next few decades to come," he said. **E**

Blueprint to address Penang's STEM talent shortage

FROM PREVIOUS PAGE

The deepening and intensifying of linkages in the supply chain and the role that the government could play was another issue raised, both during the Q&A session with Zafrul as well as by BlueChip VC Sdn Bhd co-founder Datuk Lai Pin Yong in his presentation. The latter pointed out that the sector remains dominated by multinational corporations (MNCs), suggesting a need for policy intervention to help local companies grow.

Small and Medium Enterprises Association (Samedia) Malaysia secretary-general Yeoh Seng Hooi, who posed the question to Zafrul, suggested that "fiscal persuasion" could be used to encourage MNCs to increase local content in their operations. He told *Digital Edge* on the sidelines of the forum that removing the labour spend (salaries) from the local content equation is a start. "If MNCs want to support the growth of linkages, buying more local materials and components from local companies would be a way forward," he said.

Clarion Malaysia managing director T K Tan also reiterated the role of industry in assisting the government, be it in terms of talent building or supply chain development. There are also opportunities for entrepreneurship among those who have put in their time in the in-

dustry, he told *Digital Edge*, echoing the sentiments raised earlier by Zafrul on the importance of nurturing entrepreneurs.

War for talent

For the semiconductor industry to capture US\$1 trillion in market size, addressing the talent shortage is critical. The chip shortages in previous years have laid bare this key structural challenge.

As pointed out by Zafrul, the global tech war that has morphed into a trade war is now becoming a talent war. MSIA's Wong says Europe, for example, requires a workforce of 100,000; China, 400,000; Taiwan, 300,000; South Korea, 100,000; Vietnam, 500,000; and India, 1.2 million. Addressing the issue of talent is crucial if Malaysia is to achieve its aspirations to achieve sustainable growth in the semiconductors as well as move up the value chain.

Despite the challenges in the talent pipeline, Zafrul said, Penang boasts one of the largest concentrations of semiconductor talent globally, with two generations of engineers and technicians. He also commended the state's efforts in tackling the issue, the most recent initiative being the Penang STEM Talent Blueprint, which was launched on the eve of the forum.

The blueprint addresses the need to build a long-term pipeline and skill development for Penang's STEM workforce

in support of the New Industrial Master Plan 2030 (NIMP2030) and the NSS. It was developed by Penang STEM Working Group, which comprises InvestPenang, Penang Institute, Penang Skills Development Centre (PSDC), Motorola Solutions, Pentamaster and Intel.

During the panel discussion, InvestPenang CEO Datuk Loo Lee Lian pointed out that the success of the NSS and NIMP2030 rests largely on the availability of talent.

"Without talent, all of us will struggle to sustain [the sector]," Loo said, adding that research has found that the intake of students in Form Four for pure sciences has dropped from 38% to 18% in the last 10 years.

"So, when the pipeline is already decreasing, let's not talk about these students going into universities."

She adds that the two universities in Penang that offer E&E courses have failed to register 600 students in engineering. "So, this is one of the biggest problems and questions I have from prospective investors — what's the output of engineering students in Penang and Malaysia? I am unable to show the figures; it's too embarrassing and horrifying."

Loo says the STEM Talent Blueprint aims to address the gaps by looking at the problem from primary to tertiary

level. "The solutions on the table today are short-term; they are not holistic and don't look at the entire pipeline."

She adds that the issue requires a whole-of-government approach, with the involvement of the Ministry of Education, Ministry of Higher Education, Ministry of International Trade and Industry, Ministry of Home Affairs, Ministry of Finance and Ministry of Human Resources, to name a few.

Collaborative Research in Engineering, Science and Technology (CREST) CEO Jafri Ibrahim, another panellist, acknowledged the need to do more. Over the last 12 years CREST has, among other things, been working on talent at different stages from the primary and secondary level, including taking students by the busloads to manufacturing plants so they get an idea of what it is like to be an engineer in the semiconductor industry as well as encouraging collaborations between industry and institutions of higher learning at the tertiary level for final-year projects and adjunct lectures.

As HSBC's Omar said at the start of the event, the close partnership between investors and businesses and industry, together with the state and federal governments, is crucial to ensure that the E&E sector can grow sustainably, viably and strongly. **E**



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Can Malaysia keep pace?

BY PATHMA SUBRAMANIAM

The future of the semiconductor market is driven by an insatiable demand for artificial intelligence (AI) chips. In fact, over the next decade, AI is poised to be the key catalyst that will propel semiconductor growth.

"The AI chip market is projected to grow by about 40% through 2032, to reach an annual revenue of US\$1.11 trillion by then. The semiconductor market has returned to growth following a tough 2023, thanks to the AI chip market, which generated almost US\$52 billion in revenue in 2023 or about 10% of the global industry's total revenue," said the Ministry of Investment, Trade and Industry (MITI).

However, the surge in demand has strained manufacturing capabilities, impacting the availability of essential production tools and threatening to derail production targets.

As such, the National Semiconductor Strategy (NSS), which was announced in May, arrives at a crucial moment, and is poised to play a pivotal role in addressing pressing challenges and seizing opportunities in the evolving semiconductor sector.

With five ambitious headline targets and a three-phase rollout planned over the next decade, the NSS aims to serve as a comprehensive road map for advancing Malaysia's electrical and electronics (E&E) industry.

As many global semiconductor giants are still redesigning and securing post-pandemic supply chains, the NSS represents a unique opportunity for Malaysia to leverage its strategic semiconductor diplomacy to further develop and expand the local industry. This effort will also support the New Industrial Master Plan (NIMP) by aiming to increase the industrial sector's contribution to the country's gross domestic product by 61% to RM588 billion by 2030.

"Currently Malaysia is very focused on Osat (outsourced semiconductor assembly and test), which represents only 10% of the global sector's value. We must move to higher value activities such as IC (integrated circuit) design and fabrication, both of which account for 90% of the value. Advanced packaging (higher-value Osat) is also part of our plan," stated the ministry.

