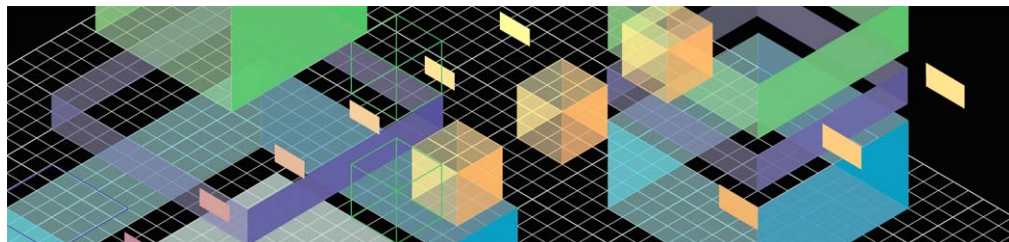
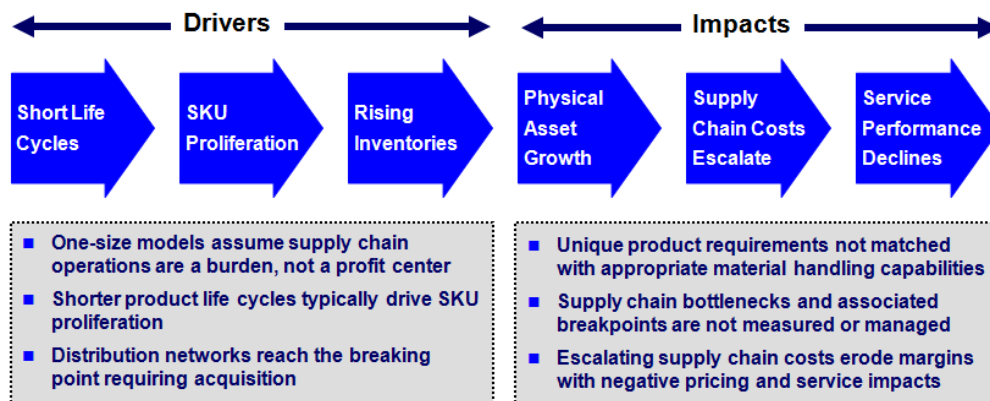




Discovering the Lean Supply Chain I: Transforming Supply Chain Operations into a Lean Differentiator

Organizations today often face their greatest struggles when converting factual demand signals into pull-based schedules for those customers actively contributing to the growth and success of the business. An effective Lean supply chain strategy must provide the disciplines, methods and tools necessary to segment the customer against growth and value-contributing factors, link trading partners through collaborative planning & forecasting regimens, match supply and demand for the most appropriate use of enterprise-wide capacity and drive the selection & integration of strategic suppliers that offer the skills necessary to augment the entire supply chain for the benefit of the ultimate customer.

Although Lean concepts and disciplines have long been associated with dramatic improvements in the manufacturing arena including waste elimination, throughput improvements, line changeover cycle time reductions and substantial quality improvements, supply chains today face enormous pressures linked to competitive forces, ever-exacting customer demands and “non-Lean” practices:



Simply put, Lean supply chains are those where end-customer demand permits the smooth, synchronized flow of materials, information and physical assets (up or down) based on period-specific demand requirements.

Far too often, supply chain management programs focus on the optimization of intra-supply chain components such as inventory management, warehousing operations or production scheduling. In the Lean environment, such producers of waste are eliminated in favor of a universal supply chain mechanism that rapidly self-adjusts to the pull of end-customer demand through the use of three Lean supply chain concepts:

- *Demand-Driven Operations Planning*
- *Lean Strategic Sourcing & Supplier Integration*
- *Lean Distribution Operations*

