

INTERVIEW FOR MANUFACTURING COMPUTER SOLUTIONS

Lean Rapid Replenishment Loops: the Challenge for the Next Decade

10 years ago, Professor Dan Jones shocked the manufacturing establishment by declaring what many suspected but few dared say – that MRP couldn't cut the mustard. Brian Tinham finds out what he believes has changed and what's key for the next 10 years

The challenge for manufacturers over at least the next decade will be to revolutionise their supply chains, moving to decentralised, replenishment-based models assisted by rather different enterprise IT. It took Toyota 25 years and it's taken Tesco seven years, so this isn't going to happen overnight – but for companies to survive, they have to start work now. Just as important, ERP software developers need to engage in mature, frank and open debate so that they can play their proper part, rather than being left behind.

So says lean thinking guru and founder of the Lean Enterprise Academy (LEA) Professor Dan Jones, who famously said in this journal at its birth 10 years ago: "MRPs are junk." Today, he admits to that as an extreme view, driven out of frustration with manufacturing managers attempting to paper over the cracks of their apparently ordered, but actually disjointed, chaotic and ultimately flawed systems. Centralised MRPII within ERP couldn't run fast or frequently enough, was being fed with inaccurate data and was anyway designed for outmoded on-forecast and -stock activity-, not flow-based production. "If you try to impose MRP on chaos, you just get more chaos," he said then, and that much remains absolutely true.

But what about lean? 10 years ago, even the thinking, never mind the application, was nowhere near as developed as it is today. Although we date lean to the mid 1970s – and indeed some of the concepts go back to Toyota's work in the '1930s and 40s – actually, the revolutionary Jones & Womack book 'Lean Thinking' book wasn't published until 1996. "We'd crystallised a lot of our thinking by 1994 following on from the book, 'The Machine that changed the World'. But at that time, all that was known about lean was in the automotive sector, and at that only really in Japan," agrees Jones.

"Toyota, Honda and Nissan were doing it, but the Ford Production System didn't exist; the only western company getting there was Valeo in France... Toyota actually learnt flow production from Henry Ford's plant at Highland Park in 1913. But Ford abandoned that for mass production in his second River Rouge plant in 1927 – which was organised by departments and batches to cope with product variety That's what spawned the requirement for MRP able to manage the complexity of lots of departments, materials, batches, capacities, schedules and so on.

"What Toyota did was turn the original flow idea that worked with no variety, into a system that worked with variety, and by the '60s that was fully developed, at least internally. By the end of the '70s they had writing it down for the first time in order to teach their suppliers. But the first translations did not appear in the West until the late '80s." Which brings us back to 'Lean Thinking'. "That was about turning the vision and the model into something that could work. It was an agenda for action." And it was published at a time when Nissan and Toyota were growing fast, and the western automotive giants were having to respond.

Jones and the LEA team now spend their time taking lean knowledge to other sectors – pharmaceuticals, healthcare, construction and administration, HR and sales. "Everyone thinks they're different – high volume, low volume, service businesses, build-to-order – and they are different, but the logic behind their processes is largely common. What they need is translation into their language."

And for him the proof of that is Tesco. “In 1996, Tesco was on the point of going for an MRP/ERP system, but they wanted to know if the Toyota system could work in retail. We worked with them, and over time they reorganised their supply chain, with regional distribution centres and rapid replenishment from their suppliers to those. The new system is all about continuous, distributed rapid replenishment, not attempting to manage vast complexity of production and logistics across whole supply chains using centralised systems, forecasts and overnight batch runs.

“As a result, service levels are up, cost of goods is down and Tesco is market leader. This year, it’s also taken control of the inbound supply side, picking up goods from its suppliers to schedule – which benefits Tesco, but also its suppliers because they can synchronise better to customer requirements and get better levelled production.”

And that’s going to be the way of it for all of us: rapid replenishment loops cascading through distributed supply chains, triggered in this case ultimately by goods taken off store shelves – without the noise, amplification and error of batched and aggregated, centrally-managed systems. “It’s modelled on what Toyota did with its after-market parts distribution system,” says Jones. “Not only is it efficient, but there is no escape. Asda and others are doing it; more will follow suit, maybe through third parties.”

So what of the IT? “Tesco didn’t buy ERP: instead it developed its own system which it called CR, continuous replenishment,” says Jones. He concedes that any business still needs to forecast, to see trends and to manage capacity, resources and materials into the future. “But that’s not the same as attempting to drive production from a 13 week forecast, and having that cascade down a supply chain,” he insists.