To add on, recent major investments such as those by B. Braun, Infineon, Google and Amazon Web Service demonstrate Malaysia's growing appeal. It also serves as a testament that the government is committed to fostering policies that support the growth of the semiconductor industry.

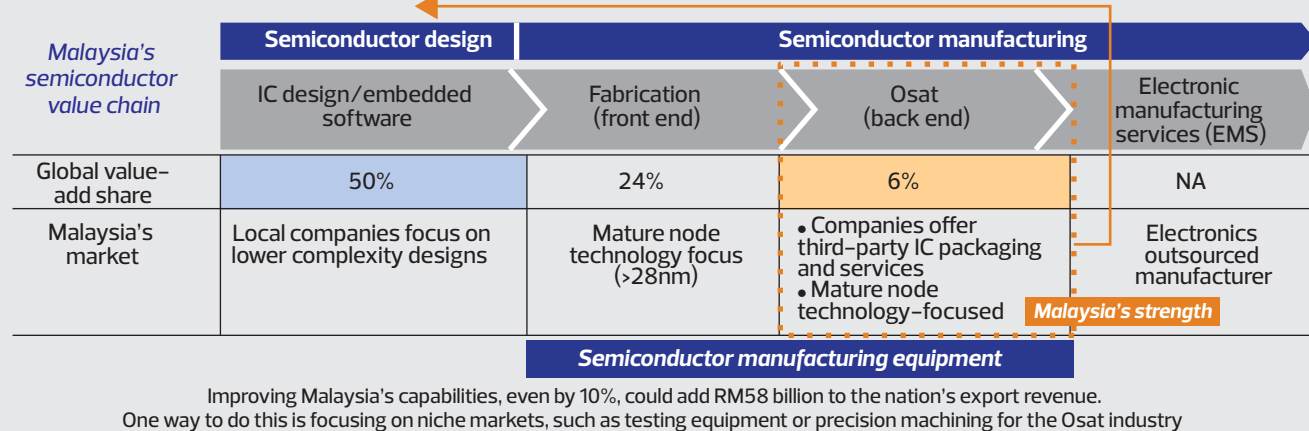
"Malaysia attracted RM329.5 billion in approved investments in 2023, set to create almost 130,000 job opportunities across the nation. From 2021 to 1Q2024, RM162 billion of digital investments were approved by Malaysian Investment Development Authority (MIDA) and Malaysia Digital Economy Corporation (MDEC), alluding to our increasing attraction as a preferred investment destination for investments such as data centres, cloud technology and semiconductors.

"Given Malaysia's consistent policies and steadfast commitment to promoting green mobility and/or technology, we are confident of attracting further investments into Malaysia's semiconductor industry.

"Malaysia's conducive investment climate with pro-business policies and attractive incentives and initiatives promoting

Moving up the semiconductor value chain

Shifting Malaysia's focus from outsourced semiconductor assembly and testing (Osat) to higher-end value chain opportunities such as integrated circuit (IC) design, high-end manufacturing and manufacturing equipment



MITI

green technology such as Low Carbon Mobility Blueprint (LCMB), NIMP 2030, National Energy Policy 2022-2040, National Energy Transition Roadmap (NETR) and the National Agrofood Policy (NAP) 2030. Many investors we have engaged with also value Malaysia's rule of law, one of our strongest points against our regional competitors," shared Miti.

The country also aspires to investments due to supply chain disruptions caused by the US-China geopolitical tensions, which are expected to persist beyond 2024. As such, Southeast Asia and Malaysia are becoming attractive destinations for businesses, especially in the tech sector.

In 2023, the E&E sector, including semiconductors, contributed RM575 billion to Malaysia's exports, but this was only achieved with basic global market involvement.

In fact, Miti said, the greatest value lies in higher-end segments: semiconductor design and embedded software commands a 50% share of global value; fabrication and front-end manufacturing at 24%; and Osat at 6%.

There is potential too in the electronic manufacturing services (EMS) segment. By enhancing our capabilities in IC design and embedded software, focusing on lower complexity designs and attracting investments in mature node tech, Malaysia can significantly boost its export revenue, it added.

Moreover, targeting niche markets for Osat will strengthen the country's position. To advance up the value chain, the ministry said it is working on enticing global semiconductor companies for fabrication facilities as well as boosting local

investments in IC design and equipment manufacturing — a potential addition of RM58 billion to export revenues.

Harnessing home-grown talent

The NSS will not be vague or aspirational either, said the ministry, as clear, quantifiable targets have been established for each of the phases in this strategy. These milestones will serve as benchmarks and allow Miti to track and adjust accordingly.

In fact, many homegrown Malaysian companies such as Inari Amertron Bhd (KL:INARI), Vitrox Corp Bhd (KL:VITROX), Oppstar Bhd (KL:OPPSTAR), SkyChip Sdn Bhd and Pentamaster Corp Bhd (KL:PEN-TA) are already integrated into the global ecosystem and are well-positioned to advance further. Beyond strong support and feedback from industry players, there is also strong fiscal support for the NSS.

"RM25 billion in fiscal support (RM5 billion for Phase 1) may not seem much compared to other countries' allocation, but this is just an initial allocation and it is only for Phase 1. We don't think any particular sector in Malaysia has seen this level of fiscal shot in the arm in between our national budget cycles," said the ministry.

The funding will come from public-private mechanisms, including government allocations for capital grants, tax incentives, a RM100 million Co-Investment Fund (CoSIF) and RM2 billion Syarikat Jaminan Pembiayaan Perniagaan Bhd (SJPP) guarantees. Capital market initiatives like equity crowdfunding, P2P financing and dual-class shares are also part of the plan, along with international and private sector collaboration.

