SINGAPORE
SEMICONDUCTOR VOICE
Volume 5
T05SS0291A

BUILDING A SUSTAINABLE TALENT PIPELINE

ELECTRONICS INDUSTRY DAY 2019

CREATING AN EMPLOYEE-DRIVEN LEARNING CULTURE

SMEs PLAY A CRUCIAL ROLE IN ATTRACTING TALENTS

SEMICONDUCTOR TRADEWINDS SEP & OCT 2019

SSIA
Singapore Semiconductor Industry Association

SSIA EVENTS CALENDAR 2020

JANUARY
- *SSIA HR Roundtable
- *SSIA Environment, Health and Safety Workgroup

FEBRUARY
- *SSIA HR Conference
- SSLA Alumni Meet

MARCH
- Semiconductor Week
  - Semiconductor Women Forum
  - Manufacturing Career Fair
  - Semiconductor Tech Forum
  - *Water and Energy Savings Workshop
- Singapore Semiconductor Leadership Accelerator (Module 1)

APRIL
- Silicon Classic 2020
- Export Control Workshop

MAY
- Singapore Semiconductor Leadership Accelerator (Module 2)
- SSIA Automation Supplier Day

**Tentative events and may subject to changes*

JULY
- *SSIA HR Symposium
- *SSIA HR Roundtable
- *SSIA Environment, Health and Safety Workgroup
- SSIA Semiconductor Industry Meet

AUGUST
- *SSIA HR Conference
- *SSIA Young Leadership Programme

SEPTEMBER
- SSIA Summit & Semiconductor Dinner 2020

OCTOBER
- Industrial Transformation ASIA-Pacific (ITAP) 2020

NOVEMBER
- SSIA Annual General Meeting
- Electronics Industry Day 2020

Please contact us at **secretariat@ssia.org.sg** if you would like to be a **sponsor of SSIA events!**

For updates, please visit **www.ssia.org.sg/upcoming-ssia-events/** or **scan QR code**

FOREWORD BY EXECUTIVE DIRECTOR

"Coming together is the beginning. Keeping together is progress. Working together is success."
— Henry Ford

We finally reached the one-year mark since SSIA has started its major transformation. We have fulfilled all 3 commitments for the transformation; restructure SSIA Board, expand SSIA Secretariat and to drive the Electronics Industry Transformation Map (ITM) for our industry. 2019 has been an eventful year for SSIA, against the weaker business backdrop throughout the year due to the US-China trade tension. I am personally encouraged by the multitude of support received from various companies, both MNC and SME, to realise SSIA's vision and mission to be the voice of the industry in Singapore. We have organized, both on our own and with various partners, more than 50 activities and initiatives over the past year, reaching out to more than 4,000 participants. All these activities and initiatives are in line with the ITM, which will transform the semiconductor industry here in Singapore and the region.

Right from the very beginning, the SSIA Board has agreed that workforce development is key in enabling future growth of our industry in Singapore. With that in mind, we have worked on many strategic initiatives that drive this area within the industry. Our initiatives focus on reaching out to future talents as well as supporting the current workforce in the industry. We have conducted school talks, both at secondary schools and institutes of higher learning (IHL). Besides career talks, we have also organized career fairs where we bridged companies and students at events such as the inaugural Electronics Industry Day which has brought together close to a thousand students with over 20 companies showcasing their products and services at the fair. We will further increase the awareness of our industry through a strategic communications campaign that will be rolled out early next year. We will promote available scholarships to students and encourage them to join the industry.

SSIA is also committed to ensuring that those currently in the industry stay in the industry. We have partnered multiple organizations such as Singapore Polytechnic, NUS SCALE, NTUC LearningHub and SSG to line up a series of courses needed to help the current workforce upskill and upgrade themselves. SSIA is also organising "industry-relevant courses" such as Operations Excellence, Semiconductor Fundamentals and Cost Optimization for the industry. For more information about these courses, do check out the classes for next year on our website.

Do expect a lot more exciting and value-added initiatives and activities from SSIA in 2020. We have rolled out our calendar of events, and you will see that there will be new events for next year. All these events will be in line with ITM, and will carry elements of business networking and development. As we are a non-profit organization, we do hope companies could step up and support our initiatives by sponsoring some of these events. It is with your strong support that SSIA can develop and execute even better events in future.

I would like to end my note specially on a topic close to my heart. All that we have achieved is only possible because of the new Secretariat team we have put together. Getting the right talents to join the Secretariat was one of our primary focus for the year. We recruited our team members from various sectors, not only from the semiconductor sector. The cross-pollination of experience and ideas within the team members is definitely a key reason when it comes to introducing new, exciting events and initiatives for our members. As what Henry Ford once said, "Coming together is the beginning. Keeping together is progress. Working together is success." I am personally thankful to all my staff for all the dedication and passion they have shown over the past months. I am confident this team will do many great things in future.

I would also like to take this opportunity to welcome the new member companies who have joined us over the past year. I strongly encourage our members to introduce your partners and suppliers to SSIA, and further increase our network of member companies. As the saying goes, the more, the merrier. This is especially so when we can rally more companies to support and align with our goal to help grow the semiconductor industry in Singapore and the region.

Thank you!

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SSIA BOARD

contents

INDUSTRY

SSIA SUMMIT AND SEMICONDUCTOR DINNER 2019

The semiconductor industry has contributed 7.8% of Singapore's GDP and supported 35% of the manufacturing workforce. Despite the industry facing a slowdown made worse by prolonged trade tension between US and China, the automotive semiconductor market is going to be a key driver for the semiconductor industry - expected to expand from US$37.4 billion (S$51.5 billion) in 2017 to over US$58.5 billion in 2023.

"Embracing the Mobility Transformation" was the theme of the Singapore Semiconductor Industry Association (SSIA) Summit 2019 held on 10 October 2019, where 9 speakers from different companies and agencies including National Research Foundation, Micron, Infineon Technologies, Soitec, Xilinx, A*STAR's Institute of Microelectronics and Institute of Materials Research and Engineering, Singapore-MIT Alliance for Research and Technology, and National Instruments shared insights on the mobility trends, and the paradigm shift in quality mindset required for the mobility business transformation. There was also a panel discussion on "Technologies that will shape the future of mobility" where representatives from SSIA, CapitaLand, Asia Mobility Industries, TPG Telecom Pte Ltd and Soitec discussed on how different technologies like AI and 5G will enable fully autonomous vehicles in Singapore and the region.

Panel discussion on how different technologies like AI and 5G will enable fully autonomous vehicles

Over 450 delegates from over 70 companies attended the annual flagship SSIA Summit and Dinner. Mr. Ang Wee Seng, Executive Director, SSIA, said in his opening speech, "Getting into the automotive semiconductor business isn't as easy as one might imagine. Zero Defects, the comprehensive automotive quality control, can't be achieved by simply setting up a system or solution in the company. It can only be achieved by a paradigm shift in quality mindset and needs to be built into the core values of the business and starts with the company's leadership."

Exhibiting companies introduced their products and services to Summit participants

The event ended with a gala dinner, the Semiconductor Dinner, with Mr Damian Chan, Assistant Managing Director of EDB, as the Guest of Honour. This year's Dinner carried the theme **"Fostering Talents for Tomorrow"** to reinforce the importance of talent development amidst different economic challenges. SSIA has also signed an MOU with NTUC LearningHub to collaborate on initiatives to upskill and upgrade the workforce for future industry needs.

SSIA has been working closely with different agencies such as WSG and e2i to help companies in talent recruitment, development and retention. Mr Andrew Chong, Chairman of SSIA, said in his speech at the Dinner, "Having the right business strategy or investment cannot make a business successful without the right people to execute. It's now a challenging time for the industry, but it is also the right time to invest in our workforce and keep our talents."

SSIA signed an MOU with NTUC LearningHub to collaborate on initiatives to upskill and upgrade the workforce

Semiconductor Dinner 2019

Andrew Chong, SSIA Chairman

Highlights of SSIA Summit 2019

Overview of Singapore's Microelectronics Landscape

(Keynote Speaker)
Prof Low Teck Seng, *CEO of* ***National Research Foundation***

Driving the Continuous Evolution of a Quality Culture: A Micron Perspective

Raj Narasimhan, *Corporate Vice President, Global Quality,* ***Micron Technology, Inc.***

Disruptive Megatrends Transforming the Automotive Industry

Dennis Fong, *Head of Powertrain Marketing at* ***Infineon Technologies***

SOI Technologies for Automotive Electronics

Dr Carlos Mazure, *EVP, Advisor to CEO of* ***Soitec****, Chairman & Executive Director of* ***SOI Industry Consortium***

Accelerating Automated Driving Market Readiness through a Scalable & Adaptive Platform

Steven Fong, *Senior Director of Sales,* ***Xilinx South Asia Pacific***

Enabling Mobility through mmWave Technologies

Gabriel Lim, *Industry Development Manager of* ***A*STAR's Institute of Microelectronics (IME)***

Making Silicon New Again

Kenneth Lee, *Scientific Director of* ***Singapore-MIT Alliance for Research and Technology (SMART)***

Addressing the 5G mmwave Test Challenges and Solutions

Neo Wei Ren, *Business Development Manager, APAC – Semiconductor of* ***National Instruments***

Batteries and Power Electronics, Enabling Future Mobility

Reuben Bakker, *Industry Development Manager of* ***Institute of Materials Research and Engineering (IMRE)***

Panel Discussion: Technologies that will shape the future of mobility in Singapore and the region

Moderator: Andrew *Chong, Chairman of SSIA*
Panelists: Aylwin Tan, *Chief Customer Solutions Officer of CapitaLand,* Dr Carlos Mazure, Richard Tan, *GM & Acting CEO of TPG Telecom,* Nathaniel, *Executive Director, Asia Mobility Industries*

Highlights of Semiconductor Dinner 2019

A delightful evening indulging in delicious food, great networking and witnessing the MOU signing between SSIA and NTUC LearningHub on workforce development









INDUSTRIAL TRANSFORMATION ASIA-PACIFIC 2019

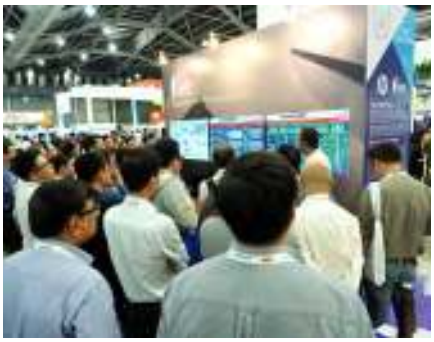
The Opening Ceremony of ITAP 2019 (From left to right: Aloysius Arlando, CEO, SingEx Holdings, H.E. Dr. Ulrich Sante, Ambassador for the Federal Republic of Germany to the Republic of Singapore, Mr Heng Swee Keat, Deputy Prime Minister and Minister for Finance, Dr Jochen Köckler, Chairman of the Managing Board Deutsche Messe AG

Asia-Pacific's biggest Industry 4.0 event, Industrial Transformation ASIA-PACIFIC (ITAP) 2019 was held from October 22-24, 2019 at Singapore EXPO & MAX Atria. The event brought together an ecosystem of government agencies and 350 exhibitors across 30 countries showcasing their Industry 4.0 related products and initiatives to more than 18,000 attendees from 55 countries. The event was organised by SingEx Exhibitions and International Partner, Deutsche Messe. SSIA was honoured to be one of the supporting organisations this year.

