

Upping the ante in automation

Companies that only a few years ago might have balked at the idea of automating key elements of their production, are now biting the bullet.

Paul Gander looks at what's happening

In early January, in the closest he got to New Year wishes for the industry, environment secretary Michael Gove confirmed to

FoodManufacture.co.uk what many already knew: that food manufacturers "[could not] rely on importing an endless supply of cheap labour", when others were investing "in more capital-intensive and productive methods" to maintain competitiveness. In contrast, robots in particular have been coming under fire from much of the media over their potential impact on jobs within the domestic workforce.

At Schneider Electric, vice president for industry in UK and Ireland Martin Walder says he has been involved in robotics and automation for years. "In the early 2000s, take-up was relatively slow, and compounded by the influx of eastern European labour. At the time, the government was not a fan, tending to equate automation with unemployment," he explains.

After taking over as chair of the Engineering and Machinery Alliance (EAMA) in 2008, Walder says he took an active part in seeking to shift government attitudes. "Since then, I think we've seen a change of view about the value of automation," he says. It is not simply the Brexit-fuelled worry about workforce numbers (and skills) that explains this evolution in attitudes. "Payback is constantly improving and, at the same time, the capital cost of the robots themselves is a lot lower than 10 or 15 years ago," says Walder.

At Siemens UK and Ireland, head of food and beverage Keith Thornhill now chairs the Industry Advisory Board at the National Centre of

Excellence for Food Engineering at Sheffield Hallam University. As part of the government's overall industrial strategy, the new Food and Drink Sector Council, which met for the first time at the end of January, holds out the promise of funding and support for automation, among other key issues, he says.

But, evidently, little of this has materialised yet in terms of any positive impact on robot sales. In fact, if we look at just the last two years, the opposite is the case. At the British Automation and Robot Association (BARA), one of the organisations coming under the EAMA umbrella, president Mike Wilson says his members sold 149 robots to food and drink manufacturers in 2016. The equivalent number for 2017 was 102. At the same time, robot sales across all industries totalled 1,389 in 2016 and 2,066 in 2017.

GROWING INTEREST

Wilson says: "Although the figures show a decline, there's been significant growth in the level of interest and enquiries from the food sector over the last six months, with the main driver being concerns over the future availability of labour." Meanwhile, BARA says it expects robot sales to

food and drink customers to increase in 2018.

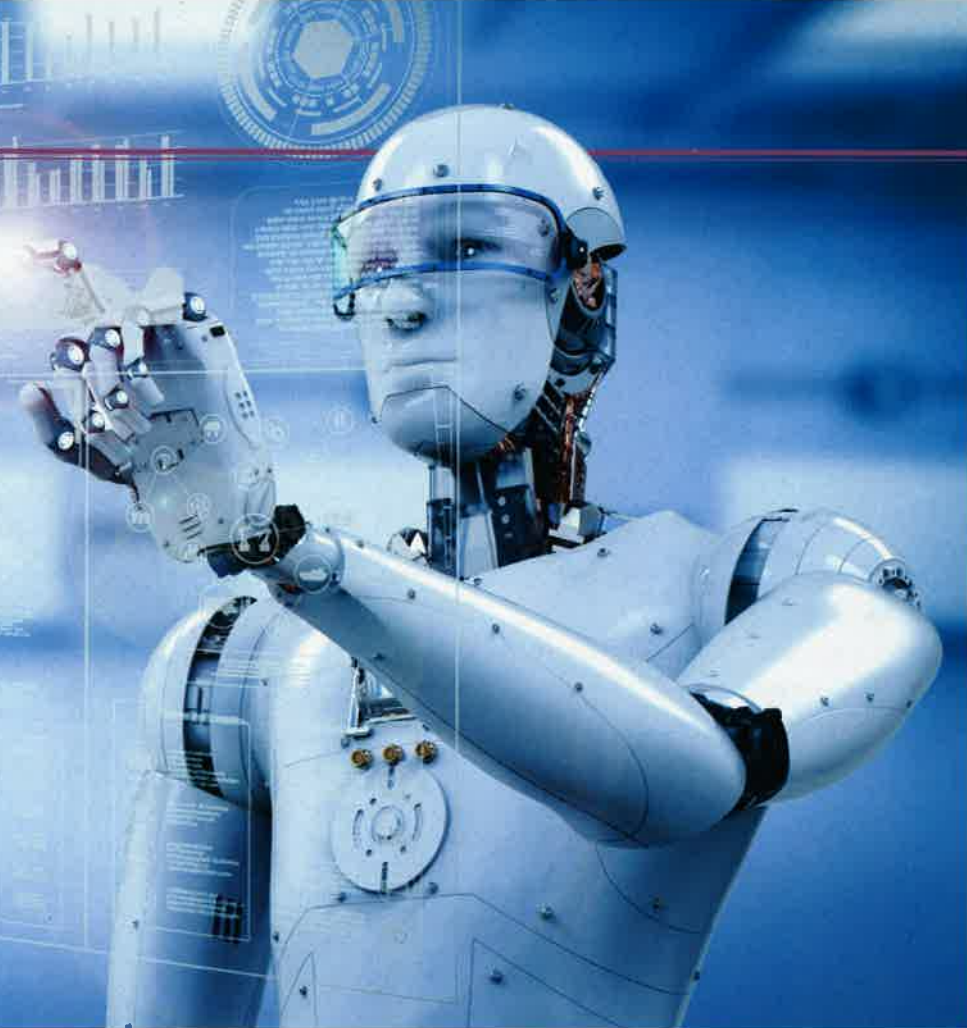
While most of the larger food and drink businesses have embraced automation and robotics, the attitude among small-to-medium-sized enterprises (SMEs) still varies enormously, says Walder at Schneider, with many still "running away" from technology. "I think they're terrified of having technology in their factories that they don't understand and may not be able to support," he says. "It's not so much to do with the capital cost, but that remains an issue, too."