“What I said 10 years ago was over-dogmatic. We’ve learnt a lot since then: we’ve learnt that the MRP aspects of ERP try to do too many things: they try to optimise production scheduling and materials and capacity planning across activity-based shopfloors and supply chains. Those two pieces need to be separated: manufacturers need to forecast and plan materials and capacity, but they need to optimise production scheduling with lean replenishment systems.”

If they’re not, then, with MRP in the driving seat, the whole value chain is subject to the noise, errors, delays, safety stocks, long lead times, constantly changing schedules and fire-fighting – all the problems, wastes and inefficiencies we know too well. “From a near term production standpoint, Tesco effectively triggers its whole supply chain at one point – when the customer pulls goods off the shelf. You can liken that to products being shipped from a finished goods store, or if it’s build-to-order, then a trigger further up the chain.”

Jones accepts that all operations are inevitably subject to choices and interruptions, but points out that Tesco reduces noise and risk by breaking its chain down into his small rapid replenishment loops, with the structure built into the process itself. And that’s how shopfloors, and by extension, supply chains, can be run – at a micro, semi-autonomous level.

What about finite capacity scheduling systems and advanced planning and scheduling? Jones doesn’t dismiss these systems. He agrees that simulation can help production planners to optimise schedules and be fleet of foot. However, he’s concerned about the hidden assumption that all routes and operations will work within defined timeframes. “In the Toyota model, it’s the other way around: Toyota assumes that even the best lean production system will be subject to interruptions and failures, so that’s managed by planning for all possible failures with a view to getting back on track fast.”

Agility isn’t about optimising for today’s unexpected problems and opportunities: it’s about getting noise out of the demand signal all the way up all the supply chains to maintain the flow. And that’s achieved first by analysing the causes of noise. “For example, Toyota looks at customers’ demand signals and compares those with what they needed. There is always a gap, and that can be due to algorithms like MRP, delays in hand-offs, aggregation for economic batches, truck loads, and so on. And the same is true well away from shopfloors – in sales offices, for example.”

So the goal of demand analysis is education towards levelling. “From then on there are lots of different ways to level demand – over time and through standard inventory,” says Jones. “In the factory there are always runners, repeaters and strangers. With runners the

variance in volume is usually low so you can flow, but you have to manage your strangers which you build-to-order separately; the trick is to go through product ranges and eliminate the special elements in the repeaters that complicate flow.”

But here comes the rub. “Most manufacturing managers like the idea of flow,” says Jones. “Their equipment, or rather the material movements between stages, may not be capable of it, but they like the ideal. What they don’t get is the levelling and pull scheduling – and that’s where we’re at right now. Most companies haven’t reconfigured their production and supplier strategies to meet that challenge.”

Jones is convinced that when realisation dawns, levelling, ‘pull’ and rapid replenishment will gather momentum like an avalanche racing through supply chains. What’s in the way is the will to work with suppliers and customers, and understanding the IT requirements to make it work.

“People haven’t been ready to hear about it, but everything is changing,” he suggests. “Manufacturing users want lean and not MRP because they’re cynical about ERP, but they don’t know what information systems they need to make lean work all the way from production up through the supply chain. And neither do the ERP companies... It needs an honest, mature, adult debate with the ERP software vendors to get that part of the jigsaw right.”

And that’s happening. Apart from a few false starts, which Jones identifies as “ERP vendors adding ‘lean modules’ and selling ‘lean ERP’ that isn’t” or “demand flow technology which is essentially ERP with bottleneck management”, the drive to compete will force the pace for dialogue. As will enabling technologies like RFID, which because of the data overload it will generate are going to break existing ERP systems.

Says Jones: “One of the key points here is that until recently, software companies could only sell systems to optimise pieces of the supply chain – not all of it. And that’s the way manufacturing users have thought. But that doesn’t get you the ultimate benefit: it just delivers you lean islands...”

“People are no longer frightened by the idea of understanding their process flows. We’ve built the mechanisms, the models and the language to help them see all that, and more of them are getting it. So in an ideal world, they know they want to reorganise to get that flow working. The next great challenge is to take it supply chain wide. Remember, it took Toyota 20 or 30 years, so we can expect this to be the challenge for at least the next decade.”