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German firms stepping up local R&D ties

Hima has linked up with NUS to nurture competent engineers in the field of functional safety and security, while Schaeffler is working with NTU to expand its research collaboration to focus on robotics, mobility and Industry 4.0. BY NARENDRA AGGARWAL

GERMAN businesses here are stepping up their collaboration with Singapore's institutions of higher learning like the National University of Singapore (NUS) and the Nanyang Technological University (NTU). Hima has recently teamed up with NUS, while Schaeffler is expanding its research hub with NTU.

Hima signed a memorandum of understanding with NUS' College of Design and Engineering's (NUS CDE) Department of Chemical and Biomolecular Engineering (ChBE) in August. The partnership will contribute towards nurturing competent engineers in the field of functional safety and security, Hima's vice-president for Asia-Pacific Friedhelm Best tells *The Business Times* (BT) in an interview.

They will collaborate in several areas like organising training and seminars to enhance education in functional safety and security. The Hima Customer Solutions Center will be available for NUS ChBE students to observe the actual operations in critical infrastructures. Both organisations will jointly develop cases to demonstrate how functional safety will assist Singapore's transition towards advanced manufacturing.

Best says that Hima will offer internship opportunities for NUS ChBE students to gain practical industry experience. And the two organisations will jointly conduct research on the potential of safe low carbon hydrogen technology pathways.

"Functional safety has been used for decades in critical infrastructure, oil and gas, chemical, and rail industries as a field of safety management. Despite improved safety regulations, the introduction of Industry 4.0 and the Industrial Internet of Things in the chemical industry comes with safety risks and cybersecurity threats," Best tells BT.

Every year, chemical plants, and oil and gas refineries, face hundreds of deaths, severe injuries and financial losses, and do detrimental damage to the fragile environment. The pandemic and increasing complexity around the world have exacerbated the need for industries to look into safety management, he adds.

"Hima and NUS CDE understand the need for future engineers to be prepared with adequate skills and a strong foundation in functional safety and security. Besides, the lack of skilled talents with safety knowledge may potentially hinder Singapore's transition towards advanced manufacturing," notes Best.

Shaping young talents

As Singapore has solidified its reputation as a regional education hub, Hima is committed to help shape and nurture young engineering talents in the Asia-Pacific region. It hopes to perform a pivotal role in energising young engineers for future science, technology, engineering and maths (Stem) career opportunities by offering internship opportunities.

"We are providing students with a real-world environment where they can apply what they have learnt in classrooms to action. We believe that students will be able to understand the theories better through experiential learning opportunities. We aim to mentor, guide and prepare them in becoming the up-and-coming generation of industry professionals," Best says.

Friedhelm Best of Hima says: "Hima and NUS CDE understand the need for future engineers to be prepared with adequate skills and a strong foundation in functional safety and security." PHOTO: HIMA

The newly launched Hima Customer Solutions Center in Singapore will be made available for NUS students to have a hands-on experience with the safety systems, typically not accessible for experiments, and to behold the actual operation in critical infrastructure.

"We allow students to interact with simulations of process controls and determine outcomes in safety, hazard identification and risk assessment. The hands-on opportunities offered by us along with the knowledge and skills that students gained in the classroom, will empower them with confidence and competencies to solve complex real-world problems," explains Best.

Besides Singapore, Hima has simultaneously opened a Customer Solutions Center in Bruhl, Germany, which was created for customers, partner companies and employees. "We are creating completely new opportunities to experience, test and further develop safety and security solutions together with partners and customers. By locating the experts in one place, discussions can be more illuminating and customers' questions can be answered and validated more effectively," Best says.

According to Hima, it is the world's leading independent provider of safety-related automation solutions for the process and railway industries to protect people, the environment and capital assets. Founded in 1908 and headquartered in Germany, the family-owned company has about 800 employees and operates worldwide.

Another German company, Schaeffler, is working with NTU to expand its research collaboration to focus on robotics, mobility and Industry 4.0. "Schaeffler focuses on bringing innovation to business and enhancing the company's technological and methodical capabilities. Under the Schaeffler Hub for Advanced Research (Share) programme, we have partnered with NTU in establishing a joint lab to undertake research in the pioneering fields of robotics, digitalisation and Industry 4.0," Dharmesh Arora, regional chief executive officer (CEO) Asia-Pacific, Schaeffler, tells BT in an interview.

