



# Advanced manufacturing in tomorrow's factories

For a long time, manufacturing was constrained by the need to have a minimum order quantity (MOQ) before it is considered cost-effective to make that product. Then came mass customisation, where manufacturers could make a product with variations, for example, in size and colour. Today, technology has evolved to allow companies to hyper-personalise a product, reducing MOQ to just one, which means consumers now have a hand at deciding how they want their product to be without having to pay a forbidding cost.

This means, for example, that a beverage company could allow a consumer to customise the sugar level of a drink, from 0 to 100 per cent, at no extra cost even if the consumer decides to choose

specifically 23.1 per cent or 89.3 per cent. The order information is then transmitted to a robot responsible for assembling the ingredients at a high speed. The final product is despatched to the individual consumer once completed.

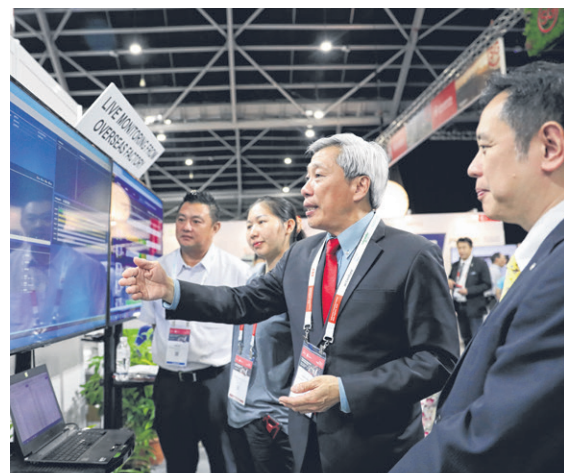
This shifts the manufacturing process to the post-order point, in effect creating on-demand products. Ultimately, it minimises wastage and cost as producers would not need to anticipate demand levels.

And all this is feasible using Industry 4.0 tools, which emphasise automation, connectivity and intelligence.

**BY SHARON SEE**

## Digital twin

In manufacturing, a digital twin would be a digital replica of a machine or robot. It allows users to monitor an equipment's functions and conditions in real time, using a combination of computational modelling and data collected from the equipment through sensors, which means users are also able to anticipate potential machine malfunctions even before they occur.



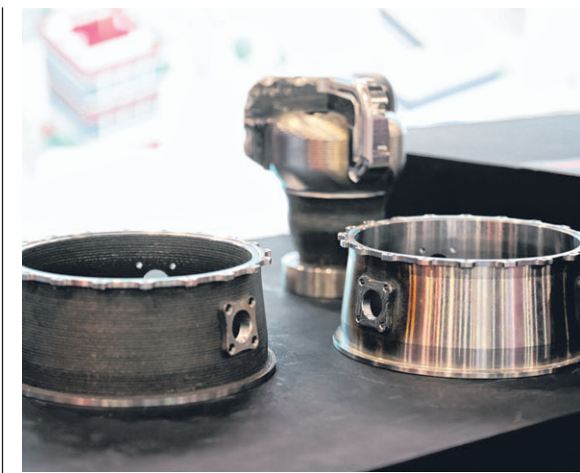
## Industrial Internet of Things (IIoT)

IIoT is essentially Internet of Things with unique industrial specifications. High connectivity becomes important in a huge factory floor with multiple connecting points. Using IIoT, business owners can also monitor offshore factories and equipment. Flexspeed Technology developed a system to remotely monitor the Overall Equipment Effectiveness (OEE) of equipment located in overseas factories.



## Real-time cost monitoring

The Smart Cost System, developed by local precision engineering firm SMT Technology, allows users to track the real-time cost of manufacturing each unit of the company's product. This means that if the unit cost exceeds a predetermined limit, a supervisor of the process can look into the factors causing the spike in cost. This may include material cost, electricity, machine depreciation and length of downtime. "Monitoring the cost is a more direct way, instead of looking at a lot of indirect data," Gerry Ong, director of SMT Technology, said, referring to data that captures a machine's efficiency in percentage terms.



## Additive manufacturing

3D printing of metal parts allows users to make a custom order of one piece, reducing the cost and time needed to replace faulty or worn parts of a machine, for example, particularly if these parts are no longer in production or where bulk ordering is not feasible. This is especially popular in the aerospace and maritime industries.