

## RACER TECHNOLOGY

# Running the technology race

Known for its engineering design capabilities, contract manufacturer Racer is now using digitalisation and IoT to take it to the next level.

**F**EATS of engineering fill the cabinets and adorn the walls within Racer Technology's Changi South premises, from a calculator dating back to World War II to photographs of classic cars placed alongside snapshots from the firm's history.

In the conference room where chief executive officer Willy Koh sits down for an interview with *The Business Times*, the items crowding the shelves bear a deeper significance: they are products that the firm has helped to create for clients over the past two-odd decades. "They have the idea, the concept," he says. "We give them the solution."

The riot of form and colour attests to Racer's varied portfolio. Although 65 per cent of its business comes from medical devices, the contract manufacturer has had a wildly diverse back catalogue, from early mobile phones and car navigation systems, to Kickstarter creations today.

With stringent certification and testing requirements, medical devices take a particularly long time to hit the market and require "deep pockets" explains Mr Koh. An insulin pump they developed, for instance, took 12 years. "So from the very start, we already had to do other devices."

He and co-founder Hsu Shen Kuo, a Harvard professor, started out designing medical devices in the San Francisco Bay Area in the United States. Within a year, they decided that they needed to have production capabilities for prototyping. So in 1995, they bought over an existing moulding company in Singapore and renamed it Racer Technology.

## MAKING THINGS POSSIBLE

Some contract manufacturers simply take a client's design and follow it faithfully, says Mr Koh. In contrast, one of Racer's strengths is its engineering design capabilities: "We co-design for you."

The firm can come up with the mechanical design for a product idea or revamp a design for more effi-



cient production, for instance by reducing the number of components required.

Why not use these design skills to manufacture their own products? Says Mr Koh: "I'm an engineer, I'm not a marketing guy." He would rather focus on solving engineering puzzles instead of coming up with products of his own, which he would then have to worry about pushing out.

It also makes sense to develop products for established firms with strong brands and existing markets, he adds. "If I develop something and put my name

on it, 'Racer Technology' – nobody knows you." Instead, he has developed products for major companies in the United States and Europe, some of which have histories going back 100 years or more.

Given the long approval period for medical devices, maintaining collaborations with firms is also helpful, with the technology used for one product potentially applicable to newer ideas as well.

In 2014, Racer worked with US start-up Nanomix to develop a quick testing kit for ebola, which took the form of a microfluidic chip: a chip that detects

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changes in a fluid, in this case blood, at the micro-level. In contrast to conventional blood tests that might take days, the chip can give a diagnosis in mere minutes.

Now, Racer and Nanomix are reapplying that technology to create a chip for diagnosing the cause of a heart attack. This test can be done in an ambulance on the way to the hospital, saving valuable time and allowing for swift treatment. Mr Koh estimates that the approval and certification process will take three years.

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placed to apply the knowledge acquired from one product to others. Its US design office, still active today, receives a lot of business from projects on crowdfunding website Kickstarter, as the startups who use the platform are themselves located in the Bay Area.

Many such products are tech-heavy gadgets, part of the Internet of Things (IoT) movement, says Mr Koh. "So what we learn from IoT, we also implement in medical devices."

Activity trackers are one example. Racer is exploring such wearable possibilities with the Singapore Institute of Manufacturing Technology's (SIMTech) Emerging Applications Centre, which has capabilities in printed electronics.

Mr Koh took Racer abroad early in its history, starting a factory in Batam within a year. "If you only have a factory in Singapore, it's very tough to survive," he points out. Singapore's high costs make it relatively uncompetitive for manufacturing.

In addition to two factories in Singapore, Racer now has four factories in Batam, two in Malaysia, and one in India, with over 1,000 employees in total. All high-volume production is done overseas. Yet it is still important to keep facilities in Singapore, adds Mr Koh, to benefit from "made in Singapore" branding and the country's many free trade agreements.

Racer's foreign factories are all in territories where Singapore was involved in setting up industrial parks. Recently, Racer took cues from the government in another area, thanks to a different sort of overseas foray.

In 2016, it participated in a business mission to Germany led by Spring Singapore, which has since merged with International Enterprise Singapore to form Enterprise Singapore. The business mission was an exploration of the "Factory 4.0" concept, in which digital technologies are integrated into the production process.

"When I came back, I told my team: 'I want this yesterday,'" quips Mr Koh.

Fortunately, Racer found a partner in SIMTech, which helped them with solutions in three areas:

operations management, equipment effectiveness, and inspection.

"We give you visibility so you can manage your operations better," sums up Wong Ming Mao, deputy director for industry development at SIMTech's Manufacturing Productivity Technology Centre. SIMTech's solutions can also be customised for firms, ensuring that they address the correct needs. "Everything has to tie in with your business model. You don't transform just for the sake of transforming."

