



AUTOMATING PROCESSES AND BOOSTING PRODUCTIVITY

Interview with Terence Teo, President of
Singapore Industrial Automation Association

Incorporated since 1982, the Singapore Industrial Automation Association (SIAA) is a trade association for companies and professionals in the Automation, Internet-of-Things (IoT) and Robotics (in short, AIR) sectors. SIAA plays a crucial role in galvanising the AIR business community through the line-up of programmes and initiatives to foster business collaborations and build capabilities. In this edition of *Chinese Entrepreneur*, SIAA President Terence Teo shares how SIAA serves their members and how to survive the data tsunami.

Q: What are the key developments in the automation industry in the recent years?

A: The fourth industrial revolution, also commonly called the Industry 4.0 (I4.0), focuses on automation, machine learning and data exchange. This reduces manual labour and improves productivity. There is an acceleration in the use of automation systems, the IoT and AI solutions. I4.0 is a new phase for companies to evaluate their usual growth approach and think about how to sustain growth.

The best approach is to learn from others that are doing well in the industry. Businesses can adjust their traditional processes according to their own needs, pick up new robotics advancements, and explore the relations between people and robots. It is just as important to consider things like the company's platform, product size, production volume and capacity, human resource allocation, model optimisation technique and cost-effective investment.



Minister of State for Trade and Industry Alvin Tan (fourth from the left) and SIAA President Terence Teo (fourth from the right) visited a smart farm which is a project by a member of SIAA. The advanced farming solution controls the entire smart farm enabled by IoT.

Automated machines and robots are doing some of the routine tasks that were done by workers. Some are even programmed to carry out complex tasks beyond what humans can do. Workers will need to be trained to operate these machines and robots and maintain the systems.

Machines with poor health will hinder and affect the production capacity. It is advisable for companies to conduct checks and decide if they should scrap old machines and invest on new ones. Through data collection, companies will be able to monitor machine efficiency, production capacity and downtime.

Q: The Singapore economy and many traditional economic sectors are undergoing transformation. How do you see the unique role and prospects of industrial automation in Singapore?

A: It is important that companies understand their manufacturing processes, digitalisation needs and adopt appropriate data to offer quality products and services.

The IoT and AI technologies help to fill the gaps in workplaces due to labour shortage, safe distancing control, contact tracing, remote management, and remote work arrangement. Workers need to acquire new skills and adapt to the “capable machines” that work alongside them. Companies should consider the implications of job transformation, how this will change the nature of work and employment prospects.

Data is now the new currency. There is an array of technologies for data collection. How can we survive the data tsunami?

Firstly, recruit more data scientists actively. The automation industry lacks the skills to turn data into usable insights. It is not surprising that data scientist was not only voted as the best job in 2016

but has been referred to by the Harvard Business Review as the sexiest job of the 21st century. High salaries, great career opportunities and flexible working hours are factors that make this field attractive.

Secondly, get ready for the future. Although there are self-driving cars, drones to lay bricks, and intelligent computers to diagnose illnesses and issue prescriptions, computers still struggle with creativity, problem-solving and forming emotional connections with people. Once we figure out the parts of a job that cannot be automated, we should try to focus and develop skills in those areas.