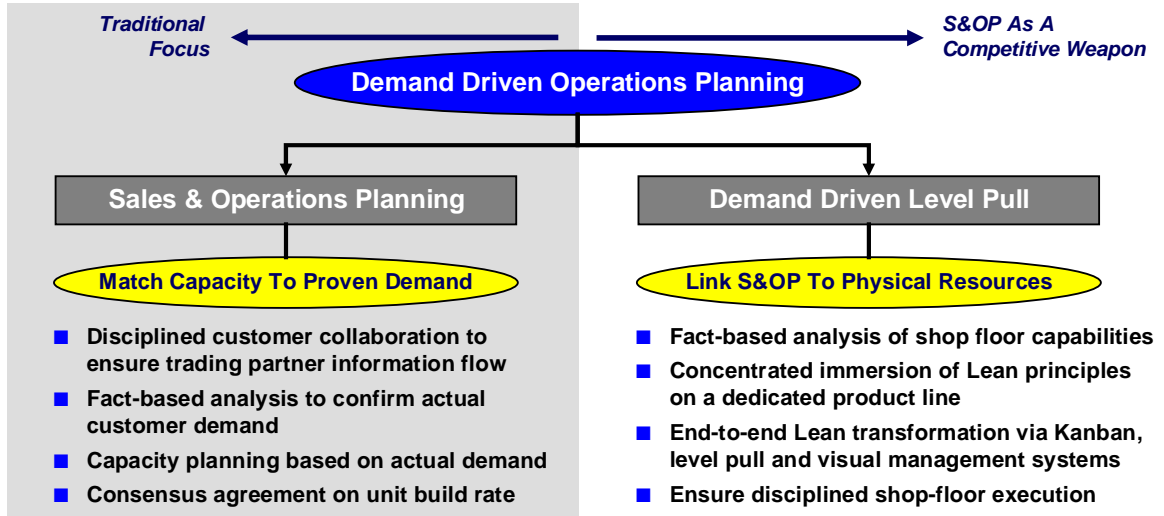
Fact-based demand signals are required to plan supply chain capacity, Lean suppliers must provide the global capacity and high-quality goods and services required to execute, and distribution operations must provide profit center-quality capabilities in order to maximize margin capture. Without all three, the Lean supply chain cannot be realized.

Demand-Driven Operations Planning: Translating Demand into Capacity Deployment

Supply chain planning can begin with the optimization of your internal assets and functional silos, or it can begin with the fact-based confirmation of end-customer demand. Considered by many as the gateway to Lean supply chain planning and execution, effective demand planning must incorporate a seamless approach to both demand confirmation and pull-based production scheduling:

- **Sales & Operations Planning:** Organizations must possess a rapid, repeatable process to match end-customer demand at both the macro and product-family level.
- **Level-Pull Scheduling:** Once demand is ascertained, customer demand must be translated into a capacity deployment plan based on margin expectation, contractual service levels and global supply chain capacity constraints.

Based on our experience, Lean manufacturing organizations are most successful by combining the core practices of S&OP and DDLP into a single program known as Demand-Driven Operations Planning (DDOP) in which the end goal is a supply chain deployment plan based on maximizing margin capture through a highly accurate match between end-customer service requirements and global supply chain capabilities including internal physical assets, third-party transportation components and upstream suppliers:



While traditional S&OP concepts perform a highly valuable service in confirming customer demand as the foundation for capacity planning, the addition of DDLP principles incorporate a host of critical Lean tools that transform capacity planning into true margin management capabilities. Through the use of key Lean manufacturing tools, DDLP provides a dynamic planning process through which inherent production variability (triggered by wasteful practices) is eliminated and replaced by level-pull production flows custom-matched to end-customer demand:

- Manufacturing “pacemakers” are identified which establish the pace, or cadence, of each manufacturing line flow.
- Demand-based inventory levels are established for all three parameters including cycle, safety and buffer stock.
- Kanban-based materials flow systems are extended upstream in the supplier community to balance global supply chain capacity; incremental capacity enhancements (e.g. overtime, added shifts) are immediately costed for margin impact.
- Global development of production TAKT time integrates all supply chain components including inbound material flows, production execution and outbound logistics and warehousing operations

By combining S&OP concepts with DDLP production-floor disciplines, senior executives can gain access to a near real-time toolkit that evaluates end-customer demand, available capacity, and incremental capacity costs in order to determine the most appropriate capacity deployment plan for any given demand period. As a direct result, DDOP provides not just a tool for capacity and service performance management, but also provides the right vehicle for maximizing margin capture across each product family and strategic customer segment.