The three-day event was kicked off with an opening ceremony graced by Deputy Prime Minister and Minister for Finance Heng Swee Keat. In his opening address he said, "There is great potential in Industry 4.0 and in advanced manufacturing. In the spirit of collaboration, I encourage all of us to take this opportunity to share our experiences, learn from one another, build new partnerships and strengthen existing ones. How well we collaborate will determine how well we succeed in the coming years."

A curated gallery on the evolution of Industry 4.0

A company showcasing their customised robotic solutions



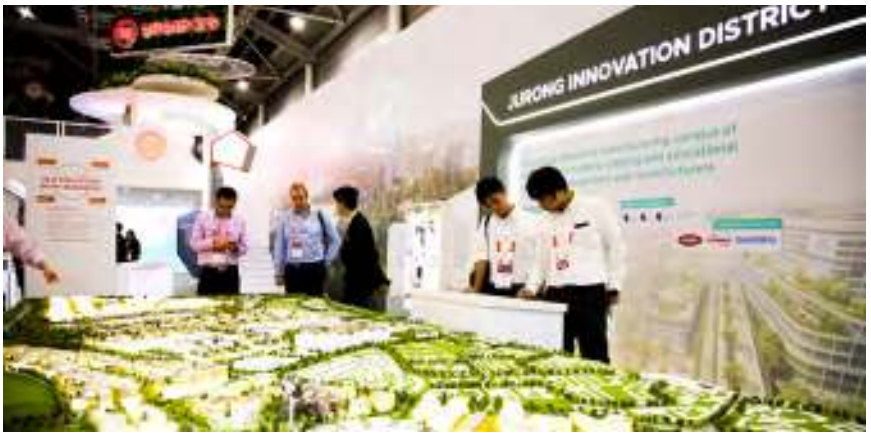
350 exhibitors across 30 countries showcasing their Industry 4.0 related products at ITAP 2019

Various Platforms To Collaborate and Exchange Understanding of I4.0

There were various platforms for key stakeholders in the technological ecosystem to collaborate and exchange understanding of the future of manufacturing and the adoption of Industry 4.0 solutions. Over 60 sandbox and workshop sessions to provide practical learnings based on industry-specific challenges, and over 100 guided tours addressing industry verticals and needs were organised.

Semiconductor Pavilion at ITAP 2020

SSIA is planning to have a Semiconductor Pavilion in next year's ITAP to strengthen the presence of the semiconductor industry in the Industry 4.0 arena. Please email to secretariat@ssia.org.sg if your company is interested in participating.



Model displaying the future Jurong Innovation District

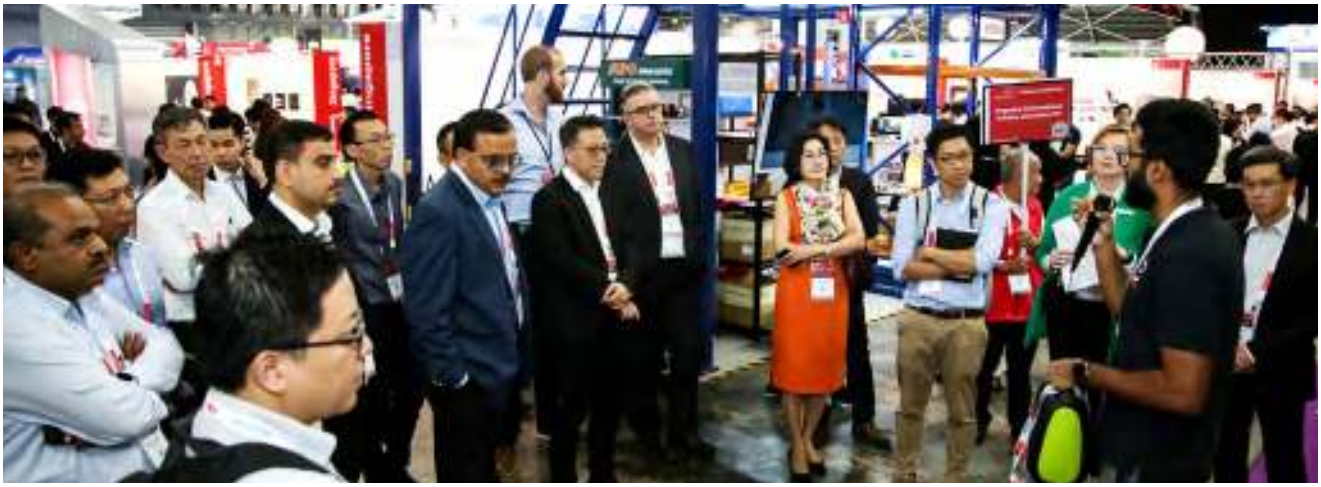
A sandbox session at the event

Speech by Dr Koh Poh Koon, Senior Minister of State, Ministry of Trade and Industry, at the ITAP Networking Event on 24 October 2019

SSIA CURATED TOUR AND NETWORKING SESSION

During the ITAP 2019 event, SSIA organised a curated guided tour especially for the semiconductor and electronics industry. The customised and curated tour comprised 8 stops over 2 hours, bringing around 60 participants to a combination of the Gateway Gallery, Whole of Government (WOG) booth, Learning Journey areas and exhibitor booths of companies in the semiconductor industry.

The tour ended with a networking event, where business leaders exchanged ideas and best practices, built new networks as well as enjoyed the beer and wine.



ELECTRONICS INDUSTRY DAY 2019

JTC Corporation and Singapore Semiconductor Industry Association (SSIA) jointly organised the inaugural Electronics Industry Day 2019, themed "Chip in for a Smarter Future" at Tampines Wafer Fab Park on 1 November 2019. The event saw the participation of close to 1,000 students from related fields across Institutes of Technical Education (ITEs), polytechnics and universities.

A CLOSE NEXUS BETWEEN INDUSTRY AND ACADEMIA

There were over 20 companies and IHLs exhibiting at the event including ams AG, Siltronic Singapore Pte. Ltd., Soitec, SSMC, United Microelectronics Corporation (UMC) and Jabil. Students were given exclusive tours to the factory premises of six electronics companies to learn about the work that goes on in the highly specialised sector, as well as how multidisciplinary teams are being used in the research and development of different smart applications. They had a fun-filled day with a preview of the estate enhancement plans, engagement with exhibition booths of different companies as well as the exciting career opportunities in the electronics sector.

Mr Ang Wee Seng, Executive Director of SSIA, said, "Hopefully this event has brought awareness of the semiconductor and electronics industry to the students, the future talents of our industry. As the sector moves into new methods of manufacturing, having a relevant workforce that is well-equipped with skills that can meet new industry demands is more important than ever."

REJUVENATION OF WAFER FAB PARKS TO SUPPORT FUTURE WORKFORCE

The event was graced by Mr. Chee Hong Tat, Senior Minister of State for Trade and Industry as the Guest of Honour. He also announced the estate enhancement plans of Pasir Ris and Tampines wafer fab parks as well as the new semiconductor facility called JTC semiconSpace in Tampines.

'Wefie' of Mr Chee Hong Tat and students

Said JTC Chief Executive Officer Ng Lang: "As our manufacturing activities continue to evolve, so too should our estates in order for Singapore to remain attractive as a manufacturing destination. These upcoming enhancements are a step forward in making our estates more conducive for our workers."

Artist impression showcasing the future Tampines Wafer Fab Park



Companies introduced their latest innovation to students

Group photo with Mr Chee Hong Tat, organisers and representatives from participating companies and IHLs

Exclusive tours to the factory premises of electronics companies

Students experienced the games involving Artificial Intelligence (AI) and immersive media such as augmented reality and virtual reality on the IMDA Labs on Wheels

SEMICONDUCTOR FUNDAMENTALS COURSE

The semiconductor chip is well recognised today for the fundamental revolution it has brought to the advancement of electronics technology. Since the first integrated circuit was created by Jack Kilby in Texas Instruments' labs more than 50 years ago, the idea of transistors on silicon becoming the building blocks for intelligent processors has transformed almost every facet of daily life. Even though chips are widely used, how simple sand (silicon) is transformed into a highly complex chip is still less widely known.

SSIA held the Semiconductor Fundamentals Course on 17-18 October 2019 to equip all the participants with the basic knowledge to bring everyone to the same starting point in the electronics industry. "The course has equipped us with the many and complicated processes from start to end in wafer fabrication," said Gretchen from Swagelok Singapore and Tai from Avitech Electronics Ltd.

