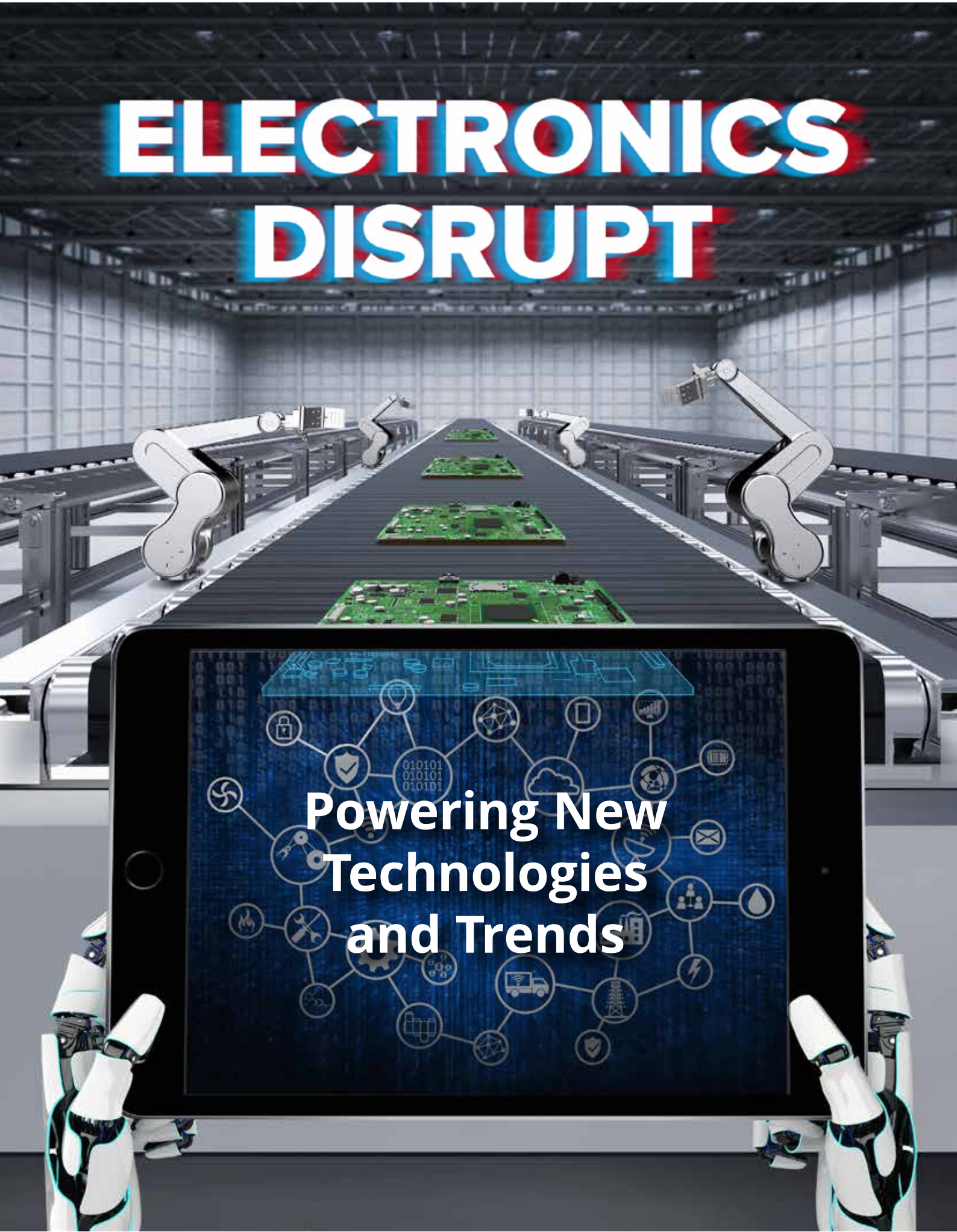

ELECTRONICS
DISRUPT
Powering New
Technologies
and Trends

FOREWORD

The electronics industry's boom has fuelled Asia's growth since the start of the century, with factories in the region churning out powerful new devices and exporting them across more open borders. Today, a new generation of digital technologies are keeping Asia's electronics manufacturers and innovators busy as they work to meet rising demand for their ideas and products.

WHAT'S IN THIS GUIDE?

GETTING WIRED FOR INNOVATION

The emergence of new technologies such as Artificial Intelligence (AI) and Internet of Things (IoT) is expected to fuel the growth of the global electronics sector over the next decade. AI – which is powering applications such as voice and facial recognition, driverless vehicles and robots – will contribute as much as US$15.7 trillion to the world economy by 2030, projects PwC.

Meanwhile, IoT could generate US$4-11 trillion in value globally by 2025, says consultancy McKinsey. These two technologies alone will drive demand for a wide range of electronics hardware. AI solutions, for instance, will require advanced processors that can power its complex algorithms, while IoT devices will stimulate demand for components in the areas of connectivity, memory and sensors. End-use products such as mobile phones and televisions will also need to be upgraded to accommodate new applications derived from these technologies.

Asia's Role In The Electronics Ecosystem

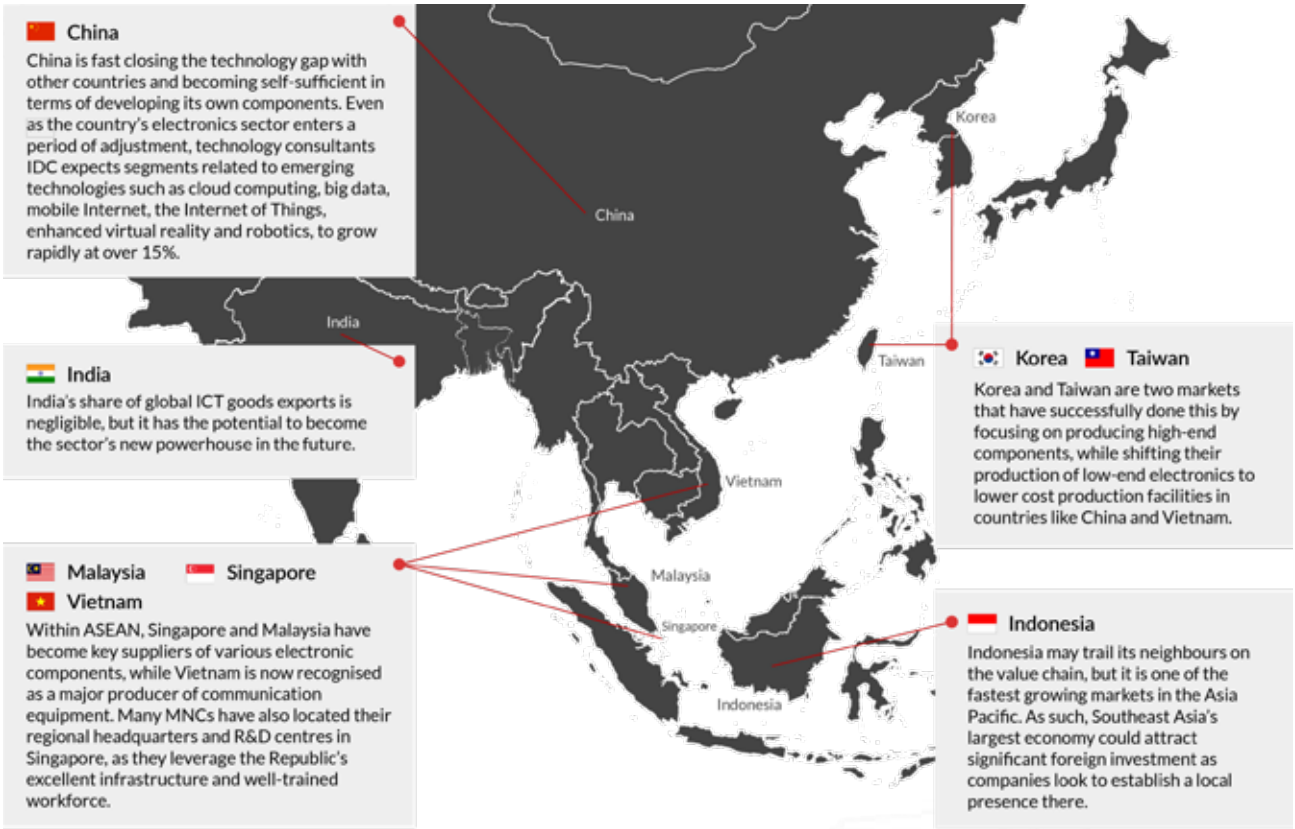
Home to the world's largest electronics manufacturing base, Asia is in a good position to capitalise on the industry's evolving landscape.