A key focus is on advanced materials and the semiconductor sector under the NIMP, with RM95 billion in total investments by 2030 for industries of the future. This will boost growth in related sectors such as equipment manufacturing, software development and renewable energy. By leveraging Malaysia's critical mineral reserves and honing expertise in higher-end chip design, the country aims to strengthen its position in the global semiconductor market.

"What is key is that with the NSS, the clear policy direction will encourage more companies to expand their R&D (research and development) and enhance their capacity and capabilities to enable them to better serve the bigger MNCs that we are attracting into this sector."

Talent is a crucial factor in achieving the challenging but essential NSS goal of gaining 60,000 engineers. Industry experts

have called for the need for increased investment in high-skill sectors such as technology, R&D and advanced manufacturing.

To meet immediate demands, the government has introduced visa liberalisation plans, including facilitating Employment Pass approvals for strategic investors and offering Long-Term Social Visit Passes for skilled graduates. The Strategic Investor Pass (SIP) will target high-value investors, while the Manufacturing Nomad Pass (MNP) is aimed at highly skilled professionals, making it easier for foreign talent to contribute to the local economy.

The focus is also on enhancing local talent through the reform of technical and vocational education and training (TVET) programmes.

"The National TVET Council (MTVET) will spearhead the reformulation or revamp of certain TVET modules to ensure the curriculum fits the focus areas of the NSS and NIMP.

"Miti has received the support of the Ministry of Human Resources, Malaysian Ministry of Higher Education, TalentCorp and Department of Skills Development and selected industry players for inputs to better develop TVET programmes for critical sectors," explained the ministry.

However, while all these measures are a priority for the NSS' success, the solution may need stronger roots in the classroom — and possibly even at home.

"We must pique students' interest in STEM (science, technology, engineering and mathematics) even from the primary school level, given that Malaysia's tertiary level STEM enrolment has dropped drastically," it said.

It's crucial to rope in parents too, so they understand that STEM and TVET graduates have promising prospects for secure, well-paying jobs.

"TVET must also be destigmatised — it is equally important and not secondary to the academic track. Without this robust talent pipeline, our dream to take advantage of global semiconductor growth will remain a pipe dream. Malaysia has the key success factors to make the NSS work, and Miti is determined to capitalise on this two- or three-year window of opportunity, so time is really of the essence."

Five targets for the National Semiconductor Strategy (NSS)

- RM500 billion in Phase 1 of combined domestic direct investment (focused on Advanced Packaging, IC Design, Manufacturing Equipment) and FDI (focused on Wafer Fabs and Manufacturing Equipment)
- Create 10 Malaysian companies in Design and Advanced Packaging (RM1 billion to US\$1 billion revenue) and 100+ high revenue (RM1 billion or more) companies in Phase 2, who will in turn create higher wages for Malaysian workers
- Become a global semiconductor R&D hub with world-class universities, corporate R&D, and centres of excellence
- Train and upskill 60,000 high-skilled Malaysian engineers
- Allocate at least RM25 billion, for a start, to implement the NSS



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State Executive Councillor
for Infrastructure,
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Group CEO &
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Dato' Seri Wong Siew Hai

President,
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Dato' Loo Lee Lian

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Forging partnerships to power Malaysia's semiconductor future

BY VANESSA GOMES

Launched in May, the National Semiconductor Strategy (NSS) has had time to resonate with industry players, allowing them to provide feedback on its strengths and weaknesses. In a fireside chat with The Edge Media Group publisher and group CEO Datuk Ho Kay Tat, Minister of Investment, Trade and Industry Tengku Datuk Seri Zafrul Abdul Aziz noted that the government has been actively engaging with stakeholders. Despite limited resources, the government is striving to incorporate as much of the feedback into the NSS as possible.

"[The NSS] is a live document, so we can always incorporate new elements that can improve the plan. That's why engagements like today as well as our team on the ground has been meeting industries [for feedback]," he said during the fireside chat titled "The Multiplier Effect" at The Edge-HSBC New Era for E&E Industry Forum 2024.

The NSS also creates awareness among companies, prompting them to plan for the future in tandem with what policymakers want to see in this sector. "We need to give clarity, not just in terms of the roadmap, but also the timeline to support our ambition to be a major hub for the semiconductor sector," Zafrul said.

However, after launching the NSS, he said the government realised that it needed to spend some time addressing the challenges, and it needed a bit more time to find solutions. Some of the challenges include the need for talent and for the industry to be green and to grow sustainably.

"This sector consumes a lot of energy. And going forward, they are mandated by their own stakeholders to meet their sustainability targets, so they do need green power," Zafrul added.

"Thankfully, by September, we will hear the announcement on the availability of third-party access. That means companies can tap the grid to supply green power."

In August, it was reported that the government will introduce the Corporate Renewable Energy Supply Scheme (CRESS) in September to increase corporate entities' access to green electricity.

Through the concept of open grid access, third parties can supply (sell) or obtain (buy) electricity via the grid network system with a predetermined system access charge.

A need for better infrastructure and ecosystem

There are three areas of focus in the semiconductor industry currently — technology, climate change and finally, logistics, which is a particularly important part of the equation as the sector requires the movement of goods at a pace not seen by other industries.

Zafrul said there is an expectation that the government has to spend money to



LOW YEN YEING / THE EDGE

upgrade the infrastructure to become competitive in the sector globally. "We are lucky because we've been in this sector for the last 50 years. So in terms of talent, we can build [on] what we have."

"We're also lucky the infrastructure is there, but perhaps we underestimate the growth. Therefore, we need to catch up and prepare for that."

He added that 80% of the total export of the country is manufacturing and 20% is commodities. Of that 80% exports in the manufacturing sector, half is E&E.

"That's how important infrastructure is in terms of logistics to support the kind of growth that NSS is expecting. So if you assume that kind of growth, you have to make sure that the supporting ecosystem is there to cater towards that growth."

Going up the value chain

For quite a while now, the government and industry players have been lamenting that Malaysia needs to "move up the value chain" in the semiconductor space. This means that the focus is to move away from manufacturing and to focus more on innovation (in the form of E&E engineering) in the semiconductor space.