There are many personnel who are working in part of the processes or supply chain, or even supporting roles, who do not understand the full picture of the electronics eco system. By attending this course, they will have a better understanding on the different roles they play in this industry. The second run will be held in January 2020, do keep a lookout on SSIA website: https://ssia.org.sg/upcoming-ssia-events/

TUM ASIA MASTERCLASS

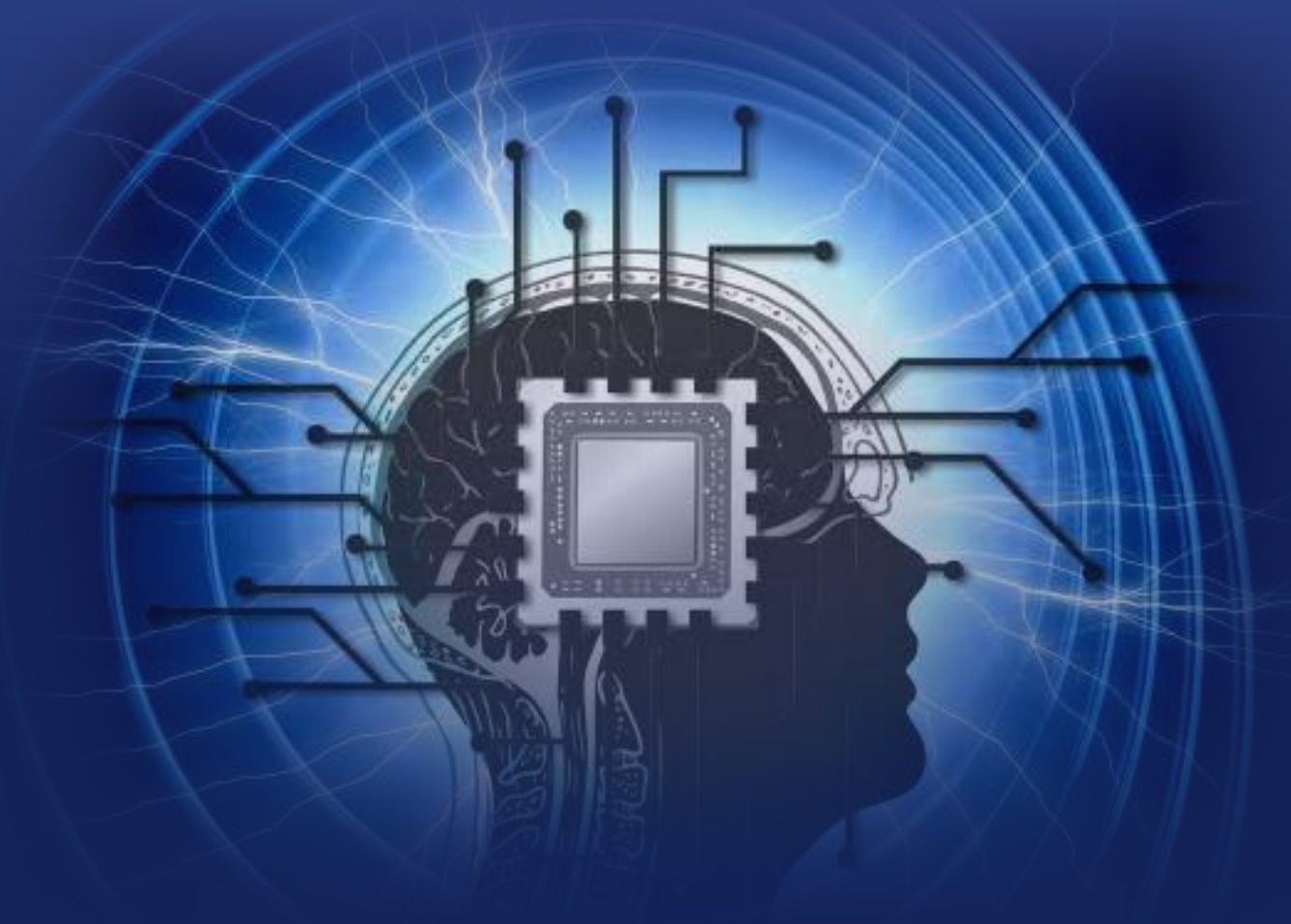
Singapore Semiconductor Industry Association (SSIA) was invited to give a talk at the "Innovation, Technology and Management" Masterclass on 30 October 2019. Ang Wee Seng, Executive Director of SSIA introduced to the students the Singapore Semiconductor eco-system, the challenges faced by the semiconductor industry as well as the latest update and initiatives launched by SSIA. Students at the class responded with different questions. Many of them were keen to understand the impact of the trade war tension and industry 4.0 on the industry, and the opportunities available to them in the semiconductor arena in Singapore.

TUM Asia commenced operations in Singapore in 2002 as a branch campus subsidiary of the Technische Universität München (Technical University of Munich, TUM). TUM was invited to set up a campus in Singapore to be part of the "Global Schoolhouse Initiative" providing a variety of top quality education options to Singaporeans and in the region. The Innovation and Technology Management Masterclass explores material and anonymised examples from live company situations, combined with discussions of practical experiences through global industry speakers and an industry site visit in Singapore. Areas such as Semiconductors, Industrial Electronics, Automotive Electronics, LED Lighting, among others, will be discussed.

CAREER TALK AT SINGAPORE POLYTECHNIC

Close to 900 students attended the Education and Career Guidance Talk on Semiconductor Industry on 6 November in Singapore Polytechnic Convention Centre. The audience were year 1 to year 3 students from the Diploma in Electrical & Electronics Engineering, Diploma in Energy Systems & Management and Diploma in Engineering Systems. As a veteran with over 20 years of experience in the semiconductor industry, Ang Wee Seng shared his career journey and the prospect of the industry with the students. 'Studying microelectronics and semiconductor wasn't the reason for my success in this industry, it is my interest in science that has helped to drive my career. The key is to do what you like – "Enjoyment Performance Theory"," said Mr Ang.

SSIA also set up a booth at the venue to showcase the courses and initiatives that will help students in exploring their learning and career opportunities and the semiconductor and electronics industry.



BUILDING A SUSTAINABLE TALENT PIPELINE

Technology is an agent of change. With the emergence of disruptive technologies driving the industry 4.0, it is imperative for firms to take on a new paradigm for competition, to constantly explore the potential for new roles that allow people to play to their strengths while leveraging technology for greater innovation and new approaches to learning and development. There is a challenge lying in the widening skills gap as new jobs created demand a distinct set of skills from jobs of today.

In Singapore, the government, government agencies and educational institutions are playing various roles in preventing the skills gap from widening among the workforce, by helping to develop a stable pipeline of future talents, as well as supporting retraining of existing employees.

BUILD VS. BUY: THE DAYS OF HIRING SCARCE TECHNICAL SKILLS ARE OVER

For years leaders have grown their companies by issuing the demand "go out and hire someone who knows how to do this!" This approach leads HR departments and hiring managers to retain expensive recruiting firms, spend millions of dollars on recruitment advertising, and often hire expensive sourcers to try to "steal" great talent from competitors.

WHAT IF THERE WAS A BETTER WAY?

Well, there is. We just completed a research study called "Rethinking The Build VS Buy Approach To Talent" with three companies and found that some of the highest performing organizations are doing something different: they're taking a "build vs. buy" approach to critical talent. And finding that "build" often outperforms "buy."

Internal talent development is not a new idea – so why is it so important now? It's quite simple: the economy has created a bidding war for people with critical skills, increasing the cost and risk of hiring from the outside. So the economics have now totally shifted: it's more cost-efficient and far more effective to build critical skills from within. And there are many cultural benefits as well.

Here are the economics:

The cost of recruiting a midcareer software engineer (who earns US$150,000 - 200,000 per year) can be US$30,000 or more including recruitment fees, advertising, and recruiting technology. This new hire also requires onboarding and has a potential turnover of two to three times higher than an internal recruit. By contrast, the cost to train and reskill an internal employee may be US$20,000 or less, saving as much as US $116,000 per person over three years.

The net savings: it can cost as much as 6-times more to hire from the outside than to build from within.

We conducted detailed interviews with Bloomberg, Adobe, and Guardian and in each case we found an overwhelming business case to building a "capability academy" to develop skills internally. And as I discuss in the article Capability Academies: Where Corporate Training Is Going, this model can become a business transformation solution as well.

I recently met with the CHRO of one of the world's largest auto manufacturers and she told me the company is desperately trying to hire people with skills to build autonomous vehicles. Short of buying an autonomous vehicle company, she said "these skills are just not to be found." As we discussed the problem further, she agreed that "the solution is to build from within."

Every company is now looking for critical skills in AI, machine learning, data science, user interface design, and cloud engineering. If you're a healthcare company, insurance company, or manufacturer, are you going to be able to compete with a well-funded startup that lavishes people with stock options and benefits?

As this research shows, you may not have to. New ways of building internal skills are now here, and the result is a stronger learning culture and positive brand of internal development and growth.

I encourage you to read this research: it will get you thinking about how important L&D has become to recruiting. Internal mobility, mentorship, and capability academies create a growth mindset, something every company needs today.

> **"It can cost as much as 6-times more to hire from the outside than to build from within."**

QR code to access the research "Rethinking The Build vs Buy Approach To Talent – How Savvy Employers are Building Tech Skills from Within"

Link: www.joshbersin.com

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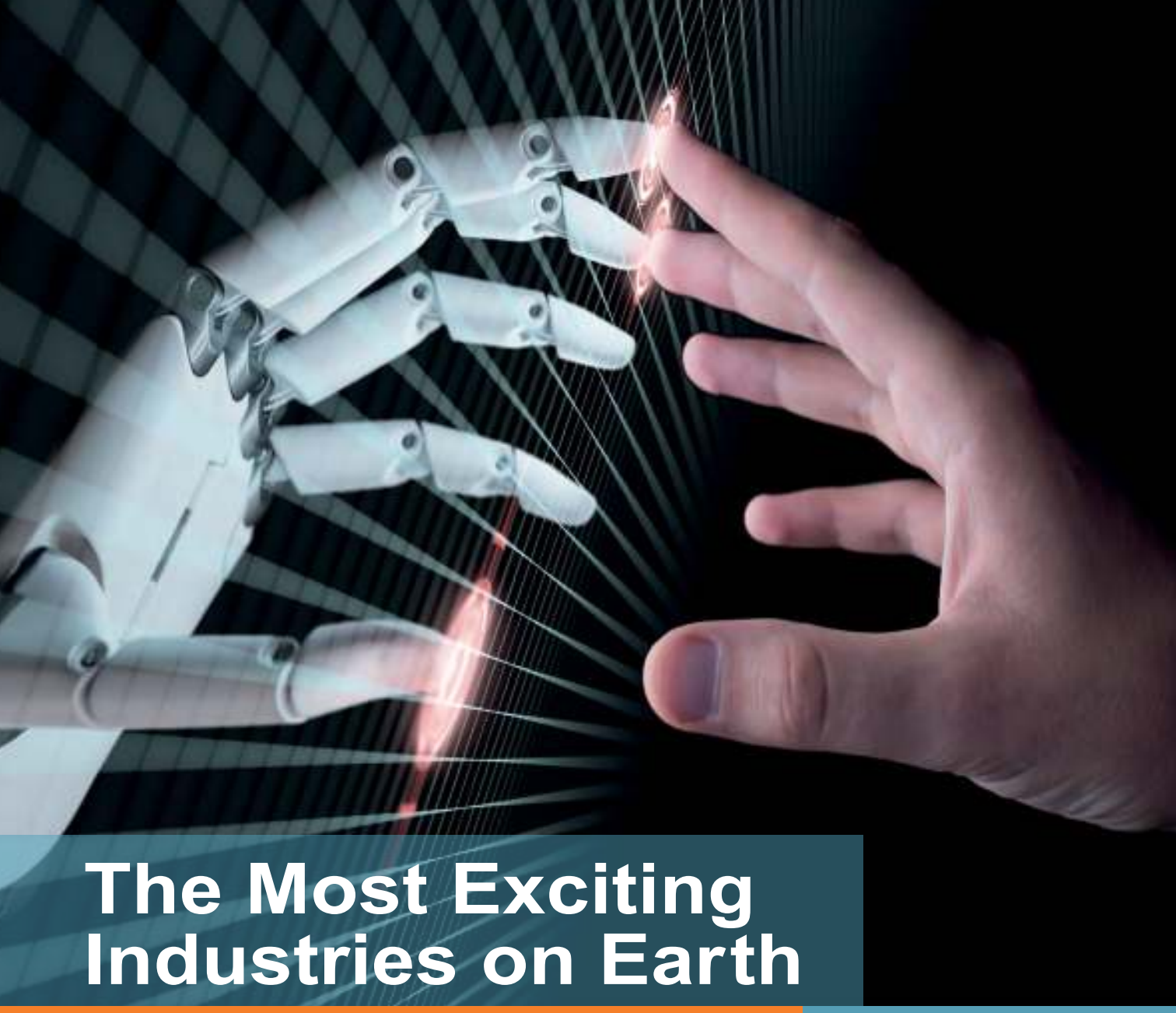

