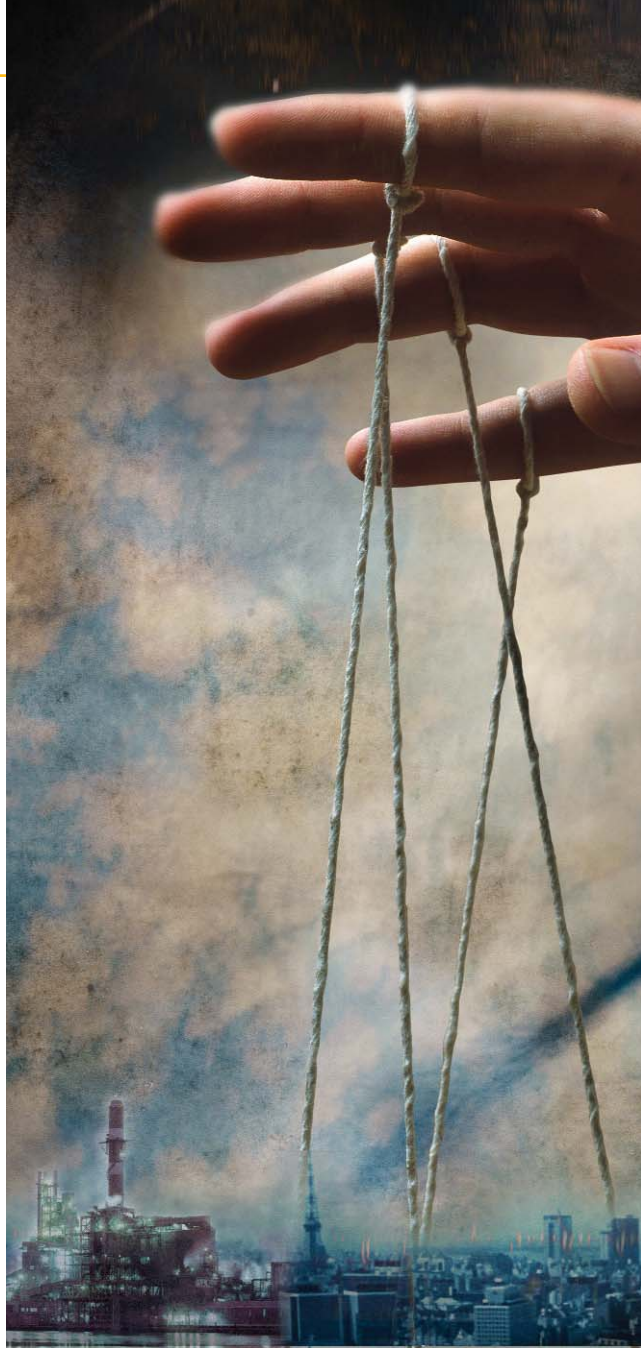

Going even more demand-driven has to be one of the most important goals in manufacturing for this year. Brian Tinham assesses what's involved and some of the solutions

Manufacturing to the

Most of us know that we need to do something radical in manufacturing to tackle stiffening competition, particularly from the increasingly active low cost economies around the world – like India, China and eastern Europe. We also know from looking at what's happening in the global automotive sector, among others, that top of the list is changing more of our production, where at all possible, to building only what customers order, rather than making to-forecast and/or to-stock.

Do it well, and that's where the biggest cost savings come: slashed inventory in raw materials, WIP (work in progress) and finished goods, as well as reduced costs, better margins, fewer discounts, less obsolescence, space savings and so on. Indeed analyst AMR puts the potential gains of going for what it terms the demand-driven supply chain (DDSN) – and this inevitably has to involve your supply chain, not just your shopfloor – at 5–7% greater profitability, 17% more perfect orders, 10% revenue improvement, 15% less overall inventory and 35% shorter order-to-cash cycle times.

Those figures are the result of broad DDSN initiatives, covering supply, product and demand management, with integrated, synchronised processes achieved through collaboration – which is a lot to take on. But the bald fact is that substantially increasing the percentage of your make-to-order (MTO) and keeping it efficient, is likely to have ramifications for much of the organisation. And changing to make what customers want when they want it, rather than carrying on attempting to sell what you make, is fast becoming the difference between success and your epitaph.

So what do we have to do? I'm afraid there's no single answer. A great deal depends on the industry you're in, size of the organisation, position in the supply chain, nature and location of production, warehousing and distribution, lead and cycle times and product ranges and their complexity – not to mention the sophistication of your existing processes and IT.

Even sales product configurator IT, a classic first line for easing complex MTO, isn't universally the way to go, and it won't bring success on it's own. Ditto for finite capacity scheduling (FCS) and advanced planning and scheduling (APS) systems, now increasingly indistinguishable at the factory level: they can transform knowledge of your capabilities, drive up utilisation and OTIF (on time, in full) customer service stats, underpin continuous improvement, help sort out bottlenecks – the list goes on – but IT alone is rarely a panacea.

