

LEAN SUPPLY CHAIN MANAGEMENT

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Abstract

The cooperation and creating of new relationships are important between OEMs and suppliers, the suppliers themselves and end customers. One of the ways of development of the distribution network for is the application of lean principles. Lean supply chain management is about identifying and eliminating waste as measured in time, inventory and cost across the complete supply chain. The article analyzes the change of traditional supply chain according to the principles of lean management. Of comparing conventional and lean supply chain models. Formulates recommendations for the implementation of Lean Supply Chain.

Key words: Lean Management, Innovation,

INTRODUCTION

Growth in complexity of products, competition in innovation and globalisation of markets also require changes in supply chains. Supplier sector has an important role especially in the global automotive industry. Improving relations between the partners, increasing the efficiency of cooperation, the introduction of e-commerce, continuous development and supply chains need to adapt to present conditions of the global market leads to changes in the transfer of responsibility for different tasks.

Key tasks which possess OEMs cars in the past, now taken over suppliers, such as responsibility for research and development of components, production of components, modules and systems design, installation modules and systems. Suppliers must be involved in the solution for increasing productivity, creation of added value, the rapid onset of innovative products, reduce the costs of the global markets [1].

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The traditional structure of the supply chain has been grouped according to the levels. OEMs were concentrated on product development,

especially processes, assembly and delivery of the products. The first level components be manufactured and supplied directly to OEMs. The second level subsystems produced for the first level suppliers. The third and fourth level was composed mostly of suppliers of raw materials and semi-finished products.

LEAN SUPPLY CHAIN

A Lean supply chain is a set of organizations directly linked by upstream and downstream flows of products, services, finances and information that collaboratively work to reduce cost and waste by efficiently and effectively pulling what is needed to meet the needs of the individual customer [2].

A lean supply chain design requires that supply chains minimize the cost of operations at all levels. Lean requires that the supply chain use the least amount of resources to efficiently complete its job. The primary resources in a supply chain are inventory, warehouses, trucks, people, and working capital. A lean supply chain will be designed to have minimal inventories in the system, minimal amount of warehousing space required to store these inventories, and optimised shipments to reduce the cost of moving inventory. A lean supply chain will also be designed to establish long-term, stable supply contracts with the lowest negotiated cost, but typically without any substantial ability to change ordered quantities, delivery destinations, and required need dates after the order has been placed. Lean design will most likely not engage secondary suppliers, because a second tier of suppliers is expensive to maintain. All of these factors will reduce the costs of the supply chain operations, making it extremely cost-efficient, but will also constrain the supply chain's ability to adapt to any changes in demand, supply, or other resources, due to the built-in rigidity of the design [4].

Lean supply chain management represents a new way of thinking about supplier network. Lean principles require cooperative supplier relationships while balancing cooperation and competition. Cooperation involves a spectrum of collaborative relationships & coordination mechanisms. Supplier partnerships & strategic alliances represent a key feature of lean supply chain management [5].

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Lean Supply Chain Management Principles are derived from Basic Lean Principles:

- Focus on the supplier network value stream
- Eliminate waste and synchronize flow, Minimize both transaction and production costs
- Establish collaborative relationships while balancing cooperation and competition
- Ensure visibility and transparency, Develop quick response capability
- Early supplier integration into design and development, Manage uncertainty and risk
- Align core competencies and complementary capabilities. Foster innovation and knowledge-sharing

Tab. 1: Comparing Lean and Supply Chain Management. Source: [3]

Lean Production	Manufacturing Supply Chain Management
Focuses on reduce waste and non-value-added activities	Goal is on reduced lead times/cost through various methods
Traditionally focused on success with primarily optimising shop floor	Focuses on optimisation across supply chain partners
Uses a set of structured tools	Applies Lean tools as well as leveraging other tools (Six Sigma, TQM, TOC, etc.)
Uses a set of structured tools	Emphasizes on minimizing inventory through various techniques

Tab. 2: Comprehensive comparison of conventional and lean supply chain model. Source: [3]

ILLUSTRATIVE CHARACTERISTICS	CONVENTIONAL MODEL	LEAN MODEL
<i>Number & structure</i>	Many; vertical	Fewer, clustered
<i>Procurement personnel</i>	Large	Limited
<i>Outsourcing</i>	Cost-based	Strategic
<i>Nature of interactions</i>	Adversarial; zero-sum	Cooperative, positive sum
<i>Relationship focus</i>	Adversarial; zero-sum	Mutually beneficial
<i>Selection criteria</i>	Lowest price	Performance
<i>Contract length</i>	Short-term	Long term
<i>Pricing practices</i>	Competitive bids	Target costing
<i>Price changes</i>	Upward	Downward
<i>Quality</i>	Inspection-intensive	Designed in
<i>Delivery</i>	Large quantities	Smaller quantities -JIT
<i>Inventory buffers</i>	Large	Minimized, eliminated
<i>Communication</i>	Limited, task-related	Extensive, multi-level
<i>Information flow</i>	Directive, one-way	Collaborative, two-way
<i>Role in development</i>	Limited, built-to-print	Substantial
<i>Production flexibility</i>	Low	High
<i>Technology sharing</i>	Very limited,	Extensive
<i>Dedicated investments</i>	Minimal-to-some	Substantial
<i>Mutual commitment</i>	Very limited	High
<i>Governance</i>	Market driven	Self-governing
<i>Future expectations</i>	No guarantee	Considerable

Development of supply chain

Fig. 1 shows architectural innovation supply chain. Major modification is of how components in a system and product are linked together. Significant improvement in system /

product architecture is through changes in form structure, functional interfaces or system configuration. Knowledge integration over the supplier network has value stream perspective.