Malaysia has a strong foundation in Outsourced Semiconductor Assembly and Test (OSAT) integrated circuit (IC) design, which Zafrul said accounts for 13% of back-end operations globally.

Malaysia is slowly becoming a player in the IC design space as well, with states such as Penang, Selangor and Sarawak announcing initiatives and hubs to spur this growth, indicating that the country is in the midst of going up the value chain.

"Wafer fabrication requires high capex (capital expenditure) and high grant support by the government. In fact, in India, the government gives a capital grant of

“We’re also lucky the infrastructure is there, but perhaps we underestimate the growth. Therefore, we need to catch up and prepare for that.”

Zafrul

up to 75% to a company. It's not easy to compete with that kind of fiscal strength and we don't have that fiscal space. So, we have to use other natural competitive advantages that we have to move up the value chain," said Zafrul.

"That's why I think we need a concerted effort where all companies, together with the government, together with the other stakeholders, we need to work as one, a whole of nation approach to move this up the value chain."

Wafer fabrication is one of the most capital-intensive and technology-intensive industries. A 300mm (12in) wafer fabrication factory costs US\$2.5 billion (RM10.7 billion) to US\$3.5 billion, with the cost of equipment approaching 70% to 80% of the factory's capital costs.

A silicon wafer, the substrate for most semiconductor devices, incurs expense through its journey from sand to a sophisticated electronic enabler. Multiple variables dictate the final price of these components, with important cost determinants being processing equipment, wafer size, production volumes, labour costs and technology node. The manu-

facturing process demarcates into various process steps, each incrementing the price through the use of materials, resources and human expertise.

Zafrul also addressed the issue of funding for the semiconductor sector, particularly in relation to the RM25 billion allocated under the NSS. While the funds are earmarked for research and development (R&D), incentives and talent development, the minister said this amount alone is insufficient to fully drive the industry's growth.

"We need to work closely with [other agencies] and it's also why I'm bringing in funds [into this sector]. Many private equity players, pension funds and even government funds are trying to understand this industry because they are not as exposed to this industry as they should be," he said.

"They are more exposed to traditional portfolios because they want stable returns but when you look at the majority of this sector, there are opportunities as well."

He added that the semiconductor industry requires capital at various stages of growth, ranging from mezzanine financing to venture capital and bank loans. A nationwide, collaborative approach will be key to advancing the industry and positioning Malaysia as a global player.

"The NSS is looking at collaboration with all relevant stakeholders to get things off the ground faster."

"It is aggressive, but it is what we actually have in mind. We're also talking to a few companies and trying to work together so that we can develop a global champion too."

Although the strategy is ambitious, he said the government is already in discussions with several companies to foster the development of a globally recognised semiconductor champion.

Keeping out of the tech-war crossfire

Concerns were also raised about the ongoing tech war among countries such as China, Russia and the US, and whether Malaysia will be caught in the middle of it. While Malaysia's neutral stance has been made very clear, Zafrul said Malaysia still needs to be careful when navigating the tech war.

"We are friends to all parties. You can see that even in our multilateral agreements that we signed with other countries, and negotiating today, it covers all."

Some of the partnerships in which Malaysia is part of is the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) the Regional Comprehensive Economic Partnership (RCEP), which includes China, South Korea and Japan; and the Indo-Pacific Economic Framework (IPEF), which is led by the US.

Prime Minister Datuk Seri Anwar Ibrahim also announced that negotiations were resuming on the Malaysia-EU Free Trade Agreement. On top of that, Malaysia has applied to join intergovernmental organisation BRICS.

"The West has raised concerns as well [and asked] why we are joining BRICS. But then again, we are joining everything. We are not just choosing one instead of another," said Zafrul.

"Are we pivoting to any side? No. We want to strengthen Malaysia's position and when we talk to companies, I think what they want to see is that this region continues to be engaging with all, because we want a region that is stable, which will bring peace." **E**



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Foster entrepreneurial spirit to create more local champions

BY PATHMA SUBRAMANIAM

Malaysia's semiconductor sector stands at a critical juncture. While the country is recognised globally for its contributions to the electrical and electronics (E&E) industry, there remains a growing need to foster more local champions.

How can the country harness its existing strengths to create a thriving, entrepreneurial semiconductor ecosystem? Datuk Seri Wong Siew Hai, president of the Malaysia Semiconductor Industry Association (MSIA), believes that the answers lie in a combination of government policy, talent development and fostering a culture of risk-taking and entrepreneurship among industry players.

"We already have some of the brightest minds in the industry, but many are working quietly under the umbrellas of big multinational corporations (MNCs).

"The question is, how do we get these talents to step out and start their own companies? They already have the know-how, but it's about having the courage to take the leap and become entrepreneurs," he said at *The Edge*-HSBC New Era for E&E Industry Forum 2024 held on Sept 9 at the Eastern & Oriental Hotel in Penang.

Titled "Riding the Next Wave", the forum explored Malaysia's ambitions to become a global leader in advanced semiconductor technologies and manufacturing.

Speaking during his session on "Decoding the National Semiconductor Strategy", Wong acknowledged that despite Malaysia hosting major industry players such as Infineon and Intel, the challenge remains in nurturing local talent and transforming them into global champions.

"We need to change the mindset. For Malaysia to become a global hub for integrated circuit (IC) design and advanced packaging, we need to encourage these individuals to take risks," he said.

"Six companies are between RM1 billion and RM3 billion in market cap; five companies are between RM3 billion and RM6 billion; and companies above market capitalisation of RM6 billion are Inari Amertron Bhd (KL:INARI), ViTrox Corp Bhd (KL:VITROX), Malaysian Pacific Industries Bhd (KL:MPI), Greatech Technology Bhd (KL:GREATEC) and Frontken Corp Bhd (KL:FRONTKN).