The region's companies produce a range of electronic parts and components, as well as electronics end products such as mobile phones, tablets and laptop computers. More of these items are being shipped within Asia, as the share of Information and Communication technologies (ICT) exports shipped to other markets in the region has increased to around 70% today, compared to 50% in 2000.

The key production bases in Asia play different roles in the electronics manufacturing ecosystem. Take the production of Apple's iPhone for instance, which is conducted primarily in Asia. The device's core processors are made in Taiwan, its displays produced in Korea, and the cameras in Japan. The phone is then assembled in China and exported around the globe.

A Race Up The Value Chain

DBS analysts believe that Asian countries that can move up the value chain will gain more from the new wave of innovation sweeping over the sector.



In the following pages, we examine the role that these markets play in the electronics manufacturing ecosystem and the innovation taking place in the industry, as well as the opportunities that SMEs in the region can take advantage of. We also shine the spotlight on "smart factories", and solicit insights from industry veterans to help you navigate a fast-changing landscape.

SINGAPORE

Staying Ahead of the Value Curve

Singapore's electronics sector is well-positioned for continued growth as the Government works to ensure that it stays at the leading edge of the global industry.

The sector began in the 1960s with labour-intensive system assembly of consumer products before transitioning into the production of high-value components, such as RF filters and semiconductor integrated circuits.

Reflecting its importance to the economy, electronics manufacturing contributed 4.4% to Singapore's GDP in 2016, accounting for close to S$90 billion in manufacturing output, and employing about 70,000 workers.

Today, the city-state is an important supplier of various electronic components in the global ecosystem, and accounts for 6% of global ICT goods exports (including re-exports); the biggest share in ASEAN.

Looking ahead, Singapore will continue to transform the industry to attract high value-add activities and capture new growth areas. For instance, it is focused on building "smart factories" that employ a high degree of automation, as it seeks to take advantage of opportunities that emerge from new application areas such as autonomous vehicles, Artificial Intelligence and healthcare. As part of this effort, the Economic Development Board has developed the Singapore Smart Industry Readiness Index, a tool that companies across all industries can use to better understand Industry 4.0 concepts and evaluate the state of their manufacturing facilities.

A Roadmap for Transformation

In 2017, the Government launched the Electronics Industry Transformation Map (ITM), which maps out strategies that will prepare industry players for

future challenges. The plan aims to help the industry achieve a manufacturing value-add of S$22.2 billion and introduce 2,100 new PMET jobs by 2020.

The ITM has adopted a two-pronged strategy to achieve its goals. This involves diversifying into new growth markets, and transforming the existing base of electronics manufacturing to attract new investments in high-value components. It will also focus on growing a strong pipeline of local talent, and upgrading the industry associations to better support the industry.

Companies here are also embracing collaboration as a means to co-innovate and co-develop solutions with their partners. This is part of the government's broader effort to find new growth opportunities by strengthening the innovation ecosystem here.

To this end, the government is bringing together MNCs, SMEs and public agencies – such as government bodies, institutes of higher learning and trade chambers and associations – to develop new solutions.

To support this strategy, the authorities are working to provide future-ready infrastructure to encourage companies to make investment decisions quickly. One recently opened facility, JTC nanoSpace@Tampines, offers a plug-and-play, quick-start space solution that meets the stringent operational requirements of semiconductor manufacturers. The ITM targets for 100% of manufacturing plants in Singapore to be best-in-class compared to their global counterparts.

With its efforts to stay ahead of the value curve, Singapore is an ideal base for electronics firms looking to have access to world-class infrastructure and connect with innovation-driven partners.

Source: Electronics ITM by Ministry of Trade and Industry Singapore

CHINA

Closing the Technology Gap

After years of successfully attracting foreign direct investment, China has emerged as the leading producer of electronics products in Asia. Beyond the foreign manufacturers that set up shop in the country, a handful of Chinese companies –such as mobile phone makers Huawei, Oppo and Xiaomi – have also grown to become giants in the global industry.

In 2015, China was responsible for over 30% of global electronics exports, and around 40% of all exports of mobile phones and computers. Despite the scale of its manufacturing base, the country is seen as a laggard when it comes to developing its own core technologies. It remains a net importer of certain parts and components, including computer chips, semiconductors and precision equipment.

However, the manufacturing powerhouse is not standing still, and has been working to catch up to its rivals on the value chain in recent years. For instance, its sales of integrated circuits have grown by an average of about 20% in the last five years. The share of the higher value-added segments in China's ICT exports has also risen from 28% in 2000 to 55% in 2015, while lower value-added segments has fallen from 66% to 42%.

Faced with an ageing population and rising labour costs, China's electronics makers will continue to move away from low value-added, labour intensive activities and engage more in high-value activities such as R&D and design.

These efforts will be supported by the government's programme to upgrade and transform its industrial sector.

> The "Made in China 2025" initiative aims to develop the country's capabilities in high-tech industries, such as integrated circuits, robots, aviation, marine engineering and energy-efficient cars.

The government is also pumping more funds to support technological R&D.

Meanwhile, China's massive consumer market provides companies with a unique environment to test new business models and apply new technologies. For instance, the country's huge number of internet users, high volume of ecommerce transactions, and high rate of mobile payment generates large volumes of data that businesses can leverage to their advantage.

SMEs with advanced technologies looking to grow their presence in China can benefit from the rapid development of the country's electronics sector and its huge domestic market.

TAIWAN

Leader in Semiconductors

Taiwan is one of the world's key producers of high-end semiconductors and other electronic components. The island accounts for about 12% of global electronic components exports.

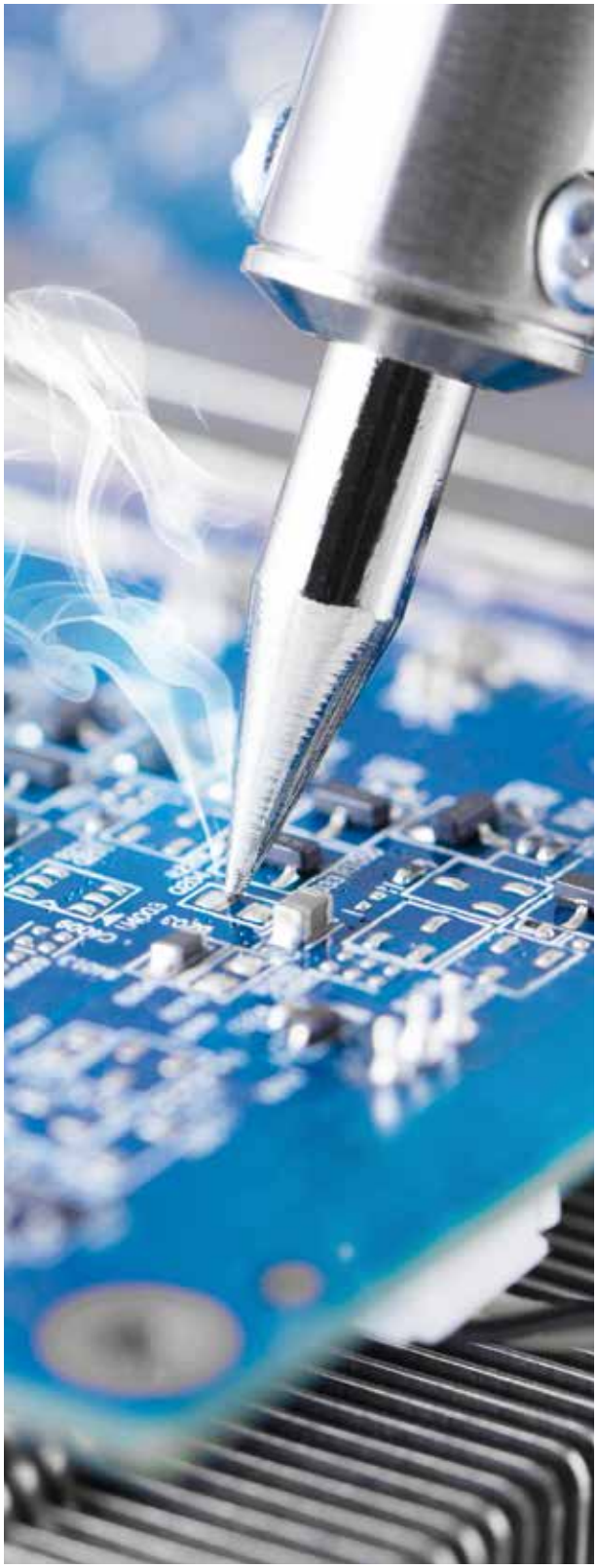
Taiwan's electronics makers had traditionally focused on assembling computers and other devices for multinational corporations. However, partly as a response to rising competition from Mainland Chinese manufacturers, it has moved up the value chain by adopting an innovation-driven model. This involved shifting production of low-end electronics products to countries with lower labour and operating costs such as China and Vietnam, while focusing on the higher value components and parts.