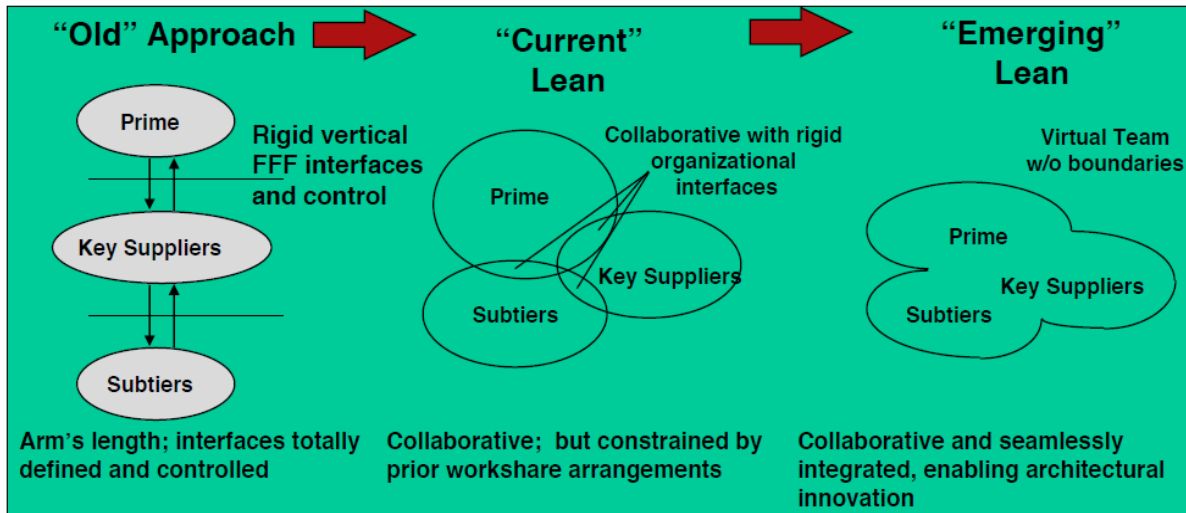


Fig. 1: Evolution of Early Supplier Integration. Source: [5]

Recommendations for the implementation of Lean Supply Chain [6]:

- A) The application of the general principles of lean
- Understand lean is an ongoing, continuous improvement approach as compared to business process reengineering which can be viewed as a one-time change
 - Gain top management’s commitment. Continuous improvement requires ongoing support
 - Build a multi-discipline team for the project-one that understands lean supply chain management.
 - Analyse the total supply chain process, not just the outbound part or just the inbound part
 - Map the process and assess for gaps or redundancies that create time, the key waste.
 - Avoid cannibalising the process, such as focusing on warehousing or transportation or other activities instead of studying the entire supply chain process
 - Realize cause-effect impacts. High freight cost, for example, can be a problem or a symptom. Inventory can be a problem or, more often, a symptom of a problem
 - Ask customers about how well your supply chain operates. Since the supply chain is built on customer pull, the end user has a vital view.
 - Identify non-value added activities, their effect and their cause
 - Involve your people-employees, suppliers, service providers-to provides input on present supply chain effectiveness and for improvements.

- Make the supply chain visible; recognize that blind spots can be areas of waste
 - Recognize the viability of outsourcing as a driver of needed changes
 - Probe for uncertainties that create inventory and other waste. Forecasting accuracy is one area of opportunity
 - Be open to the changes of a lean supply chain. From technology, such as RFID, to a completely redesigned process, significant change can be expected
 - Include change management in your lean program requirements.
- B) Early supplier integration into design and development
- Design supplier network architecture
Design of supplier network driven by strategic thrust, Fewer suppliers; clustered control, Supplier selection based on performance
 - Develop complementary supplier capabilities: Ensured process capability (certification), Targeted supplier development (SPC, Kaizen), Greater responsibilities delegated to suppliers
 - Create flow and pull throughout supplier network: Linked business processes, IT/IS infrastructure, Two-way information exchange & visibility, Synchronized production and delivery (JIT)
 - Establish cooperative relationships & effective coordination mechanisms: Joint problem-solving; mutual assistance, Partnerships & strategic alliances, Open and timely communications, Increased interdependence & “shared destiny, maximize flexibility & responsiveness: Seamless information flow, Flexible contracting, Rapid response capability

- Optimise product development through early supplier integration: Integrate suppliers early into design & development IPTs, Collaborative design; architectural innovation, Open communications and information sharing, Target costing; design-to-cost
- C) Synchronized Production and Delivery Throughout the Supplier Network is a Central Lean Concept
- Integrated supplier lead times and delivery schedules
 - Flows from suppliers pulled by customer demand (using tact time, load levelling, line balancing, single piece flow)
 - Minimized inventory through all tiers of the supply chain
 - On-time supplier delivery to point of use
 - Minimal source or incoming inspection
 - Effective two-way communication links to coordinate production & delivery schedules
 - Striving for zero quality defects essential to success
 - Greater efficiency and profitability throughout the supplier network
- D) Supplier Partnerships & Strategic Alliances Ensure Substantial Performance Improvements
- Long-term relationships and mutual commitments
 - Intensive and regular sharing of technical and cost information
 - Mutual assistance and joint problem-solving
 - Customized (relationship-specific) investments
 - Risk-sharing, cost-sharing, benefit-sharing arrangements
 - Trust-building practices -- “one team” mindset; collocation of technical staff; “open kimono”
 - Progressively increasing mutual dependence -- shared fate discouraging opportunistic behaviour
 - Self-enforcing contracting driving continuous improvement
- E) Supplier