Operations management software makes planning and order tracking easy, a mobile workflow app helps with quality inspections, and overall equipment effectiveness software gives real-time information on the yield and efficiency of machines.

Previously, machine efficiency had to be manually calculated. Now, that is automatically calculated and displayed. The data on machine utilisation can also be used to determine the amount of buffer capacity, which helps in planning. If last minute orders come in, for example, the firm can swiftly determine how much spare capacity can be brought into service, instead of having to laboriously calculate this manually.

#### AMBITION PLANS

Mr Koh has more ambitious plans for the use of digitalisation and IoT technologies. The next possible move: assessing not just machines, but individual operators. If each product is RFID-tagged, it could be possible to track which operators do best in terms of quality of output and efficiency, he suggests.

Talent, after all, is a perennial concern. SIMTech has helped in this area too, seconding a research engineer to Racer for a year. In the last few years, Racer has also started internship programmes with polytechnics, the Institute of Technical Education, and the Singapore University of Technology and Design. It hopes to increase the current three-month internship duration to six months.

Besides training a new generation of engineers, Racer wants to shape the future of the industry in other ways. Around 2013, it began forming the Singapore Medtech Consortium. From just seven firms onboard at the beginning, the grouping has close to 30 firms today, including investors and distributors – "the whole ecosystem," says Mr Koh.

Through the consortium, Racer acts as a mentor to small and medium enterprises (SMEs), and even serves as a contract manufacturer.

Explains Mr Koh: "The problem with the local SMEs is that if you are not very big, you cannot spend a lot of money on the certification." By using Racer's services, these SMEs can ride on Racer's certification and expertise. Even in the competitive medtech industry, the race of innovation does not have to be run alone.



## Getting systematic

WHEN Kelvin Tan left a Japanese multinational corporation (MNC) to join Racer Technology in 2004, he suffered a massive culture shock.

"I almost gave up in my third week," he admits with a chuckle.

The industry itself was not foreign to him, as his previous employer manufactured components for medical devices. Rather, the main difference was that Racer seemed to be running in an ad hoc manner, "without really a good system," he recalls.

Why had he left his previous employer in the first place? At that point in time, many MNCs were shifting their manufacturing operations out of Singapore to lower-cost countries. His former employer had offered him a post in Batam, but Mr Tan decided to join a local small and medium enterprise (SME) instead.

"I think our Singapore SMEs need industrial practitioners that have acquired knowledge from the MNCs, to boost our local SME sector," he says.

He chanced upon a newspaper job ad, seeking someone with knowledge of medical devices for a quality assurance role.

Racer Technology's quality assurance and regulatory vice-president Kelvin Tan (right) has been entrusted with the company's "Factory 4.0" digitalisation drive, which has benefited material and planning manager M Thamarai Selvan.

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Thanks to his previous job, he was well-versed in the relevant standards and requirements.

He got the job – then discovered just how different life in an SME could be. But he credits Racer founder Willy Koh with giving him a reason to stay on, saying: "He has a very strong urge and drive to push Singapore SMEs to greater heights."

Mr Koh supported and empowered him to revamp the company's systems and culture. Today, Mr Tan, 52, is Racer's quality assurance and regulatory vice president.

Around 2016, Mr Koh entrusted him with Racer's "Factory 4.0" digitalisation drive. Together with the firm's general manager, Mr Tan did surveys and market studies to find the right digital solutions for Racer's needs.

A lot of providers were entering the Singapore market at the time, but Racer was meticulous in doing its homework. Says Mr Tan: "Not every set of Factory 4.0 (solutions) can be applicable to any trade."

In the end, it was Racer's existing partnership with the Singapore Institute of Manufacturing Technology (SIMTech) that supplied the lead. SIMTech representatives heard that Racer was exploring Factory 4.0 solutions, and offered their own.

The great advantage was that SIMTech's solutions could be adapted to Racer's specific production processes, with the software being customised for and integrated into Racer's machines.

One of the digital solutions has also aided him directly in his job: a tablet-based application for quality inspections, which replaces tedious, manual, and hard-to-retrieve paper records. With this web-based system, his team can send information to him at any time – if they detect non-conformity or need a second opinion, say – even if he is overseas.

Material and planning manager M. Thamarai Selvan, 42, has also benefited from the digital drive. He joined Racer in 2005 as a quality assurance engineer, back when the team relied on "basic software and a lot of paperwork."

Over the years, this went fully digital, and a proper enterprise resource planning system is now in place. Unlike the old software, which offered little traceability, the current system allows for easy tracking of records, going back as far as a decade.

In his current role, he handles customers' material requirements, selecting raw materials for new projects. Racer's records have benefited long-running customers as well, he notes. If customers have lost records of the materials used in previous products, Racer's well-kept system comes to the rescue.

"They themselves might not know, but we can find out for them," he says with a smile.