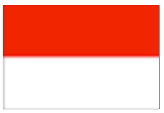
As a result, Taiwan's share of higher value-added products has risen significantly to 82% in 2015, from 47% in 2000; while its lower value-added products have fallen to 11%, from 49% over the same period. The island's semiconductor industry is home to the world's largest base of wafer foundry and Integrated Circuits (IC) packaging and testing.

> The market's leading chip maker, Taiwan Semiconductor Manufacturing Company, is the world's biggest dedicated independent semiconductor foundry.

Looking ahead, Taiwan should benefit from the next wave of technological innovations such as Artificial Intelligence and Internet of Things, which will drive demand for its high-end chips and other components. Furthermore, the economy is able to tap on its superior R&D capabilities and well-trained workforce to further upgrade its electronics sector to meet future demand.

SMEs in the semiconductor segment can leverage Taiwan's established industrial cluster and supply chain – spanning IC design, manufacturing to packaging and testing – to enhance their advantage over competitors in other markets.





INDONESIA

Growing Quickly

Indonesia, which has been running a deficit in total ICT goods trade since 2008, is focused mainly on producing computers and consumer electronics.

On the flip side, the Southeast Asian nation is seen as one of the fastest growing markets in the Asia Pacific, and boasts an electronics manufacturing hub with more than 250 companies. This will likely help the country to draw foreign investment into its electronics industry.

The Indonesian government's requirement for all 4G smartphones to use 30% of local components starting from January 2017 will also attract international firms to set up operations in the country.

> After months of being barred from selling its iPhones in Indonesia, for instance, Apple was able to resume sales last year after it committed to build a US$44 million research and development facility in the country.

As a result of these and other measures to encourage investment, Indonesia's electronics sector is expected to experience growth in the next few years.

INDIA

A Huge Domestic Market

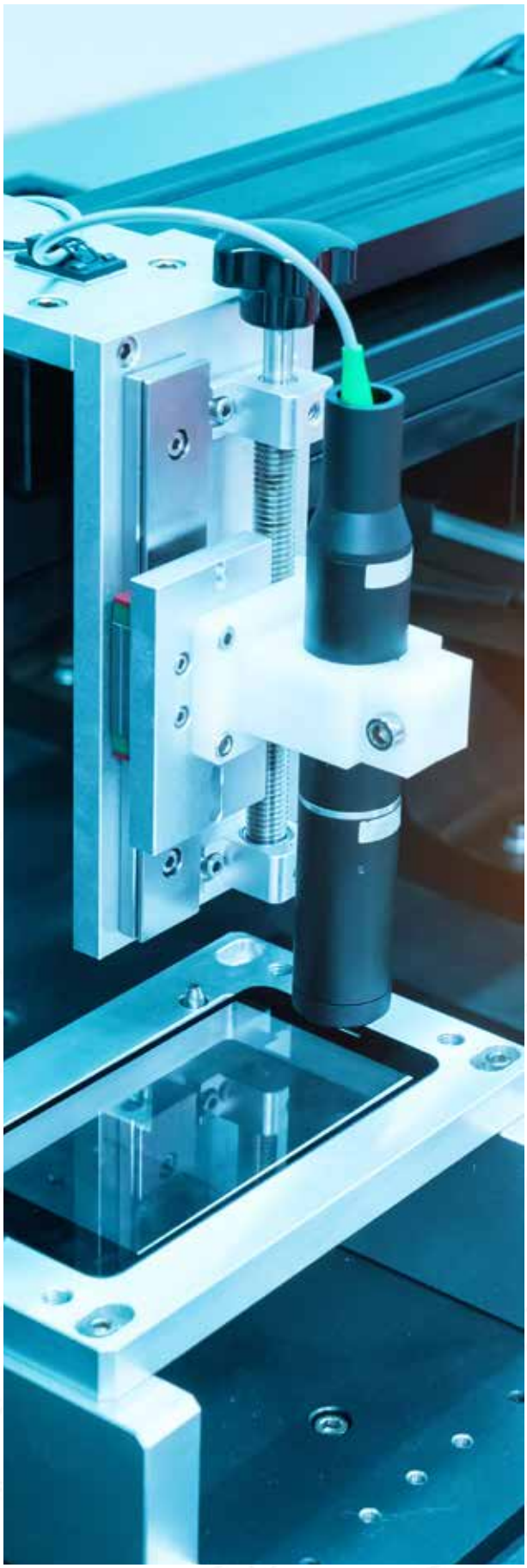
Compared to Indonesia, India lags even further in the global electronics supply chain. The country's share of global ICT goods exports barely registers at less than 1% of the total.

However, the country's huge domestic market and relatively low penetration of mobile phones and Internet usage means that there is a lot of room for its low-end electronics product market to expand.

Furthermore, the government is supporting the growth of the industry with a "Make in India" programme that features tax reforms and the easing of regulations.

For the country to realise its potential to become a new electronics production base in Asia, India has to move up the value chain by not only continuing efforts to attract foreign investment, but also building up its R&D and technology capabilities.

SMEs that want to get in early into markets that have a great deal of potential to grow will do well to consider the Indian and Indonesian markets.



VIETNAM
Rising Export Star

Vietnam is emerging as one of the largest exporters of electronics products.

In 2015, the country's electronics sector was ranked as the 12th largest exporter in the world and the 3rd largest in ASEAN. Exports have continued to grow since then on the back of foreign direct investment (FDI) and was expected to surpass US$70 billion in 2017.

The vast majority of Vietnam's electronics industry is dominated by multinational corporations such as Samsung and Panasonic. In 2015, around US$10 billion of FDI came from such companies. Korea's Samsung has been particularly active in investing in the sector through the building of factories to assemble mobile phones.

Samsung accounts for 4 of the 10 largest manufacturing facilities built in Vietnam since 2003 – collectively the largest investment in the sector by any company – according to the Central Institute of Economic Management, a Vietnamese government agency. This was followed by projects from Intel, LG, Canon, Nokia and Panasonic.

Investments by Samsung and other MNCs have helped Vietnam grow its share of the higher value-added segments in their exports in recent years.

According to Bang Hyun Woo, deputy director general of Samsung Vietnam, Vietnamese companies have moved up the value chain to produce more sophisticated components. Today, there are around 30 Vietnamese firms that supply directly to Samsung. As a result, the localisation rate of Samsung mobile phones reached 57% at the end of 2016.

Looking ahead, the implementation of free trade agreements (FTA), and continued support from the government bodies well for the growth of the electronics industry in Vietnam. This in turn presents a range of opportunities for investors and companies looking to enter the market.

The Vietnamese government also provides corporate income tax breaks for companies working in the high technology sector or in high-tech zones.

BET ALL YOUR CHIPS ON THESE TRENDS

We highlight the major trends affecting the global electronics industry today.

Internet Of Things To Impact Product Development

Internet of Things (IoT) is one of several emerging technologies having a significant impact on the electronics sector. Every connected device that is powered by IoT technology – from wearables and connected cars to smart home devices – all depend on the electronics industry in some form.

McKinsey estimates that IoT could generate US$4-11 trillion in value globally by 2025. Meanwhile, the number of IoT installed devices could rise to 20-30 billion by 2020, up from 6-17 billion today, according to projections from Gartner, IDC and IHS.

This will lead to rising demand for connectivity, memory and sensors, and present growth opportunities to semiconductor companies in Asia. With IoT, consumer electronics companies will also have the ability to connect directly with their customers and garner real-time insights into how and when they use their products.

"This offers the tantalising possibility of completely changing the product lifecycle from the engineering of products, to deploying products, engaging clients and using these insights as input back into product development, in a continuous and virtuous feedback loop," said Jason Jameson, Director, IBM Watson Internet of Things, Asia Pacific@IBM.