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DEVELOPING FUTURE LEADERS ENGINE & TECHSTAR, AND JUMPSTART PROGRAMS AT INFINEON

Fostering the development of talents is a strategic focus at Infineon and an essential element for a high-performance company. A systematic approach to people development can ensure sustainable performance leading to long-term success. In 2011, Infineon launched its talent management initiative integrating local and regional talent management activities.

Following the mission to "systematically attract, identify, develop, engage, retain and deploy talents for managerial and technical key positions", Infineon designed a regional framework and common approach for managing talents across all of their locations in Asia. Today, their management board and site management fully recognized and support talent management and the derived programs, ensuring a strong bench of talents ready to support Infineon's growth.

ENGINE and TECHStar programs

Infineon has two signature AP regional programs: **ENGINE** is a regional program for talents who are on the management and project management career paths while **TECHStar** is a regional program for talents who are on the Technical Ladder career path. These two signature programs together with talent development programs at the sites provide a comprehensive talent development roadmap for aspiring employees.

ENGINE and TECHStar programs are based on a holistic talent development approach focusing on four key areas: Training, Management Awareness, Knowledge Sharing, and Action Learning.

These 2-year programs provide talents with 4 customizable learning modules based on company requirements and market trends in partnership with SMU

(Singapore Management University). Talents are also assigned individual and group projects to help them understand and apply what they have learned during campus week. In addition, there are specially arranged dialogue sessions with the top management and opportunities to gain insights through interactions with a mentor who is usually a senior-level manager. Certainly, with higher visibility as well as upcoming workload challenges, the talents will need to manage his/her time well and work as a team to accomplish their goals. It is like a stress test as part of his/her life-long learning journey.

Fostering of talents at Infineon is a shared responsibility between HR, people managers and functional managers. ENGINE and TECHStar talents are selected by the top management team from the region with HR's support. It is a strong message to all managers to maintain a robust talent pipeline in order to ensure Infineon's long term growth in Asia Pacific.

Since 2011, the programs have generated 135 alumni and active talents coming from China, Taiwan, India, South Korea, Japan, Singapore, Malaysia, and Indonesia with more countries being included as we expand our presence in Asia. These talents hold important roles and positions inside Infineon. Moving forward, ENGINE & TECHStar will continue to develop and qualified leaders who will fill the organization.

Developing our young talents – Jumpstart

Jumpstart is a program to help grow the young talent pipeline. The development program commenced in 2015 had addressed the challenge of establishing a talent pipeline of young talent. 'Jumpstart' is an alternative staffing option to build a ready pool of early talent for workforce rejuvenation and harness the capabilities of these individuals through development to reach their career potential with Infineon.

It is designed to be a comprehensive and structured 24-months program with talent development philosophy embedded. The first step is the selection process where top ex-interns, as well as long-term temps who have showcased excellent performance are considered together with fresh graduates of high caliber. Attraction and retention are achieved via a two-pronged strategy comprising both development and compensation levers. These young talents are rotated over 2 functions with an assigned functional development roadmap. The compensation package is designed to attract fresh graduates with outstanding academic performance, through a higher starting base pay compared to the average fresh graduate - joining bonus. Completion bonus is awarded to Jumpstart upon the end of the contract to encourage retention.

In the last 2 completed cohorts, more than 75 percent of these jumpstarts have been hired as internal employees of Infineon and have been doing very well in their respective fields. In the first cohort, 3 out of 5 talents who joined the program were converted within the 24 months. The completion rate was 80 percent. The second intake grew to 7 talents with 100 percent completion rate and 85 percent conversion rate. Overall, 88 percent of our Jumpstarts have become internal employees.

In anticipation that leadership roles will have to be mobile in support of the growth in emerging markets within Asia, it is vital for the organization to expand the graduate pool by introducing the program to other markets in the region. Moving forward, the Jumpstart program will be adopted across Asia in countries like China, Korea, India and Indonesia.

About Infineon

Infineon is a leading semiconductor and system solution provider with about 41,400 employees worldwide and €8 billion of sales in fiscal year 2019.

Infineon won a Silver in the recent 2019 HR Excellence Awards for the category "Excellence in Graduate Recruitment & Development".

Source of contents:
Infineon

CREATING AN EMPLOYEE-DRIVEN LEARNING CULTURE

The Learn^{x} Strategy of Xilinx

A Continuous Learning Culture

Over the past three years, Xilinx has introduced a new learning strategy called "Learn to the Power of X", (Learn^{x}) which represents the infinite possibilities for employees to learn and grow in a personalized and empowered learning environment. This strategy defines and enables a continuous learning culture – where learners can be inspired, inspire others, and engage in shared learning and collaboration.

To support Xilinx' corporate strategy of technology and workforce leadership, sustaining a competitive advantage is critical, and learning is a key factor to enable this competitive advantage. Employees who are excited to learn are more engaged, more satisfied in their jobs, and ultimately more productive. To keep attracting the best talent, companies must provide a learning environment where employees can drive their development. Xilinx's vision of enabling a culture of continuous learning supports the company's efforts to drive the most innovative technology in the market.

The Learn^{x} strategy is employee-driven, manager-guided and technology-enabled. It supports an environment where the employee drives their own career development while being supported and guided by their management team.

To enable this strategy, Xilinx employed a cutting-edge online learning platform from Degreed to all employees and interns. This platform provides a means to curate and deliver learning content relevant to the needs of each employee.

Screenshot of the online learning platform of Xilinx's Learn^{x} Learning Platform

This platform can also be accessed anytime, anywhere through employees' smartphones.

Launching a new learning strategy was driven by a sensitivity to the changing needs of employees. Xilinx recognized radical shifts in the modern learning landscape and acted pro-actively. With the full sponsorship of executive staff, the Global Talent Development (GTD) team (part of HR) was able to get the commitment of managers and employees.

In parallel, Xilinx saw a greater need for management development and leveraged Learn^{x} and Degreed to develop a comprehensive Management Suite (MS) of learning. The MS solution was launched as a set of company-wide offerings that blend online learning, assessments, and live workshops that can be attended in-person or virtually. The live workshops are not traditional class-room style lectures. They are discussion oriented, blended learning experiences that support participants in their professional growth and their role as a manager. Many include prework, homework, and follow-up activities completed with their teams and their manager.

Measuring the Impact of the Strategy

It's one thing to share anecdotes about the evolution of a culture of continuous learning, Xilinx is using a combination of metrics to try and measure the impact of its learning strategy:

1. **Net Promoter Score (NPS):** This is a measure of how likely a person is to recommend a product or service to others. Xilinx measures NPS for every Management Suite workshop, as well as for the Degreed platform, on a regular basis. The NPS scores received so far reflect a strong embrace of the Learn^{x} strategy. A strategic outcome of this has been the development of a culture of continuous learning.
2. **Degreed Analytics:** The Degreed online platform provides analytical capabilities that indicate the

Learning classes conducted at Xilinx

Xilinx was recognized as a LearningElite Gold level organization by the Chief Learning Officer Organization

impact of the learning strategy. For example, the Degreed adoption rate (percentage of employees that login into Degreed) and the number of completed learning items give an indication of the consumption of learning items by employees. The number of recommendations per active user gives an indication of how much employees are sharing learning items – this is a key indicator of a culture of shared learning. In Xilinx's case, the company-wide Degreed adoption rate quickly reached over 80% within 5 months of the launch of the platform.

The data so far overwhelmingly shows that the strategy and technology are resonating with employees in a very positive way. In addition to the above metrics, Xilinx also collects qualitative feedback from employees and managers through feedback surveys and follow-up interviews. "Degreed has taken our success in self-directed learning to a whole new level. It has empowered our employees to take charge of their technical and soft skills development" says David Ferguson, Vice President of Production Operations and Site Director of Xilinx Asia Pacific.

Thanks to the interest and effort from many engaged Xilinx learners, the GTD team in HR was able to celebrate its vision of empowered learning through Learnˣ. Xilinx was recognized as a LearningElite Gold level organization — one of the best companies in learning and development - by the Chief Learning Officer Organization. They were evaluated across five dimensions: learning strategy, leadership commitment, execution, impact and business performance results. Competitors were very strong organizations, including Accenture, Deloitte, Ernst & Young, Hewlett Packard and KPMG among many others.