"We are in a unique position. These companies, the 17 companies we have, have the best chance of growing into global champions."

Wong was referring to locally listed semiconductor companies with a market capitalisation of RM1 billion and above.

Government support

Wong pointed out that unlike in previous iterations of the Malaysia Plan (RMK), the 12th Malaysia Plan (RMK12) highlighted the E&E industry as a standalone high-value sector. "In past RMKs, the E&E industry was grouped under manufacturing. But now, under RMK12, it is singled out as one of the eight strategic high-tech industries.

"This shift is crucial for putting the spotlight on semiconductors and attracting more investments."

Additionally, the National Semiconductor Strategy (NSS) policy has laid out aggressive targets, including attracting RM500 billion in investments in the first phase and developing at least 10 Malaysian semiconductor companies focused on IC design and advanced packaging.

"The question is, how do we get there? These



PICTURES BY LOW YEN YING / THE EDGE

Wong: We need to change the mindset. For Malaysia to become a global hub for integrated circuit (IC) design and advanced packaging, we need to encourage these individuals to take risks.

targets are ambitious. Can we seize the opportunity?" Wong pondered.

He also touched on the broader geopolitical and economic landscape, noting that the global semiconductor supply chain is evolving rapidly due to geopolitical tensions and ongoing supply chain disruptions.

For example, India has set up a US\$10 billion fund to help attract global chipmakers such as Taiwan Semiconductor Manufacturing Co, the leading provider of chips for the likes of Apple Inc and Nvidia Corp.

"We're seeing countries adopt a 'China plus one' or 'US plus one' strategy, and we hope

Malaysia will be that 'plus one'. But we need a strong strategy. We can't just say we have a strong ecosystem and expect companies to come; we need to figure out a winning combination," Wong said.

One of the most significant challenges facing the industry is the war for talent. As countries around the world ramp up their own semiconductor industries, the demand for skilled professionals in science and engineering is skyrocketing.

"Look at the numbers. Europe needs 100,000 engineers, China needs 400,000, and Malaysia is targeting 300,000. But with 15% to 20% of our talent leaving the country and fewer students pursuing science and engineering, we have a major challenge on our hands," Wong said.

Nevertheless, there has been some development on that front, particularly through initiatives like the Akademi Dalam Industri (ADI) programme, which seeks to upskill secondary school leavers and reduce the reliance on foreign workers. After 18 months in training, they will be on the path to becoming qualified manufacturing technicians.

Similarly, initiatives are underway to revamp the technical and vocational education and training (TVET) programmes to focus on the semiconductor industry at universities. But with over 1,000 TVET programmes under different ministries, it is a complex problem to solve.

One proposal is to tap into talent from other countries. "We need to adopt a strategy similar to what the US and other countries are doing — retain foreign students who study here. That's how we can fill the talent gap in the short term while we work on long-term solutions," Wong suggested.

However, he warned that Malaysia must remain cautious in its approach. He stressed creating a conducive environment for MNCs to thrive while also ensuring that local companies benefit from the presence of these industry giants.

"We need to focus on creating a stronger spill-over effect, especially in advanced technology equipment. The recent announcement of the Advanced Technology Equipment Cluster (ATEC), led by Greatech, ViTrox and Pentamaster Corp (KL:PENTA), is a step in the right direction."

The ATEC initiative will enable local companies to support MNCs by enhancing their localisation efforts through the acquisition of locally produced equipment, while simultaneously contributing to a more resilient supply chain.

Technology sector needs paradigm shift

BY PATHMA SUBRAMANIAM

Malaysia's current position in the global technology landscape is promising, but there is an urgent need for a "paradigm shift", especially in the semiconductor industry, said Datuk Seri Lai Pin Yong, founder of BlueChip VC Sdn Bhd.

Speaking at *The Edge*-HSBC New Era for E&E Industry Forum 2024 on Sept 9 at the Eastern & Oriental Hotel in Penang, Lai raised concerns about the limited role local companies play in the technology space. He pointed out that only around 10% of Bursa Malaysia's 995 listed companies are technology-related, with semiconductor companies making up an even smaller fraction.

A "dual track" approach is necessary to ensure sustainable growth in the technology sector. "We cannot continue relying solely on multinational corporations (MNCs) to drive the sector. While MNCs have played a significant role in shaping Malaysia's

semiconductor industry, now is the time to focus on upskilling local talent and encouraging local companies to take the lead," he said in his talk, "Occupying the Sweet Spot".

For more than 50 years, Penang has hosted major players such as Intel, Broadcom and Boston Scientific, solidifying the region's status as a hub for MNCs but local companies remain "insignificant" compared with their multinational counterparts, he pointed out.

"We need a paradigm shift. Half a century of MNC dominance has been beneficial, but it's time to think outside the box.

Malaysia must now focus on developing its own local semiconductor industry, especially in areas like IC (integrated circuit) design and automation," Lai asserted.

To achieve this, he recommended that policymakers and industry leaders' start focussing on attracting foreign investment while upskilling local talent. He also highlighted the benefits of listing companies in Malaysia, noting the local market offers greater flexibility and liquidity compared with Singapore.

"In Singapore, if you're not a billion-dollar company, there's little liquidity. The market is more rigid. In contrast, Malaysia's stock market is more dynamic, making it easier for smaller companies to get listed and grow," he explained.

This is also the reason BlueChip is committed to investing solely in Malaysian companies. "We will not invest in any company that is not listed in Malaysia. The mission is clear — to grow the local semiconductor industry and help Malaysian companies lead the way."

Lai pointed out that Malaysia's strategic position in the technology war, coupled with its neutral political stance, offers an excellent opportunity for the country to formulate a new strategy for the tech industry. "The trade war has disrupted global supply chains, but Malaysia can benefit from this by positioning itself as a neutral player in the technology sector. By fostering local capabilities in IC design and automation, we can attract [foreign] companies that are seeking a stable environment to operate in."