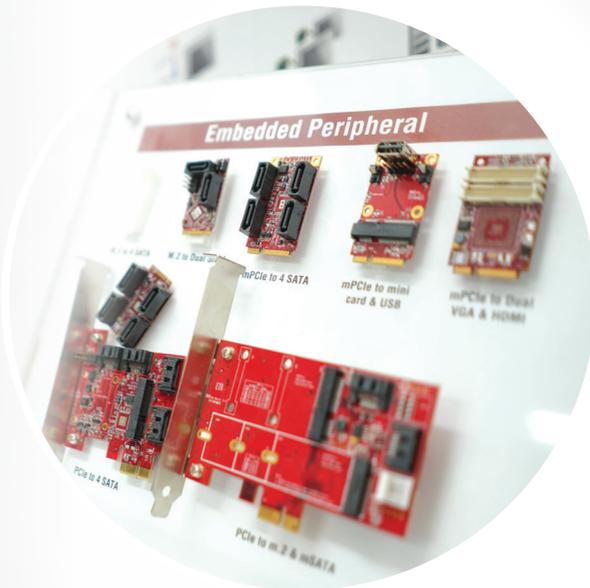
Thirdly, use data to find your perfect project or roles. Big data is not only changing our jobs but also how we find our jobs. Platforms such as LinkedIn and Glassdoor are getting smarter in understanding and matching skillsets of job seekers with prospective companies. Make sure to use these tools to our advantage – keep profiles, experiences, and recommendations up to date.

Fourthly, use data in I4.0 projects. For someone to be a technology elite, he has to be tech-savvy and able to demonstrate the ability to use data to make decisions and solve problems. A way to start is to look for data proactively. Platforms such as Google Trends and National Statistics Board offer great insights with data made available for all.

Finally, be comfortable with AI. AI-powered virtual assistants such as Siri, Google Now, Microsoft Cortana and Amazon Alexa are becoming very competent at helping us run our lives. They can manage our schedules and inform us of travel delays, breaking news, and upcoming events by monitoring our behaviour, without us telling them to do so.



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companies faced a shortage of operators in the shop floors and logistics warehouses, especially in material handling. With the implementation of the material handling robotics system, a closed loop is formed as the whole process requires little human intervention, reduces miscommunication and wrong data that is manually entered. Robots do not need to maintain safe distancing; this lowers the risk of infection. Productivity will not be affected by fatigue caused by repetitive work processes.

Collaborative robots and mobile robot transporters are used to do pick and place, high-precision visual inspection and autonomous transportation of items. Traditional processes are automated while material control processes are optimised. The production schedule will be more predictable and accurate as these will be handled by the I4.0 central management control systems.

Q: How has the COVID-19 pandemic affected the pace of industrial automation?

A: Companies are embracing automation with the tightening of the labour market and higher customer expectations. We have seen an increase in the use of service robots during the pandemic. With travel restrictions, many



Q: How does SIAA serve its members?

A: SIAA serves our members and the AIR industry in four areas:

Knowledge: Besides identifying the trends and opportunities in the AIR sectors, we also organise activities for members to share their views and feedback.

Network: SIAA has both local and overseas networks with government agencies, trade offices, associations, institutes, and companies, which help our members explore opportunities for collaboration.

Marketplace: Since 2014, SIAA has been organising the IoT Asia+ which has a wide selection of conferences and exhibitions for members to gain exposure. Members can also join our Singapore Pavilions to venture into new markets in Southeast Asia. This year, we have completed our first two Pavilions in the Philippines and Penang.

Leadership: We are always looking out for new technology, with the latest in Agricultural Technology (Agritech) and Sustainability. Members can also learn more about 5G and the management of intangible assets.

SIAA launched AIRHUB (<https://airhub.ai/>) portal in May 2021 as a repository of products and solutions of our members. AIRHUB is the marketplace for solutions and collaboration opportunities both local and in the region in Manufacturing, Logistics and Warehousing, Smart Buildings and Facility Management and Urban Solutions. End users and business owners can browse through the implemented projects and solutions for idea generation and crafting of their business models. Members can also source for business partners online.

There are about 120 companies and 190 products and solutions in AIRHUB. In 2021, we facilitated 180 targeted connections consisting of 40% business collaborations, 44% demand and supply and 16% technology.



SIAA had a half-yearly discussion with SIAA Advisor, Minister of State for Trade and Industry Alvin Tan (sixth from the right) on the issues faced by the industry amid the changing landscape.

Q: What are the key challenges faced by your members? How does SIAA address these challenges?