Asia Pacific is one of the key growth markets for IoT technology. IDC estimates that the total spend for IoT in Asia Pacific this year will be US$380 Billion, or 49% of the total worldwide revenue.

Artificial Intelligence To Drive Demand

Artificial Intelligence (AI) is another key technology that will drive demand for electronics. According to PwC, AI is estimated to contribute as much as US$15.7 trillion to the world economy by 2030, with China enjoying almost half of these gains.

Today, the key applications for AI include voice and recognition, autonomous vehicles, robots and drones. By 2030, the technology is expected to penetrate a host of areas; from transportation and home service to health care, education and entertainment.

AI will also transform electronics manufacturing by helping to optimise production and supply chains as well as enhance monitoring and quality control functions.

How can electronics firms take advantage of the growth in IoT devices?

With electronic components getting more powerful, and at the same time much cheaper, OEM manufacturers can differentiate their product offerings by introducing IoT-enabled products. These products would be able to directly connect to open standard-based IoT platforms by adding a few more components to their bill of materials, such as a WIFI system-on-a-chip – which itself is available for less than US$1 today.

Such minor hardware changes are the initial step towards a connected product which use IoT-enabled sensors and components to build up more holistic products. The manufacturer itself could also take the next steps to offer an end-to-end connected "smart product". Such a connected smart product, let's say a washing machine, can provide a set of unique benefits to the producer as well as the client.

What benefits can manufacturers derive from producing IoT-enabled products?

The manufacturer can gain end customer usage insights which they would not have had otherwise in a traditional model where the relationship with the end customer has historically been mostly with the retailer. The usage insights will differ per market and could be brought back into the product development process to prioritise enhancements as well as design new value-added services.

For example, IoT sensor readings of a washing machine could be used to make ongoing preventive maintenance predictions, including the exchange of components before they even fail.

What capabilities do manufacturers need to acquire to do this?

Many electronics manufacturers start their IoT journey with in-house projects to adopt Industry 4.0 solutions. This is what IBM calls "cognitive manufacturing".

Instead of building IoT connectivity in all products, the scope is initially focused to connect the existing production facility to an IoT solution and combine cognitive and AI to optimise the production output, reduce the quality issues and ultimately improve the bottom line.

How can electronics manufacturers use AI to improve their processes?

Sensor readings and production pictures could be used with AI solutions (based on deep neural learning) to perform product quality inspection. Currently many such cases are done by manual or semi-manual human inspection. The big benefit of such a cognitive visual inspection solution is not only the higher accuracy of AI-based systems compared to humans, but also a predictable level of accuracy 24 hours a day, 365 days a year.

Compared to earlier visual inspection systems, these cognitive solutions are a self-learning system which is automatically improving with every new inspection, and learning the relevant defect classes and image classifications similar to how a human would learn.

What are some examples of IoT and AI enabled consumer solutions happening today?

The joint engagement of Harman and IBM with Maserati, which was introduced at CES this year, is an excellent example of an AI and IoT-enabled consumer product (in this case a connected Maserati car). An AI personal assistant in the car can anticipate where you are driving and provide personalised suggestions to enhance your trip and ultimately create a far more personalised user experience.

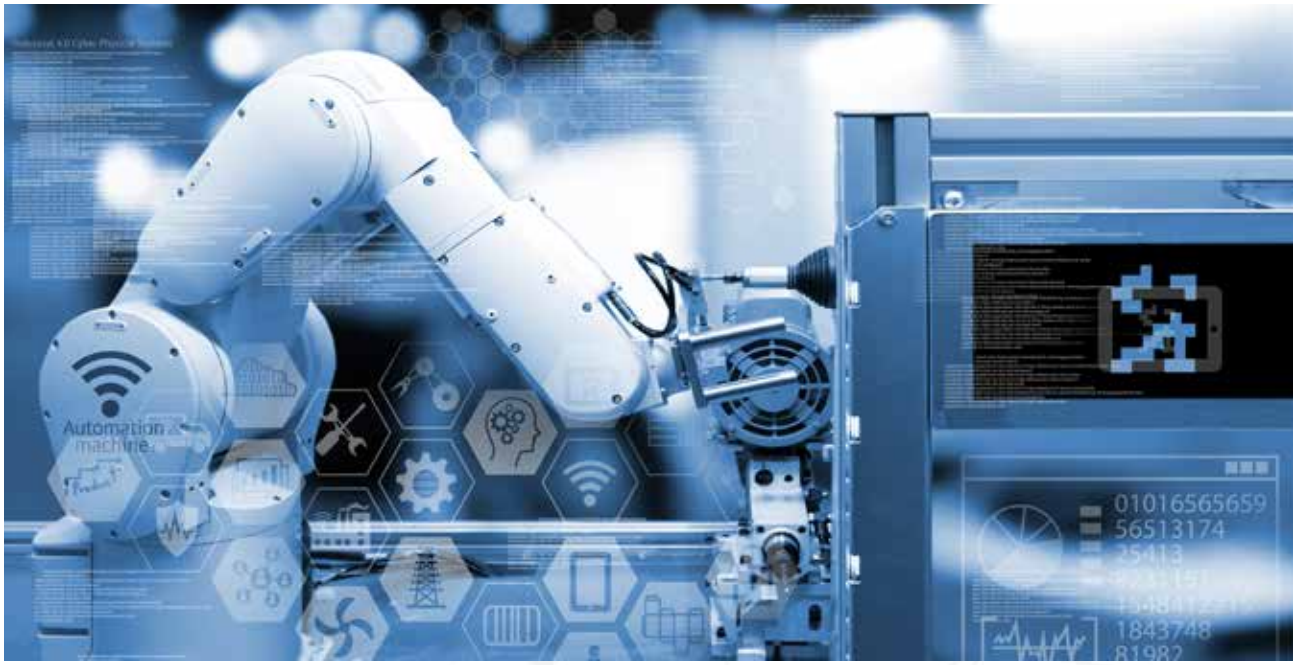
The Rise Of Smart Factories

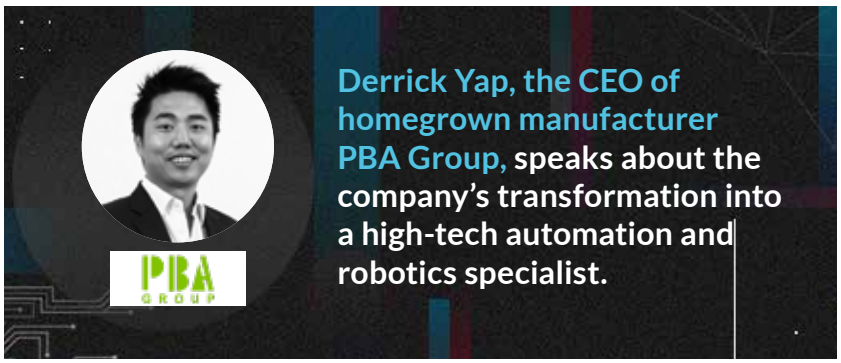
Technologies such as IoT and AI are driving the fourth industrial revolution that is sweeping over the global manufacturing sector today. Dubbed Industry 4.0, this trend involves the development of smart factories that use a high degree of automation to maximise efficiency.

In particular, there are nine technological solutions fuelling next-generation manufacturing. These include autonomous robots, data analytics, augmented reality, additive manufacturing, Industrial IoT, systems integration, simulation, the Cloud and cyber security.

Within the region, Singapore is leading the way in promoting advanced manufacturing. The city-state was recently cited as one of the 25 countries best positioned to benefit from the Industry 4.0 trend, according to a report from the World Economic Forum.

To help accelerate adoption, Singapore's Economic Development Board recently launched a set of guidelines to help manufacturers build smart factories. The Singapore Smart Industry Readiness Index was developed in partnership with German manufacturer TÜV SÜD .





Why did PBA move from being a distributor to developing its own products?

In 1999, PBA started building our own direct drive motors, to have control of the company's direction and longevity. We wanted to invest in intellectual property and not inventory, for a more defensible business model.

We wanted to build our own technologies that were complementary to the products we were distributing. We hence shifted from distributing industrial bearings to automation bearings. Then shifted gear to focus on high-tech automation. With our proven record of agility to adapt to changes, PBA's stakeholders are all very bullish about PBA's future – we've experienced in excess of 30% growth per annum for the past few years.

What were the challenges of implementing the smart factory technologies that you have adopted?

With different permutations of our motors being used in a variety of applications like aerospace and semiconductor equipment, PBA set its sights on smart factory automation to collect essential data from the production floor, and to build a feedback loop that enabled us to drastically improve our processes.