Even among larger manufacturers, the picture with regard to automation is not clear-cut. "Many will have automated in the 1970s or '80s," says Thornhill at Siemens. "We have a culture of sweating assets in this country. The attitude is, 'If it works, just crack on.' We often hear companies say they automated, but it's not delivering what they need, especially in terms of data and continuous improvement."

Older lines may simply be a composite of supposedly automated solutions from different original equipment manufacturers (OEMs). "Someone has to make those individual machines into a production line, to address communications and interfaces," he says. "Return on investment [ROI] can start to plummet. There's often an urgent need to standardise and run it like a complete and integrated line."

For smaller businesses especially, he claims, the entire question of payback and ROI is being reformulated, in some quarters at least, in a way that sidelines issues of system obsolescence and support, too. One emerging investment model, based on outcomes, means that the customer

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pays for the service on a per-pack basis rather than buying the machine.

"It can be good for both parties," says Thornhill. "There's better cash-flow for the OEM, with accurate data on how the machine performs, and the customer gets a better deal, too." Such systems can be supported by cloud-based data analytics that are able to deliver continuous improvement, Siemens points out.

DATA AND DIGITISATION

Data and digitisation can deliver other benefits, including traceability through production. Engineering company OAL has been working with researchers from the University of Lincoln and the English Provender Company to develop robotic systems for weighing and handling ingredients. "The more human intervention you take away, the more digitised it is, the easier it is to track and trace ingredients," says Jake Norman, head of innovation at OAL. The project is backed by funding from Innovate UK, and includes a collaborative robot (cobot) at the micro-ingredient weighing station, able to weigh ingredients to an accuracy of 1g.

At the same time, the most effective types of automation ensure that equipment availability is maximised. When Tate & Lyle acquired Swedish oat ingredient manufacturer Biovelop in 2013, it already had a clear vision of how its Kimstad plant could evolve. Working with partners including ABB Drives, it was aiming for continuous operation combined with optimal equipment efficiency. In fact, Tate & Lyle reports a 10-fold increase in capacity over the four years to

the end of 2017.

"The plant was already automated to some extent, for the volumes they produced back then," explains Brith Isaksson, global sales and marketing manager for food and beverage at ABB Drives. "They did not have as advanced machines as [they do] now. The purpose was to scale up production both in kilos per hour, but also to run it for more hours per week."

Contributions from ABB included 44 digital valve positioners, 85 variable speed drives (VSDs) and motor control cabinets. Remote monitoring and fieldbus flexibility are among the system capabilities. Importantly, the fieldbus digital communications used for device control is split from the fieldbus running asset management.

"This ensures that I can make any changes to the configuration of devices without the risk of the whole network going down," says Leo Dijkstra, Tate & Lyle's power and controls team leader. "Should a VSD fail in the Kimstad factory, I can connect to the internal network from my personal computer wherever I am."

GRADUAL PROCESS

For some growing companies, automation is a gradual process, Marel Poultry supplies fully-automated high-speed lines to high-volume processors, but also offers a modular approach, which is especially relevant to SMEs starting out as largely manual operations.

"The processors we supply might start at around 1,000 or 2,000 birds an hour," says technical director for product development Wim Beeftink. "For turkey and duck, numbers can be

even lower. By the time you get to around 15,000 birds an hour, you will be looking at a highly-automated operation. But, in fact, you start to automate from day one, even with the smallest capacity."

Certain functions, such as product inspection and grading, are likely to have specific transition points between manual and automated options. "Camera systems are typically installed on a grading line when throughput is above 6,000 or 7,000 birds an hour," says Beeftink. "Below that, theoretically, you can carry out 'A-B-or-C' grading manually."

RETURN ON INVESTMENT

When it comes to making decisions on whether to automate, "it totally depends on volume," he explains. "For any workstation, the customer has to look at ROI, and usually in our industry ROI is less than a year. If the ROI is there, they will usually make the investment."

As well as guaranteeing maximum equipment availability, manufacturers increasingly want to be able to measure it, typically as a component of overall equipment effectiveness (OEE). Marel, for example, has its OEE software tool Innova Impaqt. This measures the operational status of equipment, its efficiency when operational, and product loss and yield. "A very good production manager in a small operation will probably pick up on, say, 80% of these issues," says Beeftink. "But worldwide, just how many of those exceptional line managers are there?"

Impaqt gathers real-time data from sensors integrated throughout the line. Sensors of this sort play a critical and growing role in all types of operation. As Walder at Schneider Electric says: "What our customers can do now, compared with 15 years ago, has changed dramatically.

"Even in the mid-2000s, an automated line would typically require large robots, PLCs [programmable logic controllers] and drives, with sizeable controllers for each robot. It could get quite complex, and synchronisation was often not the best. Now, one controller can control and sequence the entire line and link it in to the supervisory level. That's a game-changer, and the biggest single advance has been in the area of smart sensing technology."

Control of production lines rather than sensing used to be the priority. "Today, these functions give manufacturers real-time data on how products are being produced, which in turn feeds back into a capability to change that production," says Walder.

Nor does he believe that these capabilities have reached their peak yet. "Smart sensing is going to get better and better, with data sent straight to the web," he says.

However, any automation wish-list today should include evidence not only that the ROI is there, but also that the technology is future-proofed and can be updated as required.