Then again, think about the pragmatism of lean thinking and its spread of methodologies: today, there are almost as many routes to improving performance in the real world of wide product ranges, ordering variability, seasonality and the rest as there are manufacturing scenarios. And much the same applies to the modern incarnation of TOC (Theory of Constraints) – now seeing resurgence, and continuing to prove its worth for those that dare go the whole Goldratt hog.

But there is good advice out there. Companies like Cincom, IFS, Infor (the Lilly Software component), Intentia, Microsoft Business Solutions, Oracle, SAP, SSA Global and SSI all offer both MTO functionality and useful observations.

pull of the customer

For example, IFS' latest white paper includes material on learning the lessons from project-orientated manufacturing. Indeed, Alastiar Sorbie, formerly UK managing director but now taking over as global CEO, suggests that some emphasis needs to be on functionality traditionally buried in engineering PLM (product lifecycle management) systems – able to deal efficiently with engineering re-use, change management and the bigger picture of variable production management.

SSA sees the priorities as fourfold: order and forecast accuracy, inventory management and new product development. Looking at its first point, by way of example, the firm insists that to get order-related processes slick and error-free, "every customer order [must] seamlessly become a purchase order for raw materials, a works order for manufacturing, a transport order for trucking and a pick order for the warehouse." That, it says, is the only way to shorten lead times, get invoices out faster, cut the cost of freight and improve service.

Intentia points to the need to deal with what Andrew Dalziel, product director of supply chain management, describes as the 'four vs' – variety, volume, velocity and variability. He points to the explosion of product data resulting from variety, and suggests that manufacturers need better master data management with the ability to recognise attributes for product configurator support, ideally taken out to the web, and with available to promise (ATP) functionality. As for 'volume', the smaller batch sizes that result from MTO mean a need for different types of controls – so, for example, electronic kanbans, back flushing support and better scheduling.

High speed manufacturing

Then for 'velocity', Dalziel points to the need for companies to be more responsive, which requires properly integrated, real-time systems with, for example, fast, memory-resident, simulation-based scheduling – which also answers the requirement to handle variable demand. "Because the market is more volatile and batches are smaller, you have to be able to reschedule production several times a day," he observes.

Meanwhile, Oracle's view isn't wildly different, with Ed Stubbs, UK product director, pointing to the overriding importance of responsiveness and customisation, and suggesting that the pendulum of outsourcing is swinging back in favour of UK manufacturing. For him, it's then about focusing on flexible line and product design, to enable effective postponement and mixed-mode production, but also e-kanbans, work orderless manufacturing and so on. He also advises concentrating on lead times and suppliers, with supply chain sytems, so that whatever the demand mix, it can be produced quickly and efficiently.

Sounds like modern lean thinking? Stubbs points to enlightened manufacturers increasingly calling it 'JCS', just common sense manufacturing – mixing and matching popular initiatives and enabling IT. He does, however, point to the importance of flow manufacturing software, as per JCIT International, much of which is supported in the Oracle E-Business suite. And when it comes to choosing an ERP system, he suggests looking into total cost of ownership, scope for integration and adequacy of middleware, web portal support and the like, not just for supply chain connection, but to leverage legacy system data.

Thinking about the factory, all that points to considering some of the functionality lumped into 'manufacturing execution systems' (MESs), and linking those into ▶

Smurfit Ward: slashed sales and production planning meeting times, while reducing set-up times and waste across work centres – despite smaller batches and more complex to-order jobs – all through low cost APS

usually slightly re-purposed ERP – at least the MRPII. We're talking about electronic production and/or maintenance management systems, shopfloor data collection (SFDC) systems, scheduling aids and analytics that can hang off these.

It's worth remembering that even if you have MRP, if it's not the latest generation, likely limitations will include infrequent runs, infinite capacity assumptions and poor near-term scheduling. For optimised and streamlined operations we need systems that take account of availability of raw materials, assemblies, subcontracted work, resources running and real-time constraints, but maybe also labour and skill sets, WIP, preferred routes and so on – and do so quickly and concurrently, also providing easy graphical views and 'what ifs'.

Getting visibility of exceptions, consequences and best ways around them puts you in a much stronger position to manage the challenges that going closer to the wire of MTO invariably throws up, and doing so proactively – whether that's through alternative routes, subcontracting, flexing labour, whatever. APS engines can do exactly that; older MRP can't.

On top of that, if you have integrated electronic SFDC then you've got a feedback route to improving the integrity of your BoMs and routings – not only making future scheduling and customer information more precise, but improving efficiency and flexibility while cutting costs. It also potentially enables activity-based costing, and reveals the reasons for variances, helping to direct continuous improvement.