Source of contents:
Xilinx Asia Pacific

micron.com

micron.com

SMEs PLAY A CRUCIAL ROLE IN ATTRACTING TALENTS

Interview With Chok Yean Hung – New SSIA Board Member

Mr Chok Yean Hung has joined the SSIA Board as the Board Member since August 2019. He is the Chief Executive Officer of AEM Holdings Ltd, which has operations across Asia, Europe and North America. He has more than 30 years of management and technical experience in the semiconductor industry with track record of building companies from startup to become sustainable, matured, and public listed. Yean Hung was awarded the Ministerial Citation for Excellence in Test Development from Singapore's National Science and Technology Board (NSTB) in 1997. He jointly holds patent with Texas Instruments, Dallas memory designers on `A Method in Testing Semiconductor Devices'.

SSIA talked to him about his views and aspirations on his new role and the industry.

The Growing Semiconductor Industry

Having worked in the semiconductor industry for over 30 years, Yean Hung sees semiconductors as critical technology enablers. "They are the key to technology pipeline. With the rise of different disruptive technologies like 5G and AI, the semiconductor industry will be growing." He also sees the importance of a trade association such as SSIA to help facilitating collaborations and build on partnerships to create a cohesive electronics and semiconductor community in Singapore. "SSIA is neutral and setup as a non-profit organization with a Singapore agenda. It plays a role in feeling the pulse of the industry as well as being a platform for knowledge sharing. SSIA can serve to provide a collective voice to our government agencies in charting the right training, development and education to prepare the next generation for the industry. As the industry transforms and evolves, SSIA can help bridge and continuously rejuvenate our current workforce by providing the right knowledge sharing and training or even working with the right partners supporting this."

Challenges in Workforce Development

As a leader in a Singapore SME company, Yean Hung said one of the areas of challenge in Singapore is finding the right level of expertise to drive innovation. "In Singapore, we benefit from a large pool of well-trained

Chok Yean Hung at an SSIA networking event

professional veterans. We tapped on these veterans, helming various key functions to drive the company forward and to train and guide fresh and younger generation within the company. These are all professionals who have been trained by various MNCs in Singapore, extremely proficient in business processes, continuous improvement and driving value adds. However, for talents who can drive innovation and/or global business development, we still have to explore outside of Singapore."

Grow the SMEs To Nurture the Talent Pool

While many companies said they are facing challenges in recruiting and retaining talents, Yean Hung felt that the semiconductor industry, including both MNCs and SMEs, need to show people that there are growth prospects in the sector.

"Government had done well since early the 70's to bringing in MNCs in creating jobs as well as establishing a culture of effective continuous improvements driving business excellence. Along with it, many SMEs were born to provide services and values to these MNCs."

"Moving forward, the gear should shift a bit towards elevating SMEs to local MNCs competing globally. We need to address new value creations through innovation. We need to address how to go to market successfully. These are areas in which most SMEs are lacking in term of resources, complete solutions and market reach. Sometimes local SMEs are not aware of what is needed to get there. Facilitating various SMEs to get together, pooling in resources towards a complete solution and hunt globally as a pack may be a good place for government agencies' active participation and to a certain extend SSIA can help to trigger this effort."

"Success stories of a few Singaporean SMEs transforming to MNCs with global market reach would be a good showcase to attract new talents. People can therefore see where the semiconductor industry is heading, and they will see they can be a part of it to make it happen!"

Personal Aspiration for 2020

Looking forward, Yean Hung hopes to give back to the industry and the society together with SSIA, especially in the area of workforce development. "Its outreach program is a good platform to inspire the next generation to take up engineering to continue enabling Singapore to be the location of choice for electronics innovation and manufacturing. With my SME and startups experience, I also hope to play a part in finding ways to elevate Singapore SMEs to be global players, working through agencies and tapping on available resources."

"Success stories of a few Singaporean SMEs transforming to MNCs with global market reach would be a good showcase to attract new talents. People can therefore see where the semiconductor industry is heading, and they will see they can be a part of it to make it happen!"

Chok Yean Hung (right) talking to Andrew Chong, SSIA Chairman, at the ITAP 2019 event

STAY COMPETITIVE IN THE DIGITAL AGE

Mastering New Digital Skills In a Smart Nation

Singapore's Smart Nation initiative is about harnessing technology to stay ahead as a global city and to improve lives and livelihoods for all. In this age where change is the only constant, it is said that the surest way to keep pace with disruption is to embrace lifelong learning.

For the semiconductor industry in Singapore to remain competitive, companies have been deploying different digital solutions to help optimize supply chains, that makes digitization key to competitiveness. The adoption of i4.0 will have a profound impact on the workforce. Therefore, both companies and employees should identify the new skills and capabilities that will be required in the industry 4.0 digital transformation and start planning the transition today.

In view of this, NUS SCALE's suite of Executive & Professional Development short courses are designed to upskill participants to help them stay competitive in the digital age.

These courses are guided by the Singapore government's Industry Transformation Maps, with a focus on the SkillsFuture Series' emerging skill areas and include those on Industry 4.0.

Marine Chan, HR Manager of Barghest Building Performance, joined the 'Data Analytics Begins With Me' course with her colleagues in September 2019. "Our Data Analytics Team is growing and the course has helped us to find solutions to problems we encountered when analysing data in different parameters. We will definitely send more colleagues to the course later."

Marine (middle in dress) attending the NUS SCALE course with her colleagues

Some of the courses offered:

70-90% Subsidy for Singapore Citizens, Permanent Residents and SMEs			
PROGRAMME	**AUDIENCE**	**DATE**	**FEES**
Enterprise Blockchain & DLT for Executives	Business owners, Team leaders, managers, department heads, senior executives	9 January 2020	$850
Data Analytics Begins With Me	Business Analysts, Customer Service Managers, Procurement Officers, HR Executives and any Professionals, Managers and Executives	8 January, 11 February, 10 March, 14 April, 12 May, 9 June 2020	$850
Data Visualisation Begins With Me	Executives, Managers, Business Analysts	15 January 2020 2 March 2020	$850
Robotics Process Automation Begins With Me	Engineers, Managers, Executives	22-Jan-20	$850
Introduction to Industry 4.0	Senior Managers, Managers, Supervisors, Engineers who are involved in technology innovation, entrepreneurship and strategic planning initiatives.	17 - 18 February 2020	$1,900
Analytics in Industry 4.0	Business owners, managers and professionals	20 - 21 February 2020	$1,700
Cybersecurity Begins With Me	Any employees who has access into corporate/ company network	28 February 2020 15 May 2020	$850

For the full course list, please visit https://scale.nus.edu.sg/programmes/executive-courses

EQUIPPING AND PREPARING A NEW WORKFORCE FOR THE FUTURE OF WORK – THE SUTD STORY

Introduction

Digital disruptions and Industry 4.0 call for a new educational model that will equip students with the skillsets and training needed to thrive in a complex environment. In 2009, the Singapore Government set up the Singapore University of Technology and Design (SUTD) with the mission of advancing knowledge and nurturing technically grounded leaders who will solve complex vital societal needs through technology and design. In order to enable this vision, the University needed to be helmed with top tier talents globally and locally who possess the competencies and talent to fulfill this vision and mission. The key to success lies in a coherent human resources and organizational development strategy that is needed to help recruit, reward, retain, as well as develop core talents.

As early as 2010, SUTD began an international strategy to source for global talents in different fields of expertise to helm its faculty. As a result, we now have a strong bench strength of 160 faculty from 30 different countries, working in different fields of specialization in 4 of our pillars and 2 of our clusters. SUTD adopts a pillar structure that cuts across disciplines of Engineering Product Development, Engineering Systems and Design, Information Systems Technology and Design, as well as Architecture and Sustainable Design. Supporting the pillars are the Clusters of Science and Mathematics as well as Humanities, Arts and Social Sciences. This new type of pedagogy enables our students to work across disciplines, thus harnessing multi-disciplinary skills needed to solve complex problems and for developing new innovations. Table 1 below outlines the vision and design of SUTD contrasted with those of traditional universities.

Table 1. The Vision and Design of SUTD Contrasted with Those of Traditional Universities

	TRADITIONAL UNIVERSITY	VISION FOR SUTD
Organizational Structure	Hierarchical and Territorial	Flat and agile with no schools, but instead pillars of specialization form the main core of the university.
Operating Model	Decentralization	Shared Services
Student Interaction	Big Lecture Series to achieve economies of scale	Small cohort size classrooms – to achieve intimacy of interaction.
Student Learning	Theoretical	A strong theoretical foundation coupled with a hands-on interactive experience that is interlaced with internships and practice.
Research	Narrowly Focused	Multi-disciplinary, focus on innovation and creativity (development and improvement of artifacts) rather than only description or explanation.
Faculty Recruitment	Decentralized with a narrow focus	Decentralization at the first level of screening, but centralization when it comes to decision to hire. The President chairs the final selection committee together with a multi-disciplinary team to ensure that each faculty hired has the potential to collaborate across the different specializations.
Faculty Governance	Dominant in faculty self-governance	Mixed faculty governance with specifically chartered work teams on key projects that may also include administrative staff.

Workforce Development Strategy for Phase 1

In setting an organization that is non-traditional, this needs a purposeful effort to build the culture and to develop the workforce so as to achieve alignment. SUTD's President worked very closely with the HR and leadership team in collaboration with all employees, faculty and students to develop the needed culture and values. This effort, in combination with the Learning and Development Strategy, was deployed for the last 9 years through various programs and strategic activities as illustrated in Diagram 1. Phase 1 resulted in many achievements and success for SUTD.

Diagram 1

Capability Development Strategy for Phase 2

In Phase two of our development, the President together with the Board, and Senior Leadership Team, identified core research areas that will help propel SUTD. This was specifically in the areas of Aviation, Healthcare and Cities, supported by horizontals of Artificial Intelligence, Data Science and Design. Phase 2 of the Capability Development strategy for faculty, research and administrative staff began to kick in. This included an international acquisition plan for new faculty talents in the growth areas, a development plan to groom current faculty, administrative and research talents, as well as a leadership and competency framework. The overall Capability Strategy is illustrated in Diagram 2.