Considering Malaysia's strategic proximity to semiconductor giants, China's Semiconductor Manufacturing International Corporation (SMIC) and Taiwan Semiconductor Manufacturing Company Ltd (TSMC), Lai noted that the country is well-positioned to play a pivotal role in this technological race.

"Automation is another key area where local companies can grow. With AI coming into play, the demand for automation will only increase."

To capitalise on this, Lai is advocating for the creation of more venture capital funds specifically aimed at investing in local IC design hubs. The 85-year-old shared that his vision is to transform these hubs into global players, with the goal of creating three to five unicorns and listing 10 to 15 local technology companies within the next five years.

"This is not just a dream; it's achievable with the right strategy," he said.



Lai: This is not just a dream; it's achievable with the right strategy



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RIDING *the* NEXT WAVE

BY VANESSA GOMES

As Malaysia finds itself in a prime position to capitalise on growth within the semiconductor industry, it is crucial to ensure the sector's development is sustainable. However, funding remains a significant challenge for companies striving to balance expansion with sustainability goals.

Sustainability has become a central focus in the semiconductor industry, especially as many companies export to markets that prioritise strong environmental, social and governance (ESG) practices. As a result, these companies must closely monitor their carbon emissions, not only in their operations but throughout the entire supply chain.

The growing demand for environmentally friendly manufacturing facilities underscores the importance of transitioning to green practices. However, this shift requires substantial funding. Green financing is critical in supporting companies committed to reducing their Scope 1, 2 and 3 emissions.

Another key challenge lies in addressing the talent shortage. The demand for highly skilled professionals, particularly in areas such as integrated circuit (IC) design and green technologies, is far outpacing the supply.

At a recent panel discussion titled “Sustainable Growth and Talent”, industry experts from both the public and private sectors explored ways to tackle these sustainability challenges and emphasised the importance of green financing in driving the semiconductor industry's future and the urgent need to upskill the local workforce to meet the evolving demands of the sector.

The panellists were Collaborative Research in Engineering, Science & Technology (CREST) CEO Jaffri Ibrahim, HSBC Commercial Banking regional head of sustainability in Asia-Pacific Sunil Veetil, IJM Corporation Bhd group CEO and managing director Datuk Lee Chun Fai, InvestPenang CEO Datuk Loo Lee Lian and Malaysia Digital Economy Corporation (MDEC) vice-president for digital industry acceleration Wan Murdani Wan Mohamad.

Electrical and electronics (E&E) and semiconductor companies will need to step up their game in the near term for a myriad of reasons, from upgrading facilities to acquiring high-tech equipment to retraining and upskilling talent. How can banks facilitate the industry's need for funding?

Sunil Veetil (HSBC): We see big growth plans in Penang over the next few years but what would be interesting to see is how much green energy [is needed] to support that growth, because it has to go in tandem.

Globally, the E&E industry contributes 4% of the emissions. It's not much, but the multiples that we're seeing in terms of growth [are] three times of personal devices coming in the next three to four years, imagine the amount of energy that it is going to consume. Emissions are going to increase from the E&E industry.

Just to give you some perspective — one-third of your iPhone emission comes from the semiconductors in the iPhone. It's not even the glasses and aluminium. That's how power and water-intensive this industry is. Obviously the need for investment on green energy becomes even more imperative.

We have the opportunity, as a global

Sustainable financing and infrastructure important for growth

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Panel Discussion: Sustainable Growth & Talent



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Malaysia Digital Economy
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(From left) Moderator Freda Liu with Jaffri, Sunil Veetil, Lee, Loo and Wan Murdani

bank, to work with big semiconductor consumers and semiconductor manufacturers. We have the ability to see what's happening on both sides.

Regulation is coming as well. The European Union (EU) is ahead in terms of regulation with the Chips Act and the regulatory need to disclose emissions for each component, so it's getting very complex now and it's important that companies start understanding the importance of that and start, at least, measuring and disclosing first.

When we work with customers, the first thing we ask is: do you have a transition plan and how robust is it? Is this a board-level commitment and are you serious about it?

Once they have that, how are they going to measure, report and make it transparent to others to realise what the companies are going to do? And based on that and if they then are investing in transition technology, we step in to see how we can help customers in their transition by seeing how we can connect them to investors.

We know it's a balancing act between the demand for high tech and keeping operations sustainable. How does HSBC help companies keep their supply chain clean, especially if it involves exports to countries that take ESG practices a lot more seriously?

Sunil: I wouldn't use the word clean. Clean means that it's dirty today. It's not dirty.

I would say, how do you make your supply chains more sustainable? There are so many players in the semiconductor value chain and it becomes very complex because a lot of it is not in your control. Whatever is in your control — Scope 1 and 2 — can be managed. But managing Scope 3 is more complex.

We work with a lot of small and medium customers and we encourage them to change and invest in sustainable practices. We have separate financing schemes for that, but encouraging them to do it becomes very challenging.

Walmart wanted to manage its emissions and came up with a strategy to reduce one gigaton of carbon from its shelves by 2030, and it worked with us. What we did, apart from creating a financing structure, was to work with a third-party data company to start measuring the various suppliers of Walmart and rank and score them.

Based on the score, we started giving financing, so if the score is very good and the client is very sustainable, we give incentives for that compared with a supplier who has not done it. This really encouraged clients to change and Walmart already achieved its goal and is taking it a step further.

What can we do with start-ups?

Wan Murdani Wan Mohamad (MDEC): One of the main problems is that start-ups do not know the market demand, so it's about how we bring that to the market: what

kind of problem statements and challenges that are out there that are worth it for start-ups to develop and find a solution.

Second, funding is not really an issue because there are funds available out there. It's a matter of whether they match with the mandate because there's no point when you do not have a view of the market. That means you'll be mismatched with the mandate of the venture capitals (VCs). If I'm a VC in this particular tech, then I'm not interested in funding your solution because that's not my mandate.