> **"It allows me simply to adjust the schedule to prevent a bottleneck"**
>
> *Dave Hampson, Smufit Ward*

Best to get your own perspective on what could work for you through the experiences of some who are already well advanced. Take professional cleaning equipment manufacturer Numatic, based in Chard, Somerset – famous for its smiling 'Henry' industrial vacuum cleaners. Andrew Smith, manufacturing manager, says that apart from a dozen versions of Henry, everything else – and that's around 300 more versions of Henry and 4,000 other catalogue items – is built entirely to-order – and that's at a site which has in-sourced much of its production, including powder coating, injection moulding and rotational moulding.

It runs everything, from sales orders to invoicing, on Oracle – WIP, inventory, capacity planning, routings, BoMs, engineering change control, purchasing, requisitions, the lot. "There are around 400 terminals and it's used by everybody, including end of line testing, with results going immediately into Oracle for traceability," says Smith.

Interestingly, despite product variety, this company doesn't use a configurator. "We looked at them," says Smith, "but we have a well defined and repeated range. If we used a configurator, sales would have to enter 25 lines to specify a product, whereas they insert one part number to raise a BoM. Also we have electrical approvals all around the world; if we tried to specify rules for every possible combination, we would soon be in trouble."

He prefers to use skilled people in sales and production planning, and then to simplify production with lines dedicated to product ranges and some overlap, plus a flexible workforce monitored on a Truetime time and attendance system. The clever bits are then harnessing Oracle's capacity planning to see what's realistic, alongside Oracle reporting to check KPIs in production and throughout the business. Most of the rest is automated, with work-to lists and priorities issued to line supervisors at the front of production, forward-planned against assembly and due-date requirements at the back end.

"We call it JCS, 'just common sense', or agile manufacturing, and sometimes fragile manufacturing," quips Smith. It's slick, and he isn't looking to change much. Apart from moving Oracle onto Linux this year, and looking at its supply chain and warehouse modules, his next project is to extend barcoding, again for efficiency.

Meanwhile, Peacehaven, Sussex-based Screen Solutions, the largest office dividing screen manufacturer in Europe with around 10,000 product lines, does use a configurator (Eden Origin from Datadialogs) to manage the front end of its MTO business. Colin Rawlings, Screen Solutions' IT manager, says that was the only way to get efficiency and accuracy into sales engineering. The system sits on top of a Geac Streamline ERP system running on Microsoft, with Eden passing verified BoMs for custom orders to ERP, which generates demand from twice-daily MRP runs, as well as works orders and cutting lists for the factory.

Rawlings accepts that MRP may mean the company holds more material than it might, but says it makes for efficient, low cost buying of what amounts to only three main elements – aluminium extrusions, glass and fabrics, albeit around 400 of the latter. Much of the product uniqueness is in the precise product size and shape, so scheduling too is relatively simple, in this case still on whiteboard. Beyond that, as with Numatic, there's huge reliance on ERP for reports and analysis, with information provided via an intranet.

Meanwhile, Leyland, Lancashire-based paper packaging materials supplier Smurfit Ward reckons it's slashed sales and production planning meeting times while also significantly reducing set-up times and waste across work centres, despite smaller batches and more

complex to-order jobs – all through adopting low cost APS. Before implementing the system, the company was driven by works orders generated by its Sage ERP, but subject to the usual interpretations around operators' priorities, in this case involving printing machines and tubers (bag/sack forming machine), all with their own set-up times and batch quantities to consider.

Having tried and failed with spreadsheets, white boards and job tickets, the company went for Preactor. Implementation took a month, much of that time ensuring information from Sage was accurate and could map to Preactor, which now provides work-to lists.

Future-gazing

Says planning manager Dave Hampson: "I use the system's Gantt charts to manually schedule activity on the shopfloor, but it's also excellent for 'what-if' scenarios, such as alternative scheduling routes and anticipating problems during production, and determining the best way to ensure lead times are adhered to. As soon as an order is placed on Preactor 200, I can tell whether we can make the lead time without any snags, or whether we need to inform the customer that delivery will be slightly later. In many instances it allows me simply to adjust the schedule to prevent a bottleneck."

He also says the system prevents orders being lost on the shopfloor. "Because the information is stored on Sage and Preactor, we no longer have to worry about losing route cards. We can also reduce the amount of time many of our managers spend in production meetings. Preactor facilitates better communication as a single point of contact between sales and production." Hampson estimates payback on the system will be within 24 months – and adds that the company has also gained competitive edge in being able to turn round rush jobs without impacting other orders or incurring too much overtime.

It's a similar story at Halkirk, Caithness-based MTO joinery and composites business Geddes Windows, which makes windows and doors. Geddes' managing director Kenny Falconer says that until a couple of years ago, the firm was scheduling using white boards. "As orders increased, there came the time when we were in danger of losing control: we had no reliable visibility. Everything we do needs to be driven by delivery date."