This in-house project challenged us to synergise technologies from PBA's core competencies from various technology groups – including robotics, automation, motion control, mechanical design, and inventory management. First, we needed to redesign our product for manufacturability while maintaining compatibility. Second, our engineers had to be given multi-disciplinary training in robotics, motion control and line automation. Third, we needed to ensure that data collection contributed usefully to productivity, reliability and quality optimisation.

What benefits have you derived from these initiatives?

With the smart factory feedback loop in place, we achieved 50% less material wastage, traceability of parts, accurate on-demand cost of manufacturing based on actual production yield, and consistent quality which in turn increased customer confidence. Crucially, we upskilled the competencies of our production workers to take on line monitoring, robot handling roles, and fault recovery roles. Overall, we are able to produce in Singapore at a competitive price and scale quickly.

How will PBA's recent joint-venture with Hanwha support companies in their efforts to adopt robotics solutions?

We intend for the joint-venture to be a platform for solution providers to develop accessories for global robotic markets. It will allow PBA to tie up with robotic peripheral developers to enhance the experience of customers looking to automate.

Crucially, implementation of robots is made convenient and servicing becomes seamless because we work with the regional system integrators and readily support them to take on jobs they may not have capacity or capability to handle. We also have our academy, RACE (Robotic Automation Centre of Excellence), to coach solution providers and end users, along with our engineers who advise companies on how best to automate.

What is your advice to SMEs who are just starting on their digital journey?

Perseverance and flexibility is key. The industry changes fast and, therefore, speed trumps size. SMEs can expect to fail, but they ought to develop in bite sizes to minimise the cost of failure.

Growing Electronics Trade Within Asia

According to DBS Group Research, Asia is well positioned to benefit from growing demand as it is home to the world's largest electronics manufacturing cluster. Within the region, Singapore, South Korea, and Taiwan are expected to be among the first to benefit from the current wave of technological innovation impacting the electronics sector. This is mainly due to their leading positions in components, as well as strong innovation capabilities, and well-educated workforces.

An increasingly intertwined and complex electronics supply chain also means that more trade in electronics products will take place within Asia itself. This growing trend in intra-regional trade is also being driven by Asia's strengthening consumer power.

What is the broad outlook for the electronics sector in Asia?

Electronics demand is expected to remain buoyant in the next one to two decades, driven by the third wave of technological innovation heralded by rapid progress in AI, IoT and Big Data, among others. We expect global ICT goods exports to maintain a solid growth of 3.6% (CAGR) in 2015-30, compared to 4.7% in 2000-15. Asia's ICT exports growth is expected to continue outpacing the world's during the forecast period.

Which markets in the region will be best positioned to benefit from new technologies such as AI and IoT?

AI and IoT are expected to create diverse demand for electronics hardware, in particular, high-end electronic parts and components like high-power chips, microprocessors, microcontrollers and smart sensors.

Singapore, South Korea, and Taiwan should be among the first to benefit from the new tech wave, thanks to their established position in electronic-component production, strong innovation capabilities, and well-educated human resources.

As the world's largest electronics manufacturing powerhouse, China is also likely to benefit. Its public and private sectors are both making efforts to invest in technology development and move up the value chain. Meanwhile, China's huge consumer market provides a favourable environment for the marketisation of new business models and the application of new technologies.

What is behind the trend on growing intra-regional trade in electronics in Asia?

The rapid expansion of intra-regional trade in electronics reflects the establishment of Asia's intertwined and sophisticated electronics supply chain. There is a well-defined division among the major production bases in the region, including the fabrication of various electronic parts and components, and the assembly, testing, and exports of finished products.

The expansion of intra-regional trade in electronics also reflects the strengthening of Asia's consumer power. Asia is not only the world's largest producer of electronic products but also the largest consumer nowadays, thanks to the persistent rise in per capita incomes and the upgrade in spending patterns.

How will trade tensions between China and U.S., as well as broader trend of protectionism, affect this trend?

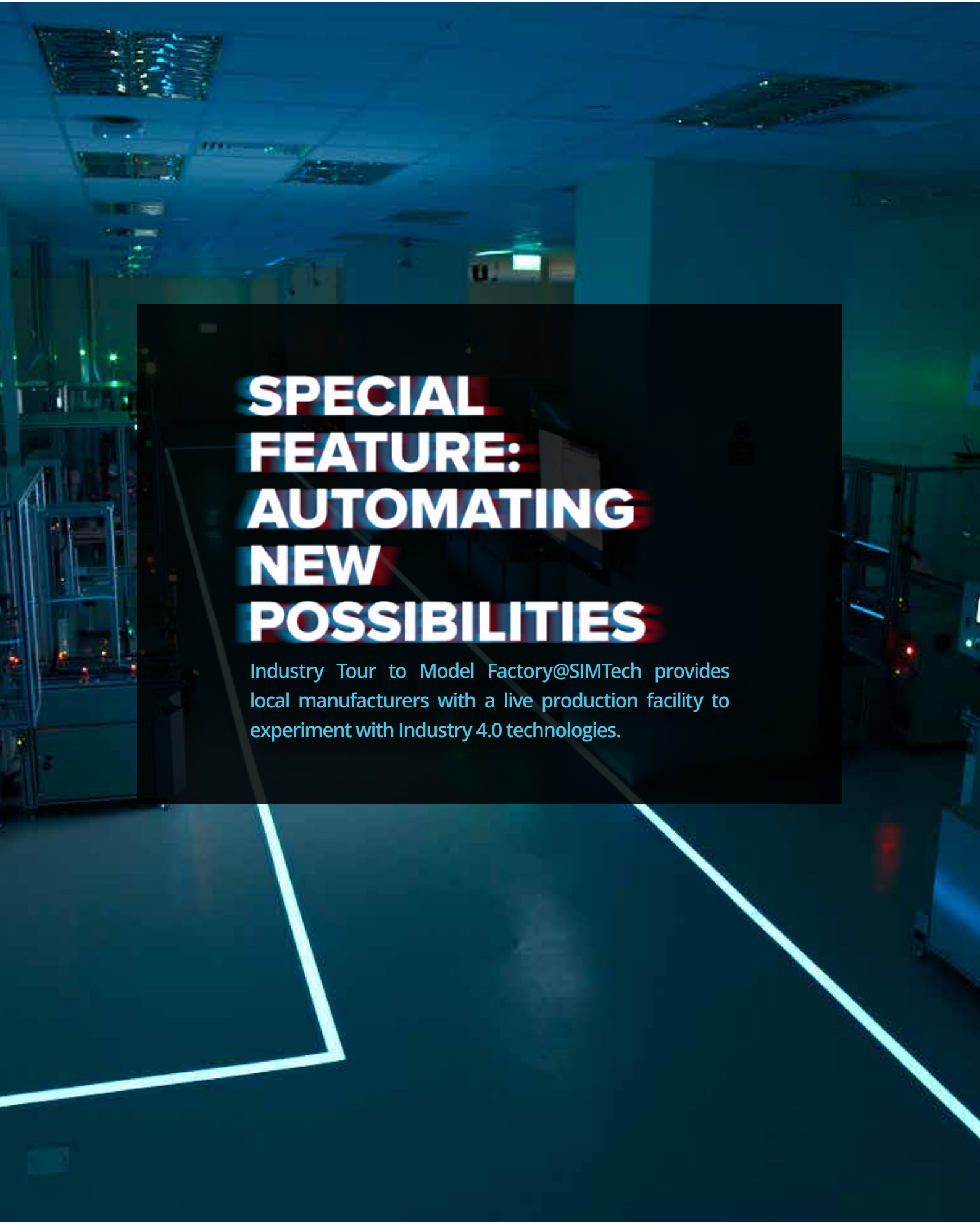
The US's tariff list announced so far mainly focuses on restricting China's exports of advanced technology goods that would benefit from the country's industrial upgrading plans. These measures, if implemented, could result in a diversion in US demand for electronic components from China to Asia's advanced economies like Singapore, South Korea and Taiwan.

If trade protectionism broadens and tariff measures are imposed on a wider range of Chinese electronics exports, the consequence would be serious. This will not only hurt the Chinese electronics producers, but also the foreign firms that have production bases in China and that supply intermediate goods to Chinese counterparts. This carries the risk of disrupting the entire electronics supply chains and dampening global trade flows.

How can SMEs from the region position themselves to benefit from these developments?