Diagram 2

SUMMARY: OVERALL CAPABILITY STRATEGY

Core Competency Development

- Workforce Planning for Optimization and Right Skilling
- Industry Focused Capabilities
- Building AI Capabilities
- Enhancing Faculty Capabilities
- Enhancing Researcher Capabilities
- Research Career Framework
- Strategic Hiring of Key Faculty & Researchers
- Multi-disciplinary Teams to Harness & Build Capabilities

Talent Pipeline

Talent Planning for Faculty

- Faculty Early Career Award Scheme
- Strategic Hiring
- Partnerships with A*STAR for PhD Talents

Enhancing Talent Brand through Strategic HR Activities

SUTD - Singapore's Smart Nation Campaign

- Los Angeles
- Edinburgh & Glasgow
- London
- Melbourne & Sydney
- Cambridge & Oxford
- San Francisco

Leadership Development and Succession

- Development of Core Competencies
- Succession Planning
- Hi-potential Development

We will share in a bit more detail the following components of the Capability Strategy:

1. Leadership Development and Competency Development

The HR team together with the assistance of a professional consulting firm worked with the leadership team to identify the critical success factors for performance of leaders. The framework also links and builds upon the broader university strategic direction. The six competencies include:

- Thinking Strategically
- Driving Impact
- Collaborating & Influencing
- Innovating
- Leading People
- Managing Stakeholders

The new framework is now applied in the following areas as illustrated in Diagram 3.

Diagram 3

2. Workforce Planning and Capability Development

Strategic Workforce Planning and Analysis is aimed at optimizing and effectively deploying our administrative resources to meet growing needs. This include:

a. Establishing a clear understanding of the current workforce capacity and capabilities, and the future workforce requirements based on SUTD's 2023 growth plan; and

b. Providing analysis and recommendations based on the desired outcomes, including the structure and competencies.

This 6-month long project involved every department and pillar. We conducted a detailed analysis of the roles and responsibilities of each job, looked at skills gaps and identified redundant processes that could be eliminated or automated. After the completion of the project, the following three streams were established.

- Business Process Reengineering
  Every department/pillar to review their own processes and systems and to set goals and targets for process improvements. This should result in better service standards internally and externally.

- Process Automation
  While departments/pillars review their business processes and procedures, they will also identify areas for possible system automation. This includes leveraging on new technologies such as RPA to digitally transform SUTD's work processes.

- Establishment of an Analytics Charter
  In order to enable our employees to look at processes using data tools, SUTD has started organizing Data Science and Analytics workshops for all employees to help them to acquire the basics to derive insights through data.

Conclusion

Workforce Planning and Capability Development is a critical component of reshoring and identifying critical skills gaps for the future of work. It allows organizations to take a strategic view of things and employ strategies to:

- Attract a skilled workforce for current and future capabilities.
- Retain valued employees to help propel growth.
- Build capacity in the long run.
- Provide strategic leadership necessary to model the right behaviours.
- Develop an efficient and flexible workforce to cope with constant change.

The first phase of our Workforce Development Strategy helped SUTD claim its position as the fifth most influential scientific research institution in telecommunications, achieved a high overall employment rate of 94% for its students, and enabled our faculty to produce strong research and publications, to name a few. SUTD is now poised for its next phase of growth as we pro-actively plan and put in place our Workforce and Capability Strategy for Phase 2.

ABOUT THE AUTHOR

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SKILLSFUTURE SINGAPORE COLLABORATES WITH INDUSTRY PARTNERS AND IHLs TO SUPPORT WORKFORCE DEVELOPMENT AND SKILLS TRANSFORMATION IN ADVANCED MANUFACTURING

Work-Learn Bootcamp for Engineer 4.0

The SkillsFuture Work-Learn Bootcamp for Engineer 4.0 is the first-of-its-kind rapid upskilling programme for advanced manufacturing. Open to fresh graduates and mid-career individuals, the programme will equip them with the relevant mind-set, and job-role specific behavioural and technical skills.

Curriculum features of the Work-Learn Bootcamp for Engineer 4.0

Participants will undergo an eight-week programme delivered by Singapore Polytechnic (SP) and Temasek Polytechnic. With the curriculum co-developed with companies and in collaboration with Generation^, a US-based non-profit social organization founded by McKinsey & Company, the programme is designed to integrate real-life industry scenarios into hands-on projects, and will include role-play, case study discussions and simulations. The curriculum incorporates feedback and inputs from experts and employers from nine companies, such as ASM Assembly Systems, Jabil and Makino Asia.

Participants will be trained in areas of industry demand such as Lean Manufacturing, Industrial Internet of Things, and Agile Project Management. They will also be equipped with behavioural skills such as adaptability, teamwork and cross-functional communication. Upon completion of the Bootcamp, participants will have the opportunity to be placed into engineering jobs such as Industry 4.0 R&D, Digital Transformation Engineer and Performance Improvement Engineer.

The SkillsFuture Work-Learn Bootcamp for Engineer 4.0 is expected to train and

place up to 200 engineering talent over the next two years. The first run of the SkillsFuture Work-Learn Bootcamp for Engineer 4.0 was conducted by SP on 21 October 2019. The second run of the bootcamp will be conducted by Temasek Polytechnic in the first quarter of 2020.

The programme is open to Singapore Citizens and Singapore Permanent Residents aged 18 years old and above, with an engineering diploma or degree, and who are willing to take a full-time job upon completion of the programme. The SkillsFuture Work-Learn Bootcamp is a three-year pilot programme, developed in partnership with SSG, the five polytechnics, Institute of Technical Education, and Generation^.

Details of Work-Learn Bootcamp for Engineer 4.0, pls visit:

First train-for-sector partnership with Bosch Rexroth

Supported by SkillsFuture Singapore, Singapore Polytechnic (SP) and JTC, the Bosch Rexroth Regional Training Centre will be set up by the fourth quarter of 2020 to anchor the technology, skills and talent needs of advanced manufacturing companies in the Jurong Innovation District and beyond.

The Centre will work with small and medium-sized enterprises to:

- Tap on Bosch Rexroth's network and expertise to drive proof-of-concept projects, to encourage enterprise adoption of advanced manufacturing technologies;
- Co-develop training content with SP in cutting-edge technologies, and provide mentorship and skills training to enterprises as part of proof-of-concept projects;
- Transfer of expertise to SP lecturers who will extend training to enterprises, especially to SMEs; and
- Train a pipeline of Industry 4.0 specialists who will be certified by the Singaporean-German Chamber of Industry and Commerce (SGC).

SSG, Bosch Rexroth, SP and JTC signed a Memorandum of Understanding on 24 October 2019 with 11 early adopter companies – Aluputer Industrial, ASM Assembly Systems, CKE Manufacturing, Delphic Manufacturing Solutions, Elite Springs, Exxel Technology, Fong Lee Metal Industries, Hai Sia Seafood, NTT DATA Singapore, Racer Technology and ServoConnect Systems (Asia) – to mark the start of the training partnership.

The Work-Learn Bootcamp for Engineer 4.0

The Work-Learn Bootcamp for Engineer 4.0

SSG, Bosch Rexroth, SP and JTC signed a MOU to mark the start of the training partnership

SEMICONDUCTOR TRADEWINDS SEPTEMBER AND OCTOBER 2019

2019 has not been good for the semiconductor market but there seems to be growing optimism within the industry that the worst is past us and we are starting to see the start of a recovery. Foundry and Logic seems to be the leading segments of this recovery driven by demand from the smartphone, data center, AI and 5G infrastructure segments. Automotive is still down as in memory but there is hope that both these sectors will turn soon. Of course, this could all change if the trade war between the US and China does not improve and escalates further.

US-China Trade War

The US-China trade war continues with no final resolution in sight, with the last 2 months producing a series of ups and downs. September started with an escalation by the US putting 15% tariffs on an additional US$100 billion worth of products with China retaliating before both sides started making conciliatory measures before trade talks between both sides that took place in mid-October. Although the trade talks were hailed as successful with a phase 1 agreement in principle, we have yet to see the final details. One positive outcome was the additional 5% tariff to be imposed on October 15th on US$250 billion of Chinese goods already tariffed at 25% was suspended.

Meanwhile, Huawei is so far shrugging off the effects of the US ban and reports a 27% jump in 3rd quarter revenue to US$23.3 billion due to a surge in smartphone sales, especially in China, where it is reported to have its market share as 42%. The Huawei ban is having an impact on some companies though, especially Xilinx which expects zero revenue from Huawei in Q4 forecasting significantly lower revenue. However, UK's chip designer ARM has said it will continue to supply Huawei after its legal team ruled that its chip technology is of UK origin and would not breach US restrictions.

Meanwhile, the Japan-South Korea trade war also continues with little sign of resolution. In the last months, South Korea removed Japan from its list of most trusted trading partners, in retaliation. Earlier, Japan had put sanctions on chemicals essential to South Korea's electronics industry, including photoresist and HF etching gas, before removing South Korea from its "whitelist" of trading partners. Despite talks at the WTO in Geneva, no resolution of the conflict is in sight.

Earnings News

The sense of optimism in the semiconductor industry that the worst is over and next year will start to see a recovery is backed by the latest earnings results indicating growth has already been seen in the smartphone, server, 5G infrastructure and AI sectors. However, the automotive and memory sectors are still down.

By sector here is a roundup of some of the key earnings results so far.

Equipment makers ASML, LAM & KLA are all optimistic reporting they expect to see the growth in Q4 due to strong demand from foundry and logic fabs. For IC manufacturers, Texas Instruments revenues were down sharply, reporting weakness across all its markets and regions, and expects their revenue to drop a further 14% in Q4. On the positive side, both Intel and AMD reported strong growth and expect next quarter to be still positive. ST Micro saw strong growth in Q3 and expect a further 5% growth next quarter, whilst NXP, On Semi were up slightly compared to the previous quarter and expected to see next quarter approximately flat. For disk drives makers, both Seagate and Western Digital revenues were up last quarter and expect further single-digit growth next quarter. Whilst Samsung Semiconductor revenues were down sharply, they did report they are starting to see better demand for memory and expect demand to increase further next quarter and into next year. For RF and compound semiconductor companies, the news was mixed with Cree reporting a decline in revenues last quarter and expecting a further decline in Q4 whilst Lumentums' revenues were up 11% sequentially. Both Qorvo and Viavi reported low single-digit increases in revenue in the last quarter. Qorvo expects further increases next quarter due to strong mobile and 5G infrastructure demand whilst both Lumentum and Viavi expect flat demand.

In the foundry and subcon segment, the overall wafer foundry market is expected to drop in low single digits in 2019. However, TSMC is expected to outperform the sector and show a small growth. TSMC reported record revenue in Q3 and is forecasting a further 9% growth in Q4 due to strong 7nm and advanced technology demand. GlobalFoundries doesn't publish quarterly results but in an interview CTO Gary Paton said that for the first time, GlobalFoundries is profitable as the decision to stop 7nm and beyond development has paid off. In addition, GlobalFoundries CEO is reported to be aiming to go IPO within the next 3 years. In the test and assembly subcon segment, both ASE and Amkor reported good growth in Q3. ASE reported 14% growth for their ATM group, which includes both ASE & SPIL Test and assembly services whilst Amkor reported 21% sequential growth. Both companies expect similar revenue in Q4.