Based on what we have done over the past three years, we have raised about US\$400 million from about 30 venture capitalists affecting about 500 start-ups. So that shows that there is enough money out there, so long as it is rightly matched to the need and appetite of the investors.

Especially in the regulated sectors where the barriers are quite high, challenges are not easy to resolve because you need guidance from the regulators. The government can play more roles here.

Given IJM's extensive experience in constructing manufacturing facilities, how do you see the role of construction companies evolving in response to the growth of Malaysia's semiconductor industry?

Datuk Lee Chun Fai (IJM): If you look at the speed of things happening in today's semiconductor and E&E industry, it's starting to look on the side of growth. It is not



a question of having the biggest contractor in town to do the job. What's more important is the ability to execute in a timely manner.

Typically, this type of construction takes a very short period of time. When we are used to building office buildings and residential, it's a three-year construction period. For E&E, we're talking about 12 to 18 months.

Therefore, the importance of having technology in construction is very important. We have invested in the industrialised building system (IBS) factory and spent almost RM100 million to build it. This is a conventional construction.

[With IBS,] we can easily reduce [construction] time up to eight times for normal construction within a conventional market. The speed and pace of construction are not by building anything at the site, but manufacturing part of the sections in a factory setting, which ensures that the standard and quality are uniform. Hence, when it is taken to the site, it's all about installation.

Therefore, with the same amount of people, you can increase productivity, reduce construction time and, at the same time, optimise the cost for the customer network.

With increasing demand for sustainable and green infrastructure, how has IJM adapted its practices to meet the ESG criteria, especially for semiconductor and data centre projects?

Lee: Obviously, carbon footprint is very important to these customers. That's why I keep alluding that they are not that sensitive to price — price is important but it is not the most important for them.

Therefore, they are always looking for solutions in the construction [industry], like how to minimise wastage. For example, we do a kind of flooring using our IBS system that reduces the amount of cement and enhances the speed of construction using the BubbleDeck system. That helps the carbon footprint manufacturers achieve green building [status], and with that, it improves the ability to sell the product at the end of the day.

How is InvestPenang working to attract foreign investment to the state and what specific incentives and support mechanisms are being offered?

Datuk Loo Lee Lian (InvestPenang): The state government doesn't give any incentives to foreign direct investments (FDIs). We always say that because the federal government is the one that collects taxes and gives out incentives. In InvestPenang, we support investments on the ground.

Very importantly, we help the state formulate investment strategies. Typically, we scan the globe or the global scene for what is important, what is a trend and how Penang can capitalise on the trend, especially now — for example, the geopolitical supply chain divide. [We also] look at our comparative advantage and which sectors that we can play.

Another scarce resource is our talent. We only have 1.8 million people, so we need to preserve or need to know that whatever strategies that we have in attracting FDIs or promoting local investors have to be done so that we can manage our resources in a very sustainable manner.

In the last three years, we have scanned the environment and identified three areas of growth for Penang: IC design, advanced packaging and equipment manufacturing. And when the National Semiconductor

Strategy (NSS) was announced, we were very happy to see that we are aligned.

We then formulated initiatives to promote this area of focus. For advanced packaging, I think most industry players on the ground will know that we have a few projects that have been implemented. ASE is going through seven times expansion and TF-AMD is also building up its new site in Batu Kawan.

The other initiative that we will be announcing by the end of this month is the Penang Silicon Design @ 5km. This involves an IC design digital park at Bayan Lepas that Penang Chief Minister Chow Kon Yeow announced in May. [There is also] the Penang Chip Design Academy, which is spearheaded by Penang Skills Development Centre (PSDC). We'll also be announcing the incubation space for IC design. Why 5km? Because we are capitalising on shared assets and facilities available within 5km of Bayan Lepas to build an incubation centre for end-to-end IC design.

How can Malaysia attract foreign talent when there is difficulty retaining homegrown talent? How will a rise of wages play a role in navigating the war on talent?

Loo: To me personally, the success of the NSS (National Semiconductor Strategy) largely rests on the availability of talent. Without talent, a lot of us in this room will be struggling with our plans, be it sustaining the current site or even the growth plan.

Just to put things into perspective, we can all talk about not having enough engineers, but we've done the research to show that the intake of students in Form 4 for pure sciences has actually dropped from 38% to 18% in the last 10 years. That is very significant. When the pipeline is already decreasing, let's not talk about these students going into universities.

There are two universities in Penang that offer E&E engineering courses. Penang has the highest demand for E&E engineers, but each of these universities can't even register 600 students in E&E engineering.

One of the biggest problems I have is when investors come to see me and ask about the output of engineering students

in Penang or Malaysia. I can't show the figure because it's too embarrassing and it's horrifying.

The science, technology, engineering and mathematics (STEM) talent blueprint that the state together with some of the industry players have crafted targets to address this by looking at the problem from primary school to the tertiary level. A lot of the solutions that we have provided are not holistic. It's very short term. It doesn't look at the whole pipeline of students. And if you look at education, it is not a two-year or three-year solution. It is actually a whole generation of students that we need to address.

It starts by igniting the interest in science in primary school, invading that life application in secondary school, immersing it in tertiary and embracing STEM education or science interest throughout the career of the talent.

How do we get more people into STEM education and, by extension, interested in technological innovation that can facilitate the semiconductor industry?

Jaffri Ibrahim (CREST): One of the things that we've been doing for the last 12 years is working with talent at different stages. At the primary and secondary level, we've been taking students by the busloads, working with the industry, bringing them into the manufacturing plants and factories and enabling them by showing how it is like to be an engineer or technician in the semiconductor industry.

For the tertiary level, we've been working with them with the industry stepping in, maybe even suggesting the final year projects for the students to be involved in. They also step in as lecturers to give lectures.

At the postgraduate level, we also essentially co-fund R&D in CREST, where we build the capability and eventually at the end of every project that we co-fund, [the students] graduate with a master's or PhD. We've touched about 10,000 people but we need to do more.