Falconer soon focused on Preactor APS through reseller Resource Management Systems. Configuration here took just two days plus a few weeks of customisation. Initially, Geddes used the system to flag late orders and drive action, while also providing accurate delivery date information for sales enquiries. But since then the company has extended it to deal with problems like bottlenecks and production sequences, optimising work-to lists according to orders and production mix.

Now, Falconer says he uses the system to spot potential problems well ahead of time. "From a business planning point of view, [it] allows us to see immediately what we would have to do to get production levels up comfortably, without any major constraints... Within six months we had recouped the investment, simply by keeping orders flowing, achieving lead times, and being able to schedule in more orders within a quicker timeframe due to the increased scheduling efficiency." ■

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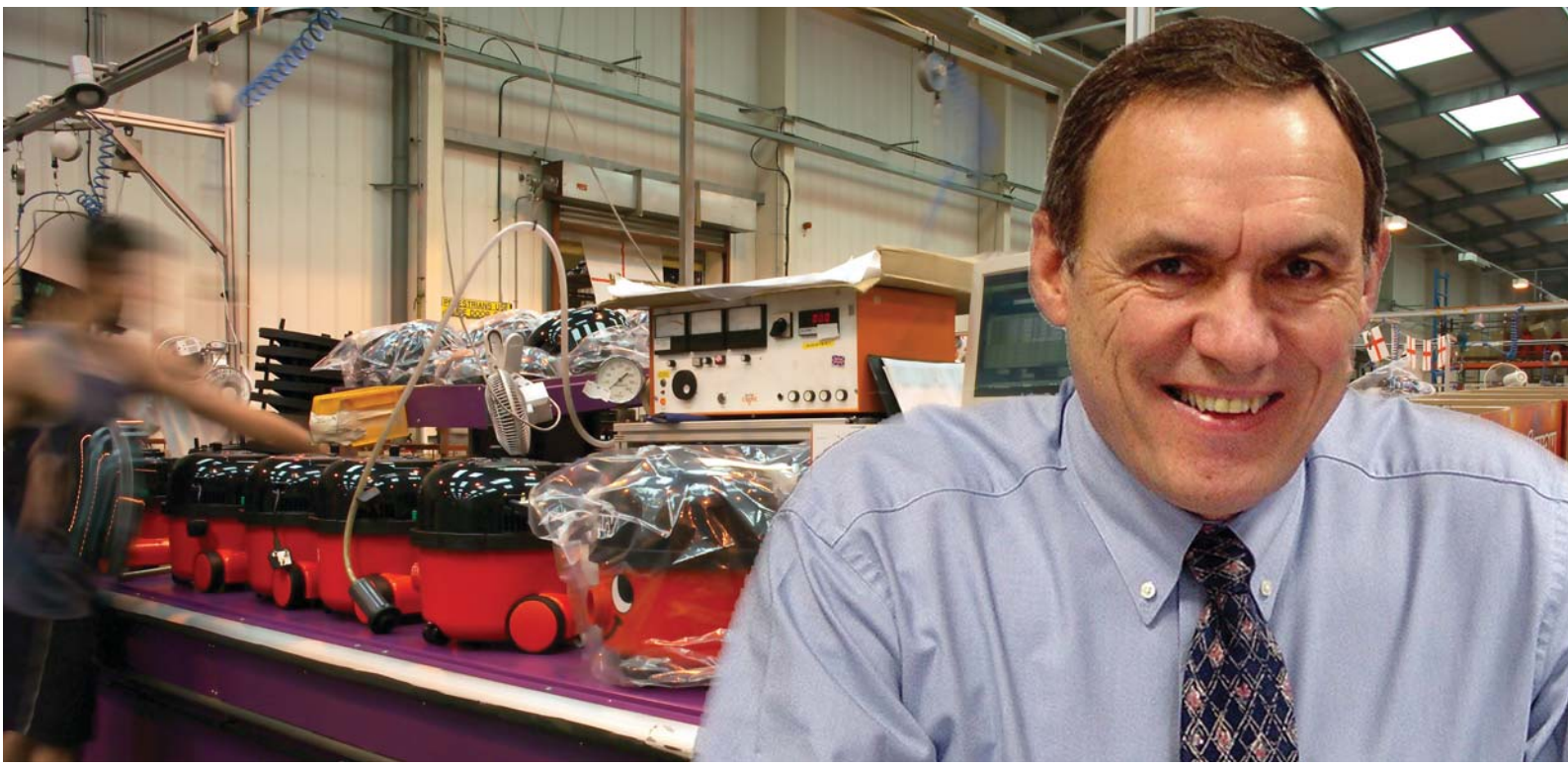

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