In other news, TSMC and GlobalFoundries have announced that they have agreed to settle their patent lawsuits. All litigation by both parties will be dismissed, as they agree to cross license each other's patents.

Mergers and Acquisitions

2019 has been a big year for acquisitions with around 20 M&A agreements already announced so far with a value of US$28 billion. This exceeds the full-year totals of previous years 2017 & 2018. This trend has continued in September and October with the following news.

The biggest M&A announcement was the battle for German lighting manufacturer Osram. Originally investment company Bain and Carlyle bid €3.4 billion for the company before Austrian sensor manufacturer AMS counterbid 10% higher and then later increased its bid further to €4.5billion. However, neither company obtained the necessary shares by the deadline, with AMS obtaining 51.6% of the shares which was lower than the threshold of 62.5%. Not giving up, AMS who is now the largest shareholder in Osram owning 20% of Osram shares, has made another bid again for €4.5billion but with a lower threshold of 55%. We will have to wait to see if it succeeds this time.

In other company news, Dupont announced it would sell its SiC business group to SK Siltron for US$450 million, with closure expected end of 2019. Lite-On confirmed it was selling its solid state drive business to Toshiba Memory for US$165 million., with closing in April 2020. Teledyne announced it has acquired Canadian MEMs foundry, Micralyne, for an undisclosed fee.

Dialog Semiconductor plans to acquire German mixed-signal fabless design company Creative Chips to strengthen its IoT portfolio for US$80 million.

Korean OSAT Nepes has announced it has taken over Deca Technologies' packaging line in the Philippines and licensed their advanced M-series Fan-Out Wafer level packaging technology.

After a long wait optoelectronics company II-VI finally closed its take-over of Finisar after it received approval from the Chinese authorities. The new company will be organised into 2 business divisions Compound Semiconductor Segment and the

Photonics Solutions Segment.

Elsewhere UMC closed on its full acquisition of Mie Fujitsu Semiconductor Ltd, whilst Ericsson closed its acquisition of the antenna and filter division of Kathrein and Qorvo has acquired RF MEMs manufacturer Cavendish Kinetics for an undisclosed sum.

UK epi foundry IQE has acquired full ownership of compound semiconductor molecular beam epitaxy company CDSC JV in Singapore.

Lastly, Google owner Alphabet has made a US$2.1 bid to acquire the US wearable fitness tracker and smartwatch manufacturer Fitbit, with the deal expecting to close in 2020.

Finally

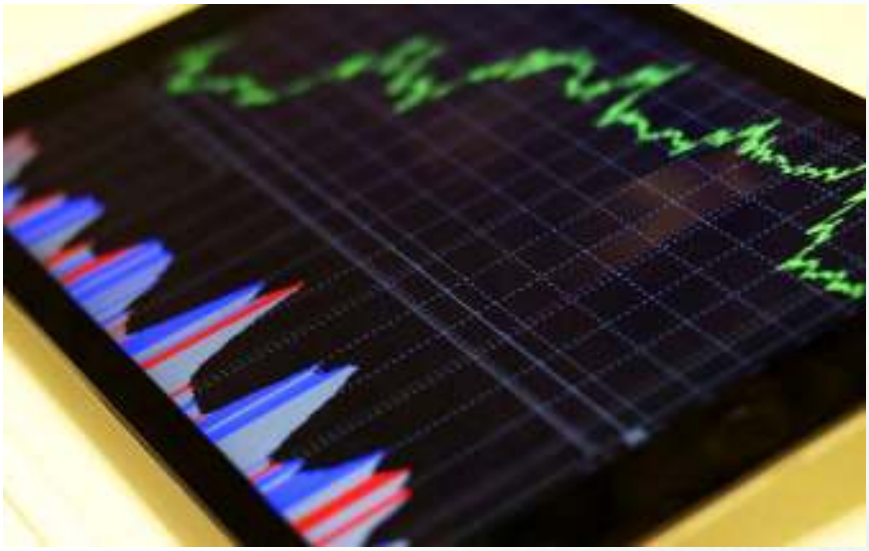
In other news Cree changed its plans and announced that its new automotive 200mm SiC Fab will now be built in Marcy, New York. Cree will be investing approximately $1 billion in construction, equipment and other related costs for the New York fab. New York state will provide a $500 million grant. The factory will ramp in 2022.

Lam Research has announced it will set up a new research and development centre in Korea. The new centre will be situated in Gyeonggi-do province close to Samsung and SK Hynix facilities.

Bosch is launching the production of silicon carbide (SiC) automotive products to help increase the range of electric vehicles. Bosch will make its SiC chips at its Reutlingen Fab near Stuttgart.

The European Union has ordered Broadcom to stop offering exclusivity deals with 6 TV and modem makers within 30 days. The ban will last for up to 3 years whilst the antitrust commission will investigate whether the Broadcom contentious practices of tying rebates or other benefits to exclusive or minimum-purchase requirements are anti-competitive. Broadcom has said it will comply with the order but will appeal the decision.

That's all for this time, with the industry being hopeful of the start of a recovery, let's hope the trend will continue and we can look forward to a full recovery in 2020.



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Singapore News

In Singapore news, ST Microelectronics formally opened a new wafer facility adding 15,000 sqm of cleanroom to the existing facility at Ang Mo Kio doubling the companies 8" wafer capacity here. Unfortunately, Dyson cancelled its electric car project and with it, cancelled its car manufacturing plant planned to be built here by 2021. In better news, JTC has announced it plans to build a new semiconductor facility in Tampines Wafer Fab Park, the first phase of the purpose-built facility will be completed by 2021.

Find out more at **www.advanteconsulting.com**

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OKTOBERTECH 2019: INFINEON INVENTS THE FUTURE WITH STARTUPS & INNOVATORS IN SINGAPORE

Infineon Technologies' OktoberTech was held on 25 October 2019, bringing together corporate innovators, startups, academics, investors and policy makers from across the ecosystem for this one-day conference.

During the event, participants got the chance to hear from industry leading technologists and innovators, learn about the latest developments and end-application trends at the panel discussions and breakout talks, and experience cutting-edge solutions presented by Infineon's customers, partners and the company, across applications such as smart city infrastructure, Industry 4.0-enabling technologies, autonomous and electrified mobility, and smart home and personal devices.

Infineon also welcomed new startups to its Co-Innovation Space as two members of the inaugural batch of startups depart with their commercially-ready solutions built with Infineon's microelectronics at the event. Three new startups, BAWA Cane, Spectronik and XaLogic, will be developing solutions for the visually impaired, clean mobility and machine learning respectively in the next 12 months at Infineon Co-Innovation Space. Two current members of the 2018 intake, Plunify and Shado, will continue their solution development at the facility.

"The outcome of the Co-Innovation Space has exceeded our expectations," said Chua Chee Seong, President and Managing Director, Infineon Technologies Asia Pacific. "Smart and secure innovations for industrial, infrastructure and mobility applications created in Singapore for the world are now ready for commercial showcase. Additionally, the synergy with the startups has helped to fan the spirit of innovation among our team and our eco-system of partners."

Cutting-edge solutions presented by Infineon's customers and partners

Students from Singapore Polytechnic showcased their latest innovation for flood detection at OktoberTech

Infineon signed three Memorandums of Understanding to boost innovation in Singapore at OktoberTech

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ACCELERATE YOUR COMPETITIVE EDGE WITH DEEP LEARNING

Starting The AI Journey With HPE & NVIDA

Artificial Intelligence (AI) is vital to the analysis and interpretation of the vast amount of data generated by organizations. Deep learning is an advanced technique offering unparalleled speed and accuracy.

Hewlett Packard Enterprise (HPE) and NVIDIA co-hosted a 2-day workshop, which introduced the deep learning and AI adoption at all stages throughout the enterprise with GPU-accelerated compute and consultative expertise in AI solution development, at HPE Singapore Headquarter on 14-15 November 2019. More than 80 participants from over 30 companies joined the 2-day workshop. This 2-day workshop is specially designed for high-tech manufacturers, showcasing AI-driven solutions such as Deep Learning (DL) - Convolutional Neural Networks (CNN). This solution has proven to be very effective for image detection and classification, which helps to improve quality through the production process.

The workshop covered key concepts of visual inspection, transfer learning and modeling, understanding of AI Ecosystem, as well as training on NVIDIA RAPIDS using HPE High Performance Computing Platform. Besides, there were 5 startup companies showcasing their newly launched AI and deep learning solutions during the workshop.

Testimonials from Participants:

"I am taking part in a auto defect classification project in my company and therefore looking for new AI, machine learning and deep learning softwares or applications. The course has introduced a lot of new technologies which I am interested to explore further."
– Chee Hong Ng, Senior Engineer

Chee Hong Ng (second right)

"Since my company is still using traditional rule-based approach to detect defect patterns, this course is perfect for me to learn more about the advanced deep learning solutions, which will improve the accuracy and efficiency in our defect inspection processes."
– Michelle Soo (Software Engineer)

Michelle Soo (first on the left)

Deep Learning Solutions Showcased at the Workshop

H2O AI – AI Automation

Abeja -Towards Industry 4.0 with Deep Learning

Mobiliya - Decrypting Digital for Industrial and Manufacturing

SixSense -Defects Inspection with Deep Learning

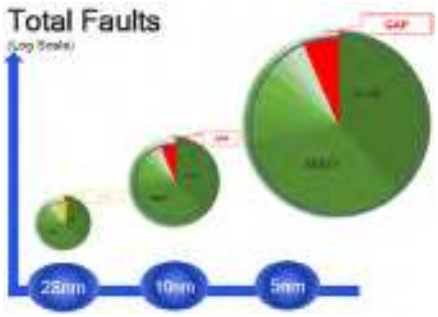
XR Vision - AI Video Content Analytics

TEST PARADIGM SHIFT WITH SYSTEM LEVEL TEST

The Semiconductor Industry Needs Continuous Improved Faults Coverage While Reducing The Overall Cost Of Test

Faults coverage is becoming more problematic as systems are getting more complex and heterogeneous, and applications are more demanding. Applications such as self-driving cars, cloud servers, AI, industrial IOT or medical devices are now mission critical, driving the need for low parts per billion (PPB) defect levels.

