

Lean and Mean: Applying Lean Manufacturing Principles to the Supply Chain



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Gartner, 2012

Is your supply chain synchronized with production? Or do you rely on a massive buffer of inventory to meet customer service demands?

In this paper we’ll explore various ways manufacturers can leverage their supply chain as a strategic advantage. By applying lean concepts at the supply chain level, manufacturers can become more agile and improve service to their customers while simultaneously lowering costs from production to delivery—and enter the era of the Lean Supply Chain.

How do you meet customer demand and deliver the perfect order?

Gartner states, “Failing to link manufacturing with supply chain will lead to a disjointed approach to business performance, serving only to perpetuate the existence of a great divide in many companies.”¹ Without a tight relationship between production and distribution, a manufacturer will find itself with competing priorities between the plant’s objective to maximize production and the organization’s goals to meet customer demand and manage cost. Illustrating this further, they go on to say, “Manufacturing and logistics agility is replacing inventory as the new buffer between meeting customer demand and delivering the perfect order.”² At first blush, this may appear to be the difference between a make-to-stock and make-to-order model. While true that make-to-order requires a balance of production capacity with an agile distribution network—seemingly the linkage of manufacturing to supply chain that Gartner prescribes—implementation of a lean supply chain requires adoption of Lean Manufacturing principles along with supply chain systems that work closely together and can respond to change.

Applying Lean Manufacturing principles to reduce supply chain costs

The Toyota Production System (TPS), forerunner to Lean Manufacturing, seeks to eliminate three negative aspects from the manufacturing process, including muda, or waste. Seven different kinds of waste exist: over-production, inventory, waiting, motion, transportation, rework and over-processing. The largest source comes from over-production, which is also viewed as the worst type of waste because it can lead to other sources of waste such as waiting (whether due to an interruption of work, a process to finish or another upstream function to reach completion), additional defects and too much inventory.

Over the years, principles of Lean Manufacturing have gained traction within plants, helping organizations improve material handling efficiency, product quality and ultimately, customer satisfaction. A walk through a typical plant

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reveals line after line of automation—each machine purpose-built for its specific task—whether to mix, fill, sort, combine, assemble, put on a lid, or apply labels or other packaging. Each automated process seeks to increase efficiency and reduce waste. The benefits of Lean Manufacturing are very well documented, so why stop there? Why not apply those same principles across the supply chain to help reduce waste and drive down costs in three main areas:

- Inventory
- Labor
- Transportation

To accomplish this, one must embrace the concept put forth by Gartner that customer satisfaction and on-time deliveries can be guaranteed, not by holding onto large inventory levels, but via the supply chain.

The make-to-order concept in its purest form would require little to no inventory, but that wouldn't be a viable model for some manufacturers simply due to the time required to build the finished goods. In addition, the need to fulfill rush orders and ensure shift changes don't cause a lapse in production and shipping would also make it difficult for some to adopt a pure make-to-order model. Does that mean that a manufacturer operating under a make-to-stock model or other manufacturing process cannot realize benefits from a lean supply chain? Not at all. A lean supply chain is not dependent on when in the order lifecycle the goods are made.

The right systems make all the difference

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A personal care manufacturer, leveraging Manhattan's Warehouse Management solution, implemented a just-in-time cross-docking process to immediately direct raw materials to production lines with a pending need. This resulted in a reduction of raw materials inventory and lower labor costs, since there's no reason for the raw materials to be stored then pulled out later by a different associate. From a Lean perspective, these examples reduce both inventory and waiting, two of the 'deadly' wastes identified.



A transportation management system enables more efficient shipping by making better routing decisions to minimize transportation costs, another of the seven forms of waste. Whether consolidating shipments to increase trailer utilization, maximizing route efficiency to reduce miles or facilitate zone skipping, or LTL pooling to reduce costs associated with the final distribution leg, a transportation management system drives down overall shipping time and costs, and plays an important role in the lean supply chain. Manufacturers using Manhattan's Transportation Planning & Execution solution have been successful in managing inbound and outbound shipments from stand-alone facilities as well as from campus-type environments where multiple plants and distribution centers co-exist in relatively close proximity. They have also implemented successful drop-and-hook programs where a driver drops off a full trailer of raw materials and picks up a full outbound trailer on the way out. This reduces driver wait time and streamlines movements through the yard as there are fewer movements happening at a given time but with the same ultimate results, while still supporting the same-day, build-and-ship concept.

