

Lean Manufacturing: Is It Really Worth It?

By R. Michael Donovan

Long production runs, big backlogs and long lead times are fast becoming operating styles of the past. Flexibility and quick response must become the norm. The driving force behind this need is customers who increasingly expect short lead times for products configured exactly as specified and delivered on time, every time.

The trend of quick-response, no-excuses delivery has put many manufacturers in the uncomfortable position of having to conform or lose business to a competitor who has developed short cycle time capabilities. To meet competitive requirements and reduce costs, many manufacturers are turning to lean manufacturing techniques to drastically cut cycle time and increase their competitive edge.

What, where, and why

Lean manufacturing is a high-velocity order-to-delivery process that many manufacturers have successfully used to improve overall business performance. In an environment that employs this process, inventory is “pulled” through each production work center only when needed to satisfy a customer requirement. This means the entire organization must be configured for maximum flexibility and quick response so custom orders can be filled as quickly as standard orders.

The demand-based “pull” of material through production is in sharp contrast to the traditional “push” production method, which is driven by an MRP schedule that often pushes inventory into stock that may not reflect what customers need.

Compounding the problem, push production typically cannot adjust for sudden shifts in what customers really want, resulting in longer lead times, too much inventory and lower customer service.

Lean manufacturing can be used in production environments involving highly complex and variable products, even in engineered-to-order situations. It does not have to be a highly repetitive production environment to achieve synchronization and a high-velocity flow of quality information and material. Using lean manufacturing techniques and the *right* information systems technology, product complexity and variability do not pose the barrier they once did to creating a flexible and fast order-to-delivery process.

As requirements in the marketplace mandate more and more high-velocity, on-time performance, customers can, and will, change suppliers when they are unable to get the goods they want when they need them. The objective is to get today’s order produced and shipped without “yesterday’s orders” being in the way and stopping the flow.

High-velocity flow

Lean manufacturing emphasizes flexibility and throughput, with total order-to-delivery cycle time reduced to the bare minimum. As a consequence, more far-reaching processes and cultural changes are needed for successful implementation of a lean process. This is necessary because substantial redesign of a number of business processes is needed; not just “some” improvement of, say, inventory planning, but changes in the entire order-to-delivery flow of information and material.

A company that can benefit from lean manufacturing is usually easy to identify. Inventory accumulates in buffer stocks, which is both a sign and a cause of excessive cycle time. There are serious balance and flow problems, with excessive inventories in subassemblies and/or raw materials, and work-in-progress (WIP) is held up because of bottlenecks and poor information flow. Scheduling and rescheduling in these environments is often a constantly attempted task but valid, do-able schedules are never really achieved.

Those manufacturers who can pull together all of the pieces with lean processes can cut their cycle time by at least 60 percent and usually much more. Lean manufacturing drives out the heavy costs resulting from imbalanced production schedules, excessive WIP queues and the high fixed overhead costs that result from trying to manage operations in disarray.

One durable goods manufacturer succeeded in cutting cycle time by 80 percent, reducing required factory space by 50 percent, and cutting rework by 90 percent. The average working capital needed to support the business dropped by more than 50 percent over a two-year period, which allowed for other investment opportunities to strengthen the business.

Not just information technology

Lean manufacturing is *not* achieved by just installing new information systems technology. However, getting all the needed elements to come together requires that the information flowing into and through the business be of very high quality – accurate, meaningful and up-to-date - and precisely synchronized with the flow of material. Addressing this requirement is usually a major, but most worthwhile, task for many manufacturers.

Advanced planning and scheduling systems (APS), as well as electronic enterprise linkages, can sometimes help solidify improvements in customer service, inventory deployment and reduced cycle times to improve every function of the business. Also, improved process and information quality help eliminate many of the human handoffs and interventions that slow the order-to-delivery process.

Better Balance

When too many manual interventions and variations are present, the problem is not just one of cutting out non-value added activity, but also the value-*subtracting* activity caused by errors that are often repeated every day.

In addition, implementing lean manufacturing mandates the need for better balance and faster flow of material through production. In most cases, the company will need to reconfigure its manufacturing processes from large lot, functionally-oriented methods to more flexible, quick changeover smaller lot methods for fast response and higher throughput.

Exhibit I
Performance Improvement Potential

Once management understands and accepts the dramatic change in overall business performance that is possible, improvement goals should be established to a timetable.