The new wave of technological changes requires SMEs to re-orient to new business areas, develop strategic plans for innovation, upgrade labour skills and climb up the value ladder.

Market wise, SMEs in the electronics sector should continue to expand investment within Asia and explore the intra-regional trade opportunities, leveraging the region's evolving supply chains and rising consumer power.



SPECIAL FEATURE: AUTOMATING NEW POSSIBILITIES

Industry Tour to Model Factory@SIMTech provides local manufacturers with a live production facility to experiment with Industry 4.0 technologies.

Seeing is believing, and when it comes to advanced manufacturing solutions, the Singapore Institute of Manufacturing Technology (SIMTech) wants to make sure that Singapore manufacturers have a first-hand look and experience at the possibilities of employing next-generation technologies.

SIMTech, a research institute under government's Agency for Science, Technology and Research (A*STAR), has developed a working factory environment where companies can test out fourth generation, or Industry 4.0, technologies.

Known as the Model Factory@SIMTech, the live production facility provides a platform for companies to learn, experiment and test-bed new digital solutions. It hosts demonstrations and hands-on training for industry visitors to help them better understand how technologies can digitalise a manufacturing operation.

Local SMEs like JEP Precision Engineering and CKE Manufacturing have been front-runners in adopting Industry 4.0. Both companies worked with SIMTech to adopt a system that monitors and gathers real-time data from their machines, which helps to improve the efficiency of their operations.

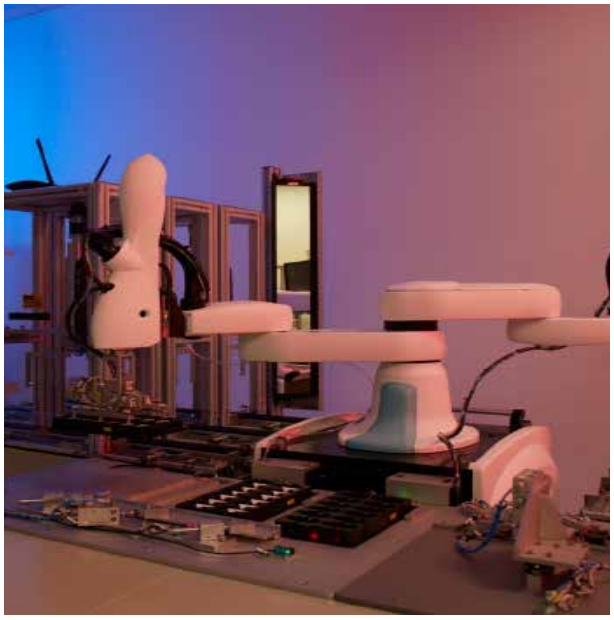
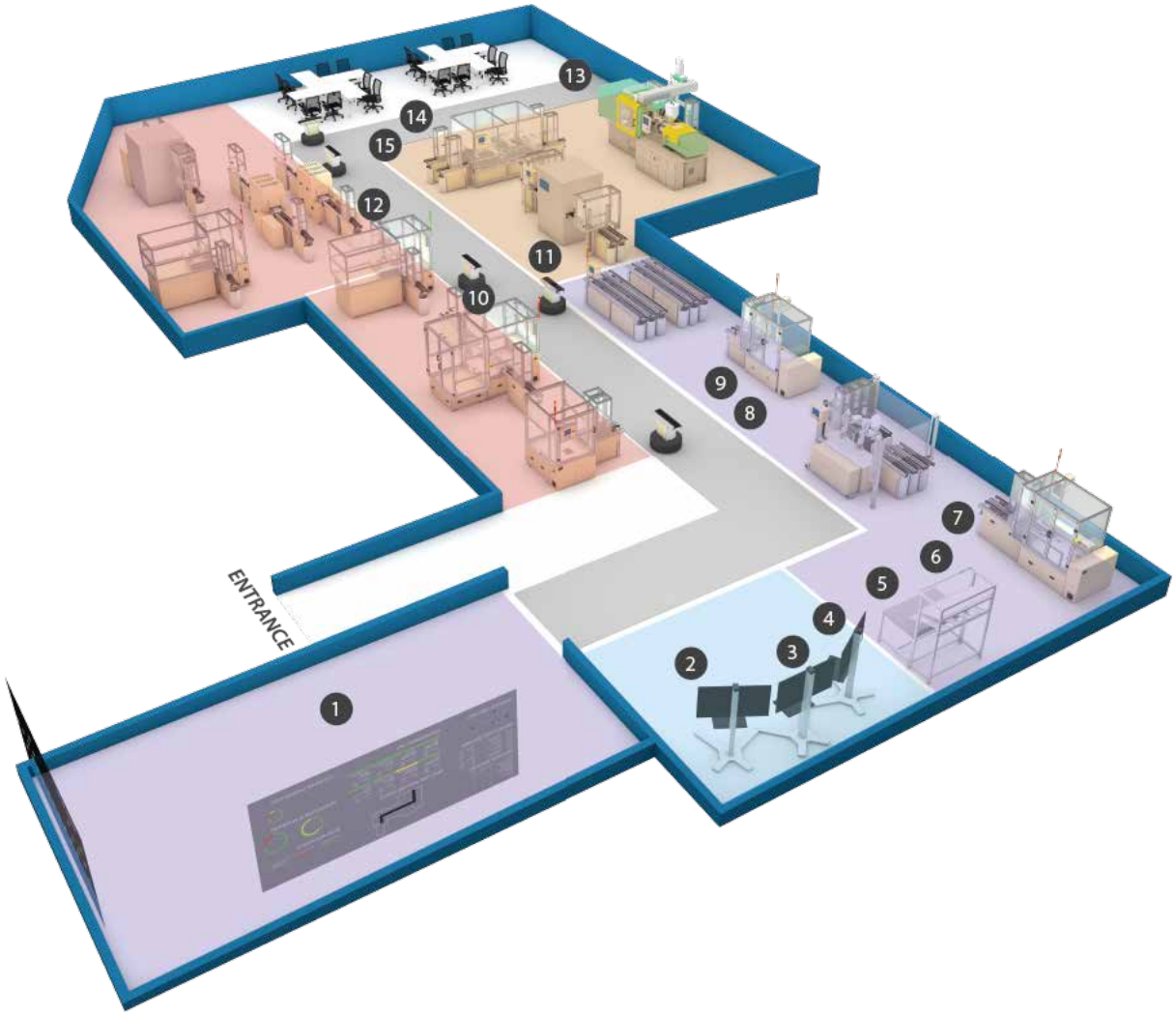


Image Credits: Model Factory@SIMTech

On April 26, DBS BusinessClass brought some 50 SMEs on a tour of the Model Factory@SIMTech as part of the Electronics Disrupt event. The model factory is broken down into the different demonstrator areas below.



Demonstrator Areas

Time Supply Chain & Logistics

2. Last Mile Alllocation & Tracking
3. Real-time Last Mile Logistics
4. Sentiment Analysis

Predictive Enterprise

1. Pervasive Nerve Centre
5. Augmented Lean Packaging
6. Real-time Lean
7. Simplied Inventory Planning
8. Real-time Scheduling
9. Adaptive Manpower Scheduling

Worry-free Shopfloor

10. Real-time Dispatching & Tracking
11. Real-time Last Mile Logistics
12. Predictive Maintenance
13. Real-time OEE Monitoring

Eco-efficient Resource Management

14. Smart Waste Management
15. Smart Energy Management

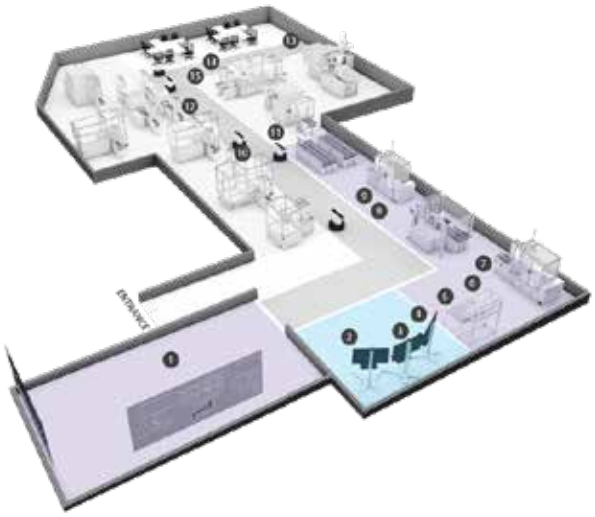
Demonstrator Areas

2 Last Mile Alllocation & Tracking
3 Real-time Last Mile Logistics
4 Sentiment Analysis

1 Pervasive Nerve Centre
5 Augmented Lean Packaging
6 Real-time Lean
7 Simplied Inventory Planning
8 Real-time Scheduling
9 Adaptive Manpower Scheduling

10 Real-time Dispatching & Tracking
11 Real-time Last Mile Logistics
12 Predictive Maintenance
13 Real-time OEE Monitoring

14 Smart Waste Management
15 Smart Energy Management



Timely Supply Chain & Logistics

These technologies feature the ability to respond to customers' needs quickly - from customer order to delivery - through a connected environment.