Warehouse management and transportation management systems can support a leaner supply chain, but can it get even leaner? To answer that question with a 'yes,' another component is required to serve as a flow controller of sorts, managing movements of trailers in and out of the yard and driving additional efficiencies into the lean supply chain. A yard management system, when deployed along with warehouse management and transportation management systems, completes the lean supply chain from a system perspective. Additional workflows are unlocked and better decisions can be made once this component is added to the mix.

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To illustrate the power of this solution, consider a **beverage manufacturer** that implemented Manhattan's Warehouse Management and Yard Management solutions. This customer groups all orders to be fulfilled at a given time based

on the shipments they have planned. Once an empty trailer arrives in the yard, Yard Management triggers the inventory allocation and pick/pack processes within the warehouse. Inventory allocation prioritizes inventory coming off the production line, supporting a just-in-time fulfillment process on the outbound side where finished goods coming off the line are immediately palletized, directed to the waiting outbound trailers and fluid loaded. This drives down inventory carrying costs, since those finished goods never see a storage location, and reduces labor costs due to fewer movements to and from storage locations. From a Lean perspective, this reduces both inventory and waiting, two of the 'deadly' wastes.

Indeed, without the right systems and technology in place, a manufacturer will be busy reacting to all the changing regulations and have little time to proactively initiate process improvements. They will remain locked into the status quo while giving more agile competition the ability to move ahead and win market share.

As conditions change, agility wins

Regulations are constantly in flux. Global manufacturers have to deal with the added complexity of changing regulations in each country they ship to or from. The global supply chain brings with it unique formulations or bills of materials, country-specific packaging, multiple language support and other variables that can lead to high SKU proliferation. This impacts not only raw materials purchase order profiles, but also quality audit policy, bills of materials maintenance, product testing, product expiration and obsolescence, physical storage space, and pick/pack/ship methodology.

The vice president of warehouse and distribution at a **leading cosmetics manufacturer** recently stated, "These requirements are continuing to expand for us and the need for strong system technologies and processes to help manage all the variables presents constant challenges to maintaining our cost of goods along with getting the right products to the right places at the right times." He went on to say that the Warehouse Management solution implemented by Manhattan Associates is critical to production and distribution, as well as in mitigating risk that is inherent with these changes.



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As conditions change, a system must be able to react to those changes. Raw materials are routinely sourced from different vendors based on cost, availability and quality. When receiving raw materials from a new vendor, additional quality checks may be desired until that vendor has proven performance. Identifying problems with a vendor can influence future purchasing decisions. Similarly, when fulfilling orders for a new customer, additional quality checks may need to be implemented post-packing to validate accuracy of the order and of the packaging and labeling.

Manufacturers are often required to track and recall lots. Consumer goods manufacturers face safety recalls due to product design or a faulty component. The warehousing system must be able to recall and lock the current inventory in the DCs. It must also be able process the returned inventory and determine whether it can be reworked, scrapped or put back into storage for another order. Cosmetics, food, chemical and pharmaceutical manufacturers must be able to recall inventory based on lots or batches. Bad raw materials or a contaminated batch can land a company all over the news, so it's imperative to have early insight into a problem and expeditiously recall the batch before it leaves your facility.

To meet the challenge, a comprehensive, manufacturing-focused supply chain solution is required, with components built upon a single platform that offers a common login and user experience, shared business rules and, perhaps most important, shared data.



The difference a Platform can make

Tight collaboration between system components is critical. When planning transportation movements for the day, the execution system inside the warehouse must be informed of the plans. Exceptions within the warehouse may require an adjustment to the shipment. How can that happen, in real time, unless the systems are both working from the same information?

Scenario 1: Take a scenario where ingredients or raw materials must be substituted to accommodate a particular country's regulatory or documentation requirements. How many systems must be updated? If the answer is more than one, then a point of failure has been introduced. If the change in raw materials affects a finished good's weight or volume and the transportation system is not updated with the new attributes, the actual shipment's weight and volume could vary substantially from what was actually packaged. This can lead to inaccuracies on the bill of lading and other shipping documents, ultimately resulting in chargebacks and an overloaded trailer that will require costly and time-consuming manual intervention.

Scenario 2: Consider another scenario where a delivery date on an order gets updated and the customer now requires the goods a day earlier. The transportation system reacts to this change, plans a shipment for pickup from the DC a day earlier and tenders a carrier for the new date, but the plant never gets the update. The trailer arrives to pick up a shipment that has not yet been built, or even scheduled to be built until the next day. Now the plant is forced to react and push through an order on a priority basis and rush to get the shipment out on time to meet the customer's requested delivery window. Meanwhile, if this was a live load, additional shipping charges will be incurred due to the delay.

When transportation management has visibility into trailer data in the yard, better carrier selection decisions can be made. If the transportation management system knows that a given carrier already has empty trailers on the yard, wouldn't it be less expensive to use one of those rather than request a different carrier to send an empty trailer? Yet, if that data is available in a different system, it cannot be leveraged during planning.

Additional, significant savings can be achieved when information is shared between the yard and the distribution center. Once a trailer is either unloaded at the receiving dock or loading is completed at the shipping dock and the trailer is pulled away, another trailer should be immediately moved to that dock. Without immediately moving a new trailer, associates on the dock have to wait, killing productivity and introducing more waste into the supply chain. By linking these processes together and creating yard movement tasks in real time based on operational triggers within the warehouse, labor efficiency is driven even higher and waste is reduced or eliminated.

The obvious answer for all of these examples is to build integration between warehouse management, transportation management and yard management systems. As long as the systems communicate and share information, everything will work out, right? Not exactly. Communication can fall apart. Individual systems can go offline for any number of reasons. Integration between systems can break down over time as individual product updates are made. Manufacturers need a better solution to successfully manage their



distribution network than just a collection of best-of-breed systems. It isn't enough to simply integrate a warehouse management system from one vendor with a transportation management system from another vendor.

To meet the challenge, a comprehensive, manufacturing-focused supply chain solution is required, with components built upon a single platform that offers a common login and user experience, shared business rules and, perhaps most important, shared data. Only then can you achieve a true Lean Supply Chain.

For more information on how Manhattan can help you leverage your supply chain for competitive advantage, please visit www.manh.com/industries/consumer-goods-manufacturing or call 1-800-661-4872.

¹ Simon F. Jacobson and Debra Hofman, "Aligning Manufacturing and Supply Chain Performance, Part 1: Crossing the Divide," Gartner Inc., September 20, 2010, p. 1

² Ibid., p. 2



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Adam Kline is director of product management at Manhattan Associates with responsibility for the company's Warehouse Management for IBM i (WMI) and Supply Chain Intelligence (SCI) products. He also drives Manhattan's strategy for the Manufacturing vertical. Adam joined Manhattan in 1997 and spent much of his career in Research & Development, working in a design capacity as a business analyst prior to assuming a role in Product Management. He has also worked in Quality Assurance and spent time on various Warehouse Management for Open Systems (WMOS) product implementations, including the company's first WMOS client.

About Manhattan Associates, Inc.

Manhattan Associates continues to deliver on its 23-year heritage of providing global supply chain excellence to more than 1,200 customers worldwide that consider supply chain optimization core to their strategic market leadership. The company's supply chain innovations include: Manhattan SCOPE® a portfolio of software solutions and technology that leverages a Supply Chain Process Platform to help organizations optimize their supply chains from planning through execution; Manhattan SCALE™, a portfolio of distribution management and transportation management solutions built on Microsoft. NET technology; and Manhattan Carrier™, a suite of supply chain solutions specifically addressing the needs of the motor carrier industry. For more information, please visit www.manh.com.

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