Semiconductors continue to follow Moore's law doubling the number of transistors at every process node. As these new process nodes come to market, higher numbers of smaller transistors will make it more difficult to catch defects, and will make test coverage more demanding.

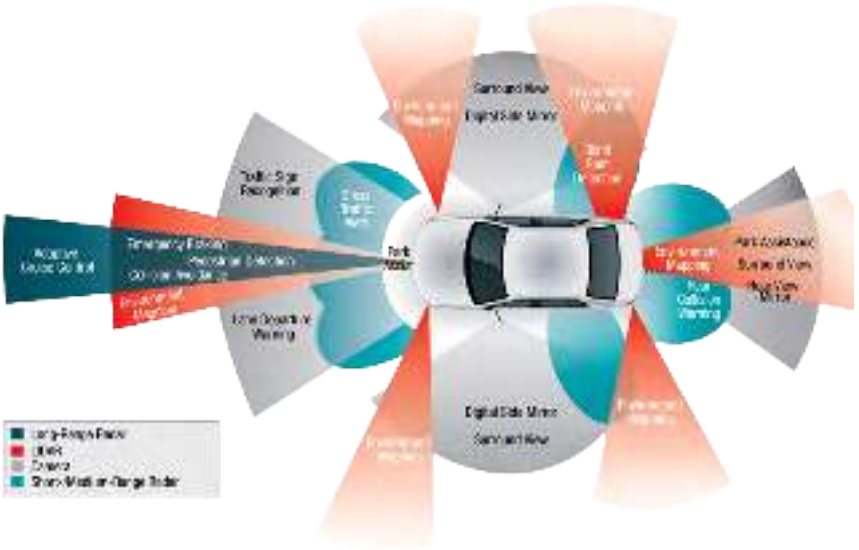


Source: Qualcomm Mike Campbell Semicon

Test coverage of 99.4% still leaves 15 million transistors untested on a 2.5 billion transistor device.

Time to market and time to revenue drives the need for shorter cycle time with increased faults coverage.

System level test in the customer application environment provides the ability to solve these challenges while providing an opportunity to significantly reduce overall cost of test.



Advanced Driver Assistance Systems (ADAS) and infotainment applications.

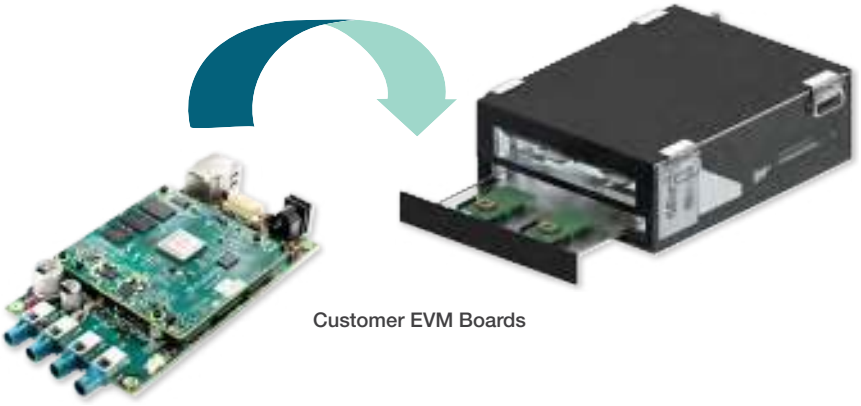
A New System Level Test Solution (AMPS)

AEM Singapore has developed a new system level test solution (AMPS) that leverages the knowledge and experience gained over the last decade in system level device handling for leading semiconductor companies.

AMPS stands for Asynchronous, Modular Parallel and Smart as key parameters for system level testing.

System Level testers need to be modular and be easily customized and reconfigured as required for specific device applications. Working with customers to integrate their modified application evaluation module into a system test handling solution leverages the existing test development.

Providing a modular approach that can be replicated and scaled enables the same system to be used in engineering debug environments and ramped in



Modified customer EVM board integration into AEM configurable test unit (CTU)

production. The production solution needs to be completely asynchronous in operation to enable each system evaluation board to be completely stand-alone in operation. This facilitates the ability to reconfigure systems without taking a line down and enables individual smart device test flows.

Modularity by re-using the same modules enables scalability for massively parallel test handlers reducing the overall cost of ownership.

System is scalable from individual devices for engineering debug up to 480 parallel sites.

Optional individual device ATC thermal control from -40°C up to 150°C enables burn-in and stress test within the same system.

Adding optional system level functional test capability (SLT+) enables BIST, MBIST and functional testing within the same system. This provides the ability to configure a system for multiple different devices or modules to be tested at the same time supporting applications with a higher mix of products such as required by OSAT's.

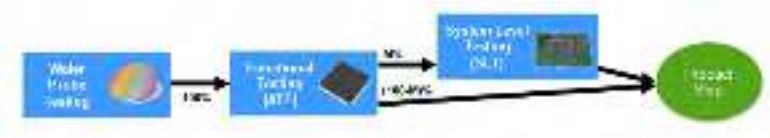
AMPS (Asynchronous, Modular, Parallel, Smart) System Level Test Enables Smart Knowledge Based Testing (KBT)

Traditional test flows include wafer test and functional ATE test.

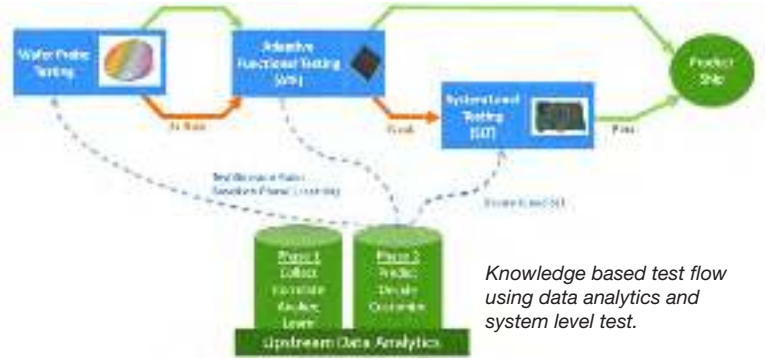
Collecting system level test data enables correlation back to the functional test and wafer test results. Stored data and big data analytics enable smart knowledge based adaptive test decisions to be made between wafer, functional and system level test (SLT) further reducing the overall cost of test.

Adding optional functional test modules into the system level tester further enables adaptive testing within the same system.

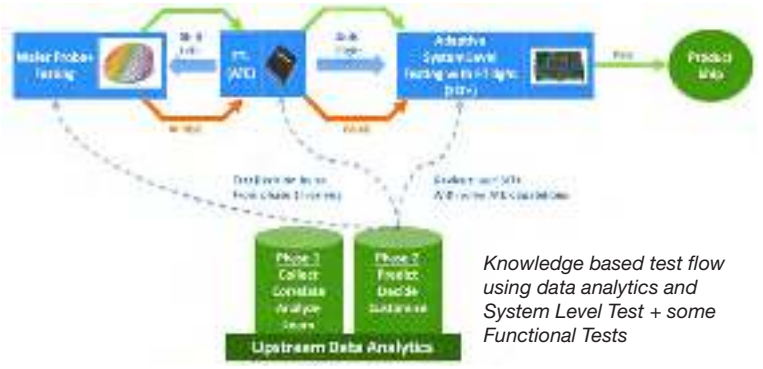
Advances in data analytics, machine learning and massive parallel test handling systems now enables a shift in test paradigm. System level testing is not a new concept but is now proven and ready to help increase faults coverage while reducing the overall cost of test.



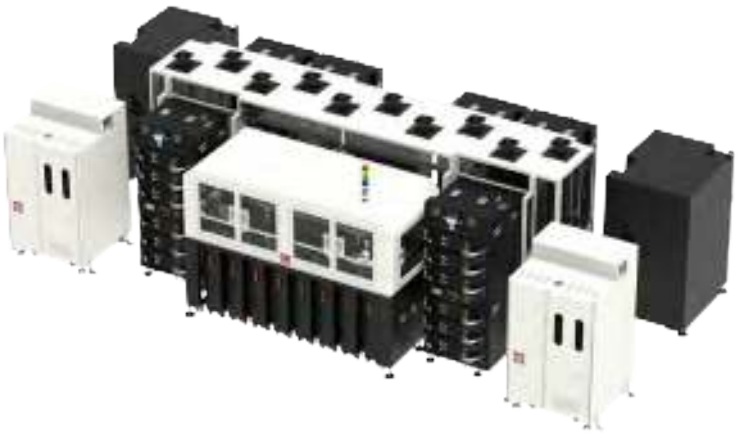
Test Flow with System Level Test



Knowledge based test flow using data analytics and system level test.



Knowledge based test flow using data analytics and System Level Test + some Functional Tests



AEM System Tester (AMPS)

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SSIA SIGNED MOU WITH SEMI SEA

(Left) Ms NG Bee Bee, SEMI SEA President, and Mr Ang Wee Seng, SSIA Executive Director signing the MOU

Singapore Semiconductor Industry Association (SSIA) and SEMI SEA reached a key milestone on 7 November 2017 by signing an MoU to start a new era of collaboration to support the semiconductor and electronics industry in Singapore and the region. The MOU signing took place at the opening ceremony of Advanced Semiconductor Technical Conference (ASTC) and Flex Conference 2019, where business leaders and technology experts in the ATE semiconductor as well as EDA supply chain ecosystem shared their insights and perspectives in these areas of interests. Under the MOU, SSIA and SEMI SEA will work together to facilitate the industry by technical sharing and learnings, expand business opportunities by networking and focus on efforts in upskilling local workforce. SSIA is looking forward to the exciting times ahead, where more joint activities and initiatives will be rolled out to support a greater growth and vibrancy for our industry.

Presentation by Mr Alvin Liew

ASTC and Flex Conference

Apart from presentations given by distinguished speakers from Singapore and overseas focusing on the development of 5G, AI, Smart Wearables, IoT and more emerging applications, the ASTC and FLEX Southeast Asia Conference also featured sponsoring companies table tops display of the latest innovations and development in this emerging sector. During the opening ceremony, Mr Alvin Liew, UOB Chief Economist, was invited as the Special Guest Speaker to talk about "Outlook for the Electronics Industry in the World of Tariffs & Trade Tensions", while Mr Ashley YAP, WSG Senior Manager was invited to introduce the concept of Talent Development and Attraction.

Sponsoring companies' booth displays at the Conference

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