2 Last Mile Allocation and Tracking

A showcase of solutions that optimise the allocation of customised orders in a multi-site production environment, as well as enable the tracking of orders at every stage.

3 Real-time Last Mile Logistics

A solution known as a Vehicle Routing Programme optimisation engine that is able to handle unplanned events to ensure timely delivery is on show here.

4 Sentiment Analysis

This area features a data-driven approach for gathering and analysing feedback and responses leading to operational insights such as more accurate production forecasts.

Predictive Enterprise

This area demonstrates command and control capabilities to enable total visibility on the shop floor.

1 Pervasive Nerve Centre

The manufacturing 'control tower' acts as the command and control centre of the factory, providing total visibility and "what-if" analyses through a comprehensive virtual monitoring system.

5 Augmented Lean Packaging

A showcase of correct and timely packaging processes through the use of cost-effective visual augmentation.

6 Real-time Lean

The power of connectivity to expedite the processing of tedious tasks through lean implementation is featured here.

7 Simplified Inventory Planning

This demonstration features an inventory monitoring and planning system made simple through intuitive visualisation and powerful backend algorithms.

8 Real-time Scheduling

This digital solution enables new and adjusted orders to be seamlessly stitched into existing schedules in real-time.

9 Adaptive Manpower Scheduling

Showcases an integrated cyber-physical scheduler that adapts to real-time changes while ensuring the best manpower deployment.

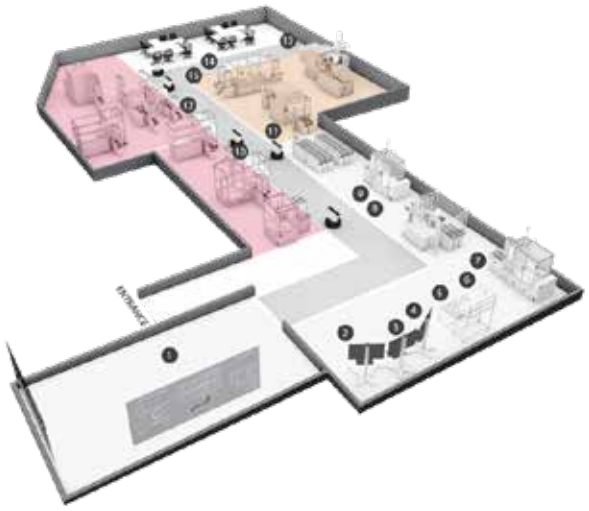
Demonstrator Areas

2 Last Mile Alllocation & Tracking
3 Real-time Last Mile Logistics
4 Sentiment Analysis

1 Pervasive Nerve Centre
5 Augmented Lean Packaging
6 Real-time Lean
7 Simplied Inventory Planning
8 Real-time Scheduling
9 Adaptive Manpower Scheduling

10 Real-time Dispatching & Tracking
11 Real-time Last Mile Logistics
12 Predictive Maintenance
13 Real-time OEE Monitoring

14 Smart Waste Management
15 Smart Energy Management



Worry-free Shopfloor

Connected technologies that reduce non-productive "firefighting" activities are the key theme of the shopfloor area.

10 Real-time Dispatching and Tracking

This capability offers the ability to obtain total visibility of all manufacturing operations on the shopfloor.

11 In-situ Quality Management

A showcase of in-process quality monitoring for both measured and predicted quality to ensure timely intervention, as well as reduce rejects and rework.

12 Predictive Maintenance

This area features real-time condition monitoring of equipment with predicted downtime and root cause analysis.

13 Real-time Overall Equipment Effectiveness (OEE) Monitoring

Organisations can get visibility of their machine's operating conditions in real-time with this automated monitoring solution.

Eco-Efficient Resource Management

The use of sustainable manufacturing technologies in a connected factory is highlighted in this area of the factory.

14 Smart Waste Management

A cost-effective real-time waste management tool that integrates both waste producers and collectors is on show here.

15 Smart Energy Management

Features a data-driven approach that enables real-time insights on the energy efficiency level of production and identifies areas to reduce energy wastages.

POWER-PACKED INPUT FROM THE EXPERTS

We pick the brains of senior executives and industry veterans to get their insights into the big issues affecting the electronics sector.

CREATE A VISION FOR TECHNOLOGY ADOPTION

Neo Teck Guan, Director, Strategy Marketing Department, Huawei South Pacific Region

SMEs should start embracing technologies by first creating a company's "Modernisation Vision". This vision will set the right direction for the employees to understand, learn and explore how new technologies can help them improve their productivity at work. Regular technology sharing programmes will also help employees to be aware of next generation technologies in the automation.

To enforce on the Modernisation Vision, a small digital transformation team can be setup to drive initiatives that can foster an innovative culture within the organisation. The focus of these initiatives can be as simple as how new ICT technologies such as IoT and AI can be applied to improve work efficiencies, how video analytics can be utilised to improve security and how big data analytics can be used to generate better business insights to improve business decisions.

EMBRACE NEW TECHNOLOGY QUICKLY

Mark Jansen, PwC Data Analytics, Technology, Media and Telecommunications Industry Leader & Partner, Singapore and SEA

SMEs in the electronics sector need to rapidly adopt and embrace new technologies to enable greater productivity via automation, predictive maintenance to reduce costs, enhance supply chain management and ultimately develop new products.

Consumer electronics specifically is expected to have one of the highest impacts from IoT, and results in a doubling of revenue over the next 3 to 5 years. Already, understanding and integrating AI into IoT networks is becoming a prerequisite for success in today's IoT-based digital ecosystems. So businesses must move rapidly to identify how they'll drive value from combining AI and IoT – or face having to play catch-up in years to come.

USE NEW SOLUTIONS TO ENHANCE EXISTING ONES

Timothy Tan, Head, Enterprise Business IT & Mobile, Samsung Electronics

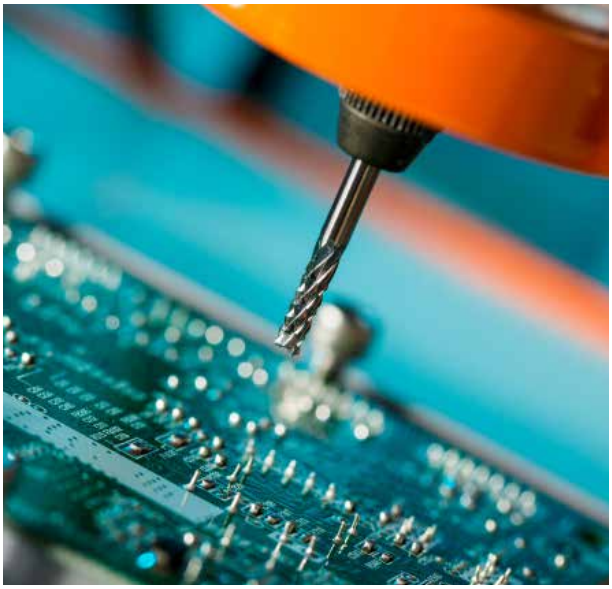
IoT, AI and automation are fast becoming buzzwords in the technology solutions of today. Companies are told that they should be adopting these technologies for the betterment of their businesses. Now is the time for SMEs to take a serious look at these technologies and understand the implication of each for their industry.

For example, solutions like AI can be used to enhance existing solutions already adopted by industries. An AI solution added to a traditional Data Processing or Customer Relationship Management system allows the adopting company access to deeper customer or production insights than what is available in traditional business intelligence reports. By understanding and embracing new and emerging technologies, SMEs can fully leverage them to yield maximum business benefits.

GRAB OPPORTUNITIES FROM NEW TECHNOLOGY

Steven Koh, Executive Director, Singapore Precision Engineering and Technology Association

Some of the key trends driving the electronics sector include disruptive technology such as smart devices, demand for greater productivity and different skillsets, globalisation, as well as the need for collaboration.