At a personal level, I believe we need to create icons out of our leaders. People who have started life in a multinational, and then decided to go out and start their own companies and have successfully

done so. We need to get the parents and government to be involved to promote these icons throughout the country so that at the end of the day, we want the students to say, I want to be like that, I want to do that too.

When you say more work needs to be done in getting them interested in the E&E and STEM sectors, what are you seeing and why are they not going into that space?

Jaffri: We've been working with the Ministry of Higher Education and it sees a decline in the numbers of students wanting to sign up for engineering. And the competitors to this are the likes of influencers, Grab workers and so on. The challenge is it's much easier for somebody who has not even graduated from school to see that there are people who are already earning money from signing up to drive Grab. How do we convince our youths to invest some time in building capabilities so that they can get involved [in the E&E sector]?

Again, we need to basically promote that there is a fantastic career for someone who dares to invest time [in STEM education]. But at the same time, we need to enable youths to get in quicker. There are a couple of schemes already that the government is involved in to make sure that students can do two years [in the classroom] and then two years in the industry. We're also working on things like micro-credentials where people can actually get qualifications so that they can get to the jobs.

In what ways does MDEC support talent development, specifically for the semiconductor industry, and what specific strategies is MDEC employing to address the declining enrolment in STEM education?

Wan Murdani: I think we need to recognise where digital technology falls into the semiconductor industry. We talked about computing power, processing power and capacity, and those are the lifeblood of the semiconductor [industry] and we need to build up that talent.

There are a few things that we have instituted. The first one is in terms of our intervention in the digital workforce. We have a [Digital Expert Network] consisting of all industry practitioners and professionals who advise us on the types of courses that are required by the industry. We have gone through quite a challenging validation process to prove what courses are worth to be listed in our directory.

Once [the courses] are listed in our directory, [the Digital Expert Network] can have access to the fund to make sure that we can reskill and upskill professionals. Talent is the key, including professionals whom we have trained, reskilled and upskilled.

Second is intervention in universities. We have about 15 premier digital tech institutions (PDTIs) recognised as a university that have met the criteria for us to be able to put up our programmes in the universities. If we do not tweak the syllabus by more than 30%, that means it can go without the approval of the Malaysian Qualifications Agency (MQA). So what we need to do is put modules that do not go over 30% of the courses to make sure that they can be taught in the universities.

We train lecturers as well. So far, we have trained more than 1,000 lecturers who can be the change agent for us to be able to teach the courses that have gone through the validation that is required by the university.

PICTURES BY LOW YEN YEING/THE EDGE



Participants from the semiconductor industry gained insights during the Q&A session

THE EDGE — HSBC NEW ERA FOR E&E INDUSTRY FORUM 2024

RIDING *the* NEXT WAVE



Zafrul (right) being ushered into the ballroom by Tong (centre) and Ho (left)



Registration of guests



Datuk Omar Siddiq (HSBC Malaysia), Datuk Seri Wong Siew Hai (MSIA), Kathy Fong (*The Edge*), Penang State Executive Councillor for Infrastructure, Transport and Digital Zairil Khir Johari, Minister of Investment, Trade and Industry Tengku Datuk Seri Zafrul Abdul Aziz, Datuk Ho Kay Tat, Datuk Lee Chun Fai (IJM Corp) and Tan Sri Tong Kooi Ong



Datuk Chong Soon Kheng (Swift Bridge Tech), Goon Koon Yin (TT Vision Holdings), Datuk Seri Wong Siew Hai (MSIA), Datuk Loo Lee Lian (InvestPenang), Karel Doshi (HSBC) and Yong Chan Cheah (YBS International)



Dillon Atma Singh (Semtech Semiconductor) and Andy Goh (JF Technology)



Goh Kheng Sneah (Walta Group) and Yeap Soon Lee (Oppstar)



Datuk K L Bock (SanDisk Storage Malaysia), Tong, Ho, Datuk Lee Chun Fai (IJM Corp), Zafrul, Datuk Omar Siddiq (HSBC), Datuk Seri Wong Siew Hai (MSIA), Datuk Chong Soon Kheng (Swift Bridge Tech) and Amarjit Singh Sandhu (Micron Memory Malaysia)



C K Goh (Asbenz Motors), Ho, E H Chong (Northeast Group) and Sharon Teh (*The Edge*)



Cindy Koh, Lim Chin Lay and Jana Lim from HSBC



Tan Yar Loon (Infinecs Systems) and E H Chong (Northeast Group)



John Lee and Fong Lai Kuan (*The Edge*)



Participants keenly listening to the speaker



Alejandro Rosselli Londoño (Ambassador of Colombia) with Datuk Lee Chun Fai (IJM Corp)



A selfie moment



Patrick Lenhardt and Ruth Foo from AT&S



Datuk Seri Tan Eng Kee (Greatech) and Ho



Exchanging contact information



Steven Siaw (ViTrox Corp) and Liew Jia Teng (The Edge)



A participant asking a question



MSIA's Wong (second from right) with Tan Yam Teck, Christina Cheah and Chan Lai Fen from HSBC



Datuk Dixon Chew (Pensonics Sales & Services), Chuah Choon Bin (Pentamaster) and Raymond Gan (Kelington Group)



Full attention



Mazli Noor (Uzma Group) and Leong Kook Weng (QES Vision Solutions)



Jaffri Ibrahim (CREST) and Dr Chang Chee Jia (SFP Technology)

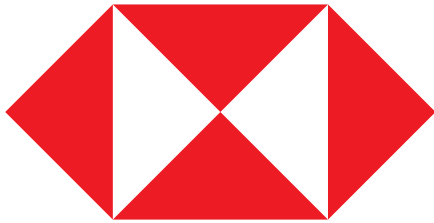


Lim Boon Soo, Yeoh Mei Ing and Yip Hin Kok from SanDisk



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