<u>Performance Improvement Goals</u>	<u>Your Company's</u>	
	<u>12 Month Goal</u>	<u>24 Month Goal</u>
• Cost to produce down 20 - 30%	_____	_____
• Manufacturing lead time decreased by 50 - 90%	_____	_____
• Overall cycle time decreased by 60%+	_____	_____
• Inventory down 50%+	_____	_____
• Cost of quality reduced by 60%+	_____	_____
• Factory floor space reduced by 30 - 70%	_____	_____
• Purchasing costs down 5 - 10% every year	_____	_____
• On-time performance of 98%+	_____	_____

Sometimes easily justifiable capital investment is required, but most of the time substantial improvements in flexibility and cycle time reduction can be achieved with current equipment.

Remember, not just labor and inventory costs are saved by higher throughput and reduced cycle time – customers are more satisfied, and that is where the money is.

Measuring Performance

One of the weak links in many manufacturing companies

is in the performance metrics used by management. Very frequently, performance metrics isolate only on areas such as labor efficiency, machine utilization, overhead absorption and purchase price variance. When the pressure for performance improvement is focused on these areas you can be sure that the organization will respond, not necessarily in the most positive manner, when the entire business is considered. For example, parts and product will be produced and put into inventory, even when they are not needed, to satisfy what management communicates as important in terms of measurable results. Too often, this creates too much inventory of unneeded material and shortages of materials that are needed. Ultimately, cycle times become longer and the customer service level goes down which is the exact opposite of what management wants to achieve.

Just changing performance measures will not bring about lean manufacturing, although they are absolutely critical to the transition. The lesson to remember: management can ask for anything, but they will get what is encouraged by the measurement system.

Improving operating performance

The advantages of lean manufacturing go beyond just productivity gains and decreased cycle time and inventory (see Exhibit I).

Because new system enablers can link together the entire enterprise, as well as the entire supply chain, administrative productivity improves with redundancies eliminated. Orders can be processed without adding layers of paperwork that often waits in queues, sometimes with unknown or uncertain priority.

New working capital reduction techniques can be used. For example, completed products can be periodically backflushed to decrease inventory balances, allowing automatic vendor payments based simply on that day's or week's material consumed at the company's location but still owned by the

Exhibit II Implementation Methodology

1. Organize and plan for Lean manufacturing with executive champion.
2. Conduct extensive education
3. Value stream map administrative, engineering and production processes
4. Develop concept for lean manufacturing pilot
5. Establish improvement targets
6. Develop time-phased implementation plan
7. Present lean manufacturing pilot concept and plan to management
8. Obtain management approval and commitment
9. Train all employees involved in pilot
10. Implement pilot

vendor. This technique can also minimize the vendor's days outstanding in accounts receivable.

In companies with poor customer service performance levels, with service levels as low as 75 to 85 percent, low quality sales planning information is often one of the culprits. Also, product specifications and bill-of-material errors exist, and inventory records are inaccurate, among other things. In many cases, manufacturers often rely on suppliers with quality problems and/or who do not ship on time. Lean requires high information quality and close coordination with suppliers whose processes and systems may need to be upgraded to get their performance synchronized with your new level of capability.

Lean manufacturing is only as good as its weakest link. In one case, a two plant company improved its overall service level from 77 to 90 percent as a result of traveling part of the way toward full implementation of lean manufacturing.

However, so far the company has missed the chance of hitting a 99 percent or better service level because the plant supplying part of the

material continues to operate under the old, unreliable, and less flexible "push" method of production. As a result of the much improved performance at one plant, a change in the poor-performing plant to lean manufacturing is not only desirable, but inevitable.

How to get started

Getting started with an effective program to implement lean manufacturing requires careful planning, design and execution of the business changes needed to achieve the desired improvement goals. Implementation should not begin unless top management is solidly championing the effort with an understanding that many business processes must be changed. Starting with a pilot product line or another contained area of the business is a big help to "proof" your concept and methodology – see Implementation Methodology in Exhibit II.

Should you invest in lean manufacturing? This question, in one form or another, and management's answer to it, will certainly set the direction for the future. First, the decision to go forward is much easier to make if lean is thought of and used as a competitive strategy for increased marketshare, generating more revenue, and fostering profit growth. Certainly, reductions in inventory and costs are also big benefits. Second, if your competitors get the jump on you in terms of response time, delivery performance, working capital, etc., how long will your company be able to compete? The worst position to be in is when you are constantly trying to catch up. The leaders always make more money.

About The Author

R. Michael Donovan has consulted with executives and key decision makers in over 1,000 manufacturing companies during his 30 years as a management consultant. His firm, R. Michael Donovan & Co., works with manufacturers to achieve breakthrough performance improvements. Mike can be contacted via e-mail at rmd@rmdonovan.com or by telephone at 508-788-1100.

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