A: Firstly, rising costs. Collating common challenges and curating solutions help companies to reduce costs, as we work with trade associations and cluster groups to get to end-customers.

Secondly, internationalisation. Every year, SIAA organises around eight Singapore Pavilions in Southeast Asia. Through these trade shows, members can find partners and serve their customers directly. We also work with overseas trade associations to be a bridge for members to build international partnerships.

Thirdly, forming collaborations. Grouping our members into application clusters facilitates networking and capability development. For example, the companies in the Facility Management cluster (SIIX-AGT, Advantech and Anewtech) worked together on a security robot

application. In the Agritech cluster, Linkwise Technology worked with Delta Electronics and SPTel on smart urban farm projects.

Lastly, innovation. SIAA facilitates the networking of technology partners through the National Robotics Programme (NRP), Innovation Partner for Impact (IPI) and overseas trade offices. We identify members that are keen to embark on innovation and leverage on IPI's services for technology scouting and landscape studies, as well as curate tech offers and provide advisory services.

SIAA works with the Association of Information Security Professionals (AiSP) to conduct workshops on Operational Technology (OT) Cybersecurity. We also organise member visits to Singapore Polytechnic 5G & AIoT (Artificial Intelligence of Things) Technology Hub to learn about the developments in these areas.

Q: How has the Government been supporting the automation industry?

A: The Government has established the Future Economy Council (FEC) which comes up with the Industry Transformation Maps (ITMs) for 23 industries. Each ITM opens opportunities to adopt new technologies. It also provides information on career pathways and reskilling options for different sectors. Companies can build a strong network, attract talent and address skill gaps through training courses.

As a member of NRP's Project Evaluation Panel (PEP), SIAA contributes knowledge and expertise in the field of robotics as well as identify areas for research and development to

help Singapore companies.

In 2019, SIAA worked with Enterprise Singapore's Standards Division and Singapore Manufacturing Federation - Standards Development Organisation (SMF-SDO) to launch the Standards Roadmap for Industrial and Service Robots.

The Open Platform Communications Unified Architecture (OPC UA) serves as a data exchange standard for the integration of automation systems and machines. Data acquisition from machines, sensors and autonomous robotic handlers can be standardised and deployed quickly. This is at the heart of the I4.0 solutions for the industry.



A group photo was taken during the MoU signing ceremony among the National Robotics Programme (NRP), ROS-Industrial Consortium Asia Pacific, Senior Minister of State for Manpower Dr Koh Poh Koon (first row, second from the left) and SIAA President Terence Teo (first row, second from the right). Looking ahead, they will lead the industry on the adoption of the Robot Operating System (ROS).

Q: What are SIAA's near- and medium-term plans? What is your definition of success for SIAA?

A: Our near-term plan is to increase the stickiness of SIAA's services to the members as we focus on their needs in innovation and technology. Our objective is to help companies with business collaborations and capabilities building.

The medium-term plan will be to first gather the problem statements of members via design thinking workshops. SIAA wants to increase members' awareness in trending topics so that they can make informed decisions as they reinvent their products and solutions and find the right business partners.

Staying relevant and dynamic will continue to be a key success indicator for SIAA. We are transforming ourselves to serve the industry better and find new ways to sustain SIAA's operations.

Q: What are the key skills that are essential to the industry?

A: We need individuals with various skillsets in building the automation system, from developing the business strategy to monitoring equipment efficiency.

Firstly, we need mechanical design engineers to design and develop the automation system using the Computer-Aided Design and Manufacturing (CAD/CAM) software. Secondly, control engineers must be familiar with programming, dashboarding and communication protocols associated with the Internet. Their expertise in machine sensorisation, IoT gateways and edge computing are needed in data collection. Thirdly,

data science, data analytics and AI knowledge will enable engineers to design systems with predictive maintenance (PdM) capabilities. Lastly, having project-management skills can ensure the smooth implementation of automation projects. All these are essential for efficient and integrated manufacturing and control systems. 