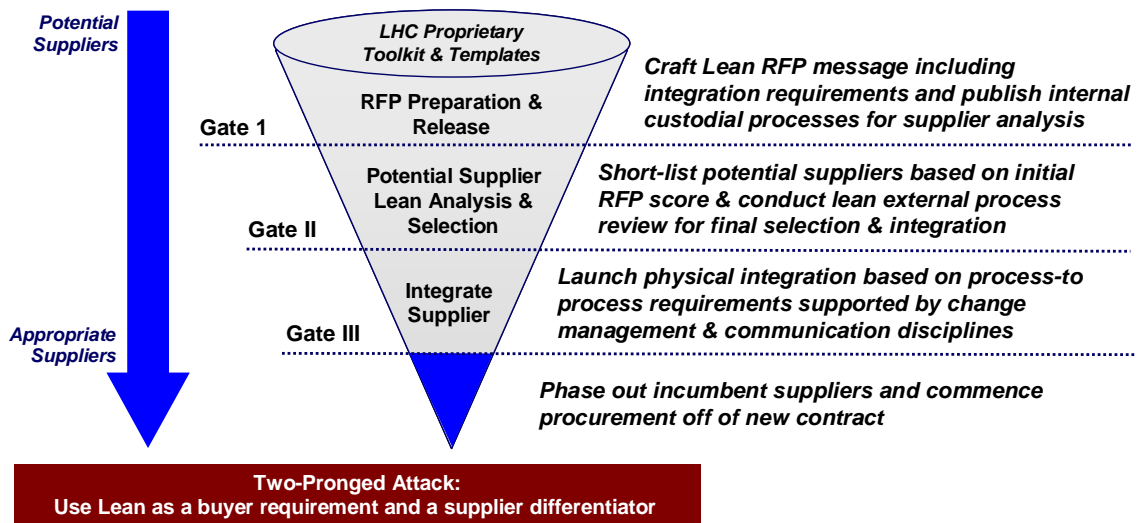
Are Your Suppliers Just Suppliers or Powerful Lean Differentiators?

Supplier performance management is no doubt an integral component of any successful supply chain execution strategy. Beyond question, tactical enablers such as strategic sourcing, fact-based negotiations strategies, proactive supplier performance management and vendor-managed inventory programs are as necessary as ever to ensuring timely (and repeatable) customer service delivery.

But is it enough? In-the-four-walls Lean, where internal waste is methodically identified, prosecuted and eliminated cannot provide a complete Lean strategic advantage. Moving beyond identification, selection and on-boarding of a new supplier, Lean concepts and disciplines must be deployed as a marketplace differentiator to the supplier community:

- Lean journeys are never complete via in-the-four-walls thinking; savvy buyers must align themselves with suppliers willing and able to negotiate their own personal Lean journey.
- Lean concepts, disciplines and required practices must become equal partners with other selection criteria (service levels, innovative solutions, economic principles, etc.) when evaluating potential supplier candidates
- Customers are not willing to pay for waste; total delivered value is based on waste elimination across the entire supply chain (including suppliers) and not just on the end seller.

Moving beyond price, progressive manufacturers must migrate to total delivered life-cycle costing models where the buyer-supplier relationship is built on an aggressive process that mandates year-over-year total delivered cost reductions mutually shared by the buyer and the supplier. Forming the basis for the eventual relationship, Lean supplier integration and performance management always begins with the supplier selection process:



By clearly stating the buyer’s Lean journey progress, waste removal successes and Lean supplier requirements, smart buyers can effectively level the playing field with a go-to-market supplier strategy grounded in the mutual acceptance of responsibility to serve end customers through a global Lean supply chain.

Beyond the go-to-market strategy and the supplier selection criteria, the Lean supplier integration process depends on the mutual acceptance of three core responsibilities:

- Buyer-supplier integration processes and mutual value stream enhancements
- Buyer-supplier total delivered cost year-over-year reduction responsibilities
- Mandatory application of key Lean tools to regulate the relationship and ensure consistent end-customer service performance

During the supplier selection process, all short-listed suppliers should be subjected to a comprehensive on-site Lean manufacturing process evaluation in which core production processes, staffing levels and quality functions are assessed against pre-defined Lean analysis criteria. Upon completion of the assessment, buyers can then confirm the accuracy level of proposed supplier pricing formulas (based on total delivered cost and waste removal potential), the complexity of the potential integration process and the degree to which the buyer's Lean values match the supplier's Lean commitment.

Where does it all lead? Successfully completed, the supplier selection process should yield five quantitative deliverables that all combine to deliver predictably superior customer service performance:

- Written long-term supply contracts outlining key terms, conditions and required performance levels
- Supplier integration program including adoption of buyer-based lean tools upstream to the supplier (e.g. DDOP)
- Mutual buyer-supplier multi-year total delivered cost reduction responsibility program
- Creation of a buyer-supplier integration value stream map governing the relationship
- Targeted “both sides of the fence” kaizen events focusing on process waste removal, performance enhancements and service level improvements