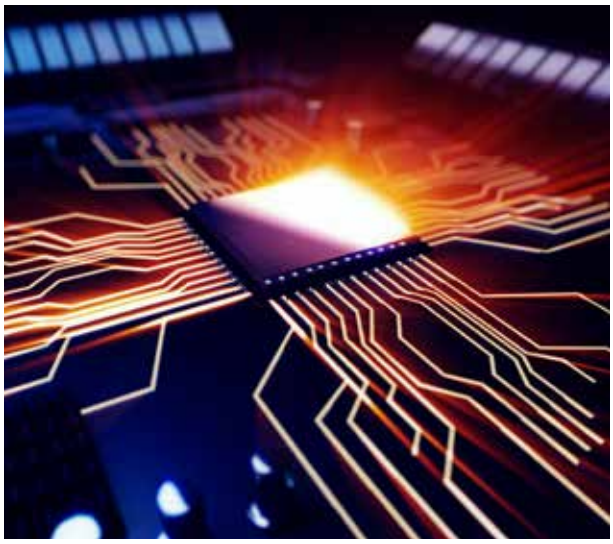


These trends present both challenges and opportunities for the precision engineering industry. The need to adopt new technology, control costs and skill up work forces continues to be a priority for manufacturers. The new technologies entering the landscape provide new revenue opportunities through the development of new products. This is especially true of smart products, which drive demand for system integrators, robotics and automation providers, as well as new. As such, there is huge potential and opportunity for those who can ride the wave.

SEEK OUT PARTNERSHIPS FOR MUTUAL BENEFIT

C.K. Tan, President, Singapore Semiconductor Industry Association

A common problem we see within the semiconductor industry is that solution providers of new technologies often do not have well positioned products that suit smaller scale manufacturers. This can result in problems such as difficulties in adapting the technology due to prohibitive costs and implementation constraints.



It is therefore essential for solution enablers to compartmentalise their suites of products into more 'digestible' portions for SMEs. One possible solution is for SMEs to collaborate to take advantage of rapid developments in the fields of IoT and AI by seeking out mutually beneficial opportunities.

INVEST IN WORKFORCE COMPETENCY

Jackie Tan, Senior Consultant, Digital Service, TÜV SÜD

Industrie 4.0 is the digital transformation of manufacturing, leveraging on data and the convergence of IT (Information Technology) and OT (Operational Technology) to realise connected factories in the information-driven cyber-physical environment. One of the biggest discussions in companies are the types of new skillsets and technologies that the labour force will need to be equipped with.

Often, companies tend to focus excessively on automating production shop floor and under-invest in equally important areas such as process design and workforce competency. It is paramount for companies to gain a common, company specific understanding of Industrie 4.0 concepts and to consider all aspects. Firstly, processes must be designed carefully given the requirements, integrated with relevant technology and continuously enhancing workforce skillsets in order to have a substantial impact in quality, productivity, speed and flexibility.

DEVELOPING A FUTURE-READY WORKFORCE

Mr Azzli Jamain, Director, Industry Development Division (Manufacturing), SkillsFuture Singapore

SkillsFuture Singapore (SSG) works with the Institutes of Higher Learning (IHLs) and quality providers to design and deliver training solutions in emerging areas such as advanced manufacturing, data analytics, and tech-enabled services under the SkillsFuture Series, to enable companies to embark on smart manufacturing.

We also partner trade associations such as the Singapore Manufacturing Federation (SMF) and Singapore Precision Engineering and Technology Association (SPETA) to reach out to SMEs to reskill and upskill their employees to be competitive and prepare them for change.

To lower training cost outlay, SSG provides up to 90% course fee subsidy for SMEs. We hope to see more SMEs join us in developing our future-ready workforce.


PRECISION SUPPORT
FOR YOUR BUSINESS

I / Networking Platform

DBS BusinessClass

DBS BusinessClass is a platform for SME owners to connect with established businesses and experts from their respective industries. This engagement platform gives entrepreneurs access to a wealth of expertise and business insights at their fingertips. In addition to the market trends and insights, DBS BusinessClass also organises different events such as The SME Academy – quarterly foundational workshops to help SMEs on their journey of growth.

Join now at go.dbs.com/bcsubscribe

II / Capability Development

The Productivity Solutions Grant (PSG)

The PSG from Enterprise Singapore (ESG) supports the adoption by SMEs of pre-approved solutions to improve their productivity. The grant will see ESG providing up to 70% funding support.

III / DBS SME Financing Solutions

DBS offers a range of financing solutions for manufacturing firms that are complementary to government funding.

i) Equipment Financing

DBS Bank's Equipment Financing solutions allow companies to gain access to an extensive range of equipment and commercial vehicles immediately with a small capital outlay. Applicants can finance up to 90% of their equipment cost at competitive interest rates.

go.dbs.com/equipmentfinancing

ii) Equity Financing

DBS can help businesses from a wide range of industries raise funds from global equity capital markets through a stock exchange listing.

go.dbs.com/equityfinancing

iii) Commercial Property Loan

Electronics firms can leverage their commercial property to get financing for the development of their manufacturing facilities. Under the DBS Business Property Loan, applicants can get a loan of up to 120% of their property's value.

go.dbs.com/CPL

IV / Overseas Expansion

The Market Readiness Assistance (MRA)

The MRA scheme helps companies to defray the costs of foraying into new markets, including the cost of setting up in overseas markets and promotion. Offered by ESG, the MRA supports up to 70% of eligible costs.

Internationalisation Finance Scheme (IFS)

Companies can borrow up to S$30 million to finance their expansion into the region and tap into growth markets under the IFS scheme offered by DBS and facilitated by ESG.

V / Simplifying Business Processes

Enterprise Development Grant (EDG)

SPRING Singapore's Capability Development Grant and International Enterprise Singapore's Global Company Partnership scheme will be consolidated into the EDG in Q4 2018. The grant from ESG will give companies the flexibility to bundle internal upgrading activities, domestic projects and international expansion plans in one application.

The Business Grants Portal (BGP)

This portal will make it simpler for business to learn about assistance schemes and transact with Government. Companies only need to fill in project information on BGP's online forms, and the relevant agency will process the application.

VI / Industry Assistance

Association of Electronics Industries in Singapore (AEIS)

The AEIS helps Singapore-based electronics firms by promoting local businesses abroad, as well as through the sharing of technical information and the development of technology.

www.aeis.org.sg

Singapore Industrial Automation Association (SIAA)

SIAA assists companies and professionals in the Automation, Internet-of-Things and Robotics sectors through initiatives such as trade collaborations and study missions.

www.siaa.org

Singapore Precision Engineering and Technology Association (SPETA)

SPETA supports precision engineering firms' efforts to improve their competitiveness through technology upgrading, educational efforts and productivity enhancement.

https://speta.org

SkillsFuture Singapore (SSG)

SSG drives and coordinates the implementation of the national SkillsFuture movement to promote a culture of lifelong learning and the pursuit of skills mastery. Among a holistic system of national SkillsFuture initiatives is the SkillsFuture Series, which is a series of short, industry-relevant programmes focusing on emerging skills areas such as data analytics, advanced manufacturing and tech-enabled services.

www.ssg.gov.sg/emergingskills

The Singapore Semiconductor Association (SSIA)

Singapore Semiconductor Industry Association (SSIA) has more than 160 members today including companies and organisations throughout all parts of the complex and comprehensive value chain – integrated circuit design companies, Manufacturers, Fabless companies, Equipment suppliers, Photovoltaic companies, EDA and material suppliers, Training and service providers, IP companies, research institutes and Academia, as well as individual members. Since 2013, SME membership has grown exponentially and SMEs now account for close to half of SSIA's membership.

www.ssia.org.sg

Workforce Singapore (WSG)

WSG promotes the development, competitiveness, inclusiveness, and employability of all levels of the workforce. The Government agency also helps enterprises to be competitive, manpower-lean and strengthen their Singaporean core.

www.wsg.gov.sg

Join
DBS BusinessClass

and grow your business network, and connect with Asia's brightest business minds!

go.dbs.com/bcsubscribe

CONNECT
Connect with over 70,000 entrepreneurs and business experts in the region.

CONSULT
Gain valuable insights, guidance and advice from our 45 advisors.

NETWORK
Get invited to exclusive events with industry leaders and disruptors from all over the world.

TRENDS
Access the latest trends, market movers and economic insights in Asia.