The Share collaboration leverages NTU's innovative technology competence and Schaeffler's components and system expertise. Following an application oriented approach to conducting research, Share at NTU will combine the academic perspective from the university and Schaeffler's industry expertise to ensure that the research conducted is academically and industrially relevant, he adds.

This collaboration will help to develop smart mobility devices to support Singapore's Smart Nation vision. "Riding on the initial success of the collaboration, which included the implementation of a fully functional R&D (research and development) demonstrator of a personal mobility device, Schaeffler has since broadened its R&D activities," says Arora.

Application-oriented research

The joint lab agreement beginning 2020 is to conduct application-oriented research with NTU in three main areas: industrial collaborative robotics, automated mobile robot platforms, and Internet of Things for smart factory applications.

"With support from various government agencies, the lab aims to nurture a collaborative ecosystem by encouraging partnerships in key industrial areas, including new production concepts and advanced manufacturing technologies to support the country's focus on digitalisation and innovation," Arora says.

Situated on the NTU campus, Share's research and manufacturing capabilities are backed by NTU's School of Mechanical and Aerospace Engineering and School of Electrical and Electronic Engineering expertise. The company on campus concept allows for close collaboration among Schaeffler employees, researchers, PhD candidates, and students on strategically important future topics.

"As we expand our scope of research this has correlated to the expansion of our lab to 580 square metres and increase our talent resources to around 70 research staff comprising professors, PhD candidates and undergraduates," says Arora. Similarly, the team at Share at NTU comprises a diverse range of students and staff from various

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backgrounds and expertise, including industrial design, mechatronics engineering, AI (artificial intelligence) specialist, embedded and control engineers, as well as human factor experience.

Arora says Schaeffler is working with NTU as it sees innovation, technology, efficiency and processes as success factors in enabling it to bring stronger innovation to its business and position the company better for the future.

"We have also defined six product innovation clusters and two production innovation clusters in which innovative ideas are checked against their market potential and Schaeffler's areas of expertise. As part of this framework, we signed the joint lab agreement with NTU in early 2017, focusing on the development of smart urban mobility devices. The partnership grew to become one of the innovation hubs within Schaeffler, where advanced technological products and urban mobility solutions from Singapore were deployed across our business," Arora notes.

Some successes from the collaboration included the foundation for developing a highly-integrated drivetrain for scooters, which eventually became a Schaeffler product. Since then, the company has expanded the scope from personal mobility devices to new research areas.

Dharmesh Arora of Schaeffler says: "With support from various government agencies, the lab (with NTU) aims to nurture a collaborative ecosystem by encouraging partnerships in key industrial areas, including new production concepts and advanced manufacturing technologies to support the country's focus on digitalisation and innovation." PHOTO: SCHAEFFLER

Innovation challenge

Beyond serving as a corporate innovation lab, Share at NTU also acts as a stepping stone in identifying and developing new talents through the various collaboration initiatives with the university. For instance, Schaeffler recently collaborated with NTUitive – the innovation and enterprise company of NTU – to organise an innovation challenge to explore robotics for vertical farming.

"The Share at NTU team also consists of interns from the Singapore University of Technology and Design, and collaborates with local companies to combine art, science and technology to crystalise innovation for our products and businesses. Most recently, our collaboration with an innovative local design firm for our Dual EXtendable (DEX), the Autonomous Mobile Robot, saw us being awarded the Red Dot: Best of the Best award in the Red Dot Design Award under the Design Concept category," Arora points out.

"Share at NTU is part of our Share programme, which comprises a global research network with leading universities worldwide focusing on applied research to expand the current state of technology and transfer these new insights into Schaeffler advanced development and product development activities," he adds.

Each Share has a distinct focus of research including electric and automated mobility, digitalisation and data science, interurban mobility, particularly on railway technology, and solid-state batteries.

"Share also serves as part of our strong academic cooperation framework with local institutions in the region. Most recently, we signed a memorandum of understanding with Burapha University in Thailand to support upskilling and re-skilling for engineers, workers, and graduates through courses, learning programmes and technical training at the university's EEC Automation Park," Arora says.

Founded in 1996, Schaeffler (Singapore) has been the regional headquarters for Asia-Pacific since 2014 and plays a pivotal role in Schaeffler's transformation and growth in the region where the company has over 6,000 employees across nine production plants and R&D facilities at eight locations. In 2015, it also set up Schaeffler Aerospace Singapore, which is a maintenance, repair and overhaul facility for the aviation sector.

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