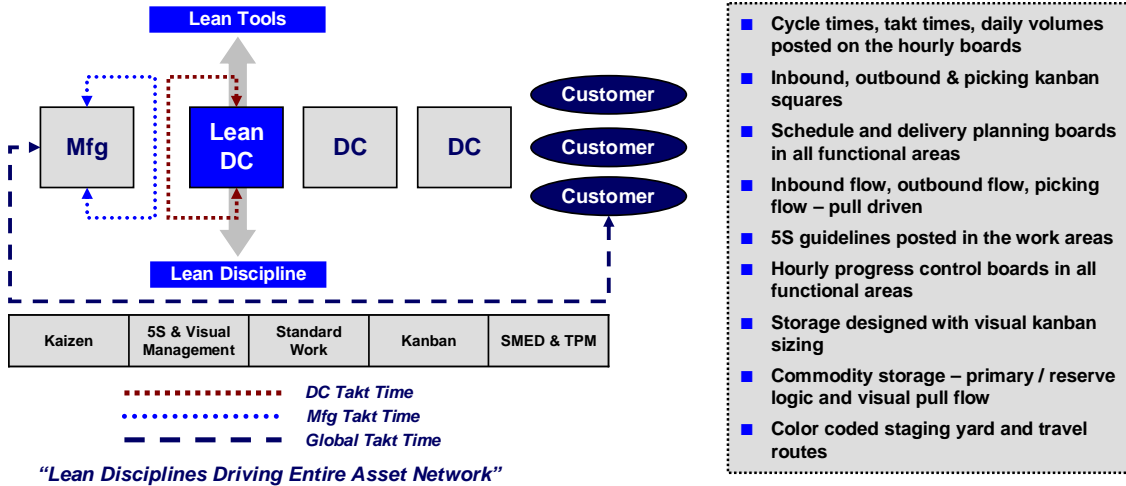
Lean mandates waste-free operations, and suppliers cannot be exempted. The choice of the Lean buyer is a simple one; either you can create an environment grounded on the translation of Lean disciplines upstream to the supplier community, or you can hope for the best with in-the-four-walls Lean applications.

Lean Distribution Operations: Cost Center Design or Profit Center Enablement?

Long consigned to the role of cost center in the overall supply chain production, distribution operations are one of the last vestiges of waste demanding the application of Lean practices and disciplines. More often than not, warehousing practices and distribution operations (including product staging, transportation and inventory deployment algorithms) suffer from a number of ailments fatal to Lean customer service performance:

- One-size-fits-all distribution formulas default to single-mode service capabilities
- Distribution operations are not synchronized with customer or production pull
- Space management increasingly monopolizes supply chain planning regimens
- Physical asset network growth (e.g. warehousing) increases cost and complexity
- Lean concepts are often confined purely to manufacturing and are not deemed “of value” to the distribution function

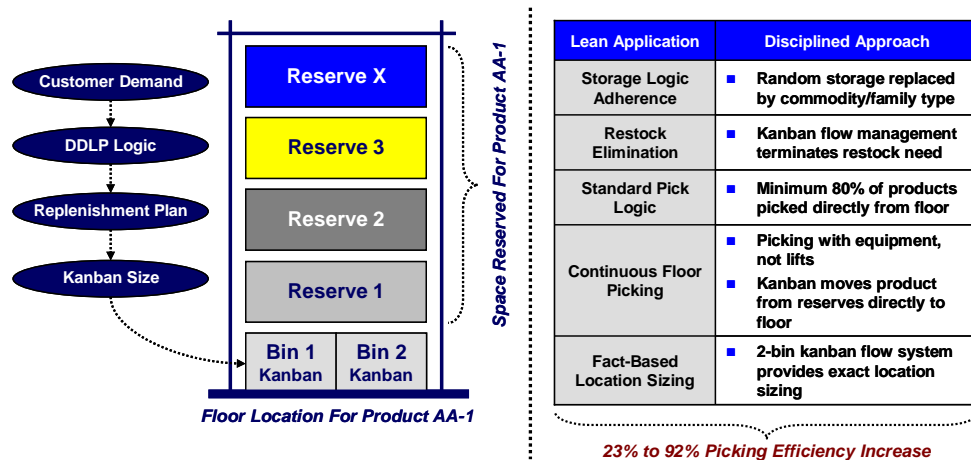
In order to avoid these service and margin-reducing impacts, progressive manufacturers are encouraged to deploy Lean concepts, disciplines and practices to the logistics and distribution arena in order to avoid the “manufacturing only” Lean journey trap. Although the deployment of key Lean tools and practices inevitably vary from manufacturer to manufacturer, the core requirements remain the same: Manufacturing TAKT time must coordinate with distribution center operations in order to successfully align with end-customer pull:



In the Lean distribution center environment, forward-thinking (and waste-free) manufacturers are able to achieve superior customer service performance via a number of highly focused Lean transformation programs including:

- (A) **Global TAKT Time Establishment:** Relying on the inputs of DDOP, organizations can generate global TAKT times that effectively synchronize non-manufacturing supply chain components including distribution center materials flows, warehousing picking & stacking regimens, transportation activities coordination and staffing profiles based on end-customer demand.
- (B) **Lean Transloading Capabilities:** Based on a highly integrated flow model, Lean disciplines can enable organizations (through the extension of DDOP principles into the distribution environment) to execute effective transloading programs whereby entire containers (or truckloads) can be pre-planned at the time of origination for loading architecture, unloading timing & resource requirements and transfer to full-container delivery to the end customer synchronized to fact-based demand signals.
- (C) **Lean Toolkit Integration:** Heijunka board scheduling, Kanban materials flow management and visual management concepts are all hallmarks of an effective, waste-free Lean environment. Distribution centers are no different; each Lean tool can be effectively implemented to control distribution center daily operations, throughput, picking logic and staffing planning.

As an example, organizations can reap substantial benefits just by altering the picking and staging profiles of their DC's through the use of basic Lean techniques:



Where does it all lead? Through the elimination of intra-DC waste via the application of basic Lean disciplines, one-size distribution models are cast aside as customer-specific or product family-specific service models are created within any given DC. Known as the “warehouse within a warehouse” model, the elimination of the one-size constraint permits the segregation of each DC into zones governed by customer requirements and pick complexity. With DDOP principles driving customer-centric (or product family-centric) service performance, once-complex DC’s are transformed into intra-connected sectors catering to the service level requirements of each strategic customer or family.

You can decide. Your DCs can dictate service level performance for all of your customers, or Lean disciplines can transform your distribution operations into segmented service delivery engines focused on strategic customer service management and higher-margin growth.

The Lean Performance Advantage

Lean disciplines, without question, promote the elimination of waste for lower-cost, predictable customer service performance. Through the application of Lean supply chain practices and policies, progressive manufacturers have an opportunity to achieve a number of quantifiable benefits as a result of a comprehensive Lean supply chain improvement program:

- Align the organization with Lean suppliers further maximizing waste elimination
- Transform DC operations into customer-centric performance and margin drivers
- Translate fact-based demand into an appropriate capacity deployment plan that optimizes both service performance and margin capture

By undertaking a comprehensive Lean manufacturing, supplier development and supply chain transformation program, progressive manufacturing organizations can reap a number of benefits across multiple functions including:

Metrics	Improvement Range	
	Low	High
Warehousing Space Consumed	6%	32%
Annual Inventory Turns	16%	40%
Network-Wide Inventory Investment Reduction	7%	21%
Distribution Center Processing Velocity	4%	17%
Orders Shipped Complete and On-Time	10%	26%
Consensus-Driven Forecast Accuracy Improvement	14%	24%
Investment-Free Throughput Increase	6%	15%
Strategic Sourcing Total Delivered Cost Reduction	4%	12%
Product Manufacturing Line Changeover Time	25%	85%
Available Capacity Uptime Improvement	9%	21%
Work-In-Process Inventory Levels (Buffer Stock & Safety Stock)	15%	60%

Lean supply chains. They can be discovered, they can be enhanced, and they can become drivers of superior customer service performance and increased margin capture. For organizations willing to extend their Lean journeys beyond the four walls of manufacturing, Lean supply chain programs are the next logical step.

About the author

Bob Hawkey, Associate Partner

A partner responsible for LHC's Lean Supply Chain management practice, Bob Hawkey has over 15 years of supply chain strategy and management expertise assisting Lean Horizons customers with key supply chain improvement initiatives including sales & operations planning, strategic sourcing and network optimization.

About Lean Horizons Consulting

Lean Horizons Consulting offers integrated competencies for achieving enterprise-wide performance transformation to global firms in the manufacturing, energy, consumer products, financial services, pharmaceutical, bio-technology and healthcare sectors. Lean Horizons further serves investment firms regarding acquisition integration and rapid value creation. Lean Horizons aligns Lean and Six Sigma capabilities with the deployment of enterprise strategy to deliver unique, end-to-end solutions that incorporate the organization's business model, core processes, functions and information systems. Lean Horizons' field force of internationally experienced industry professionals bear direct lineage to the Toyota Production System, lending a unique combination of explicit and tacit knowledge to Lean performance transformations.



Strategically Creating Value through the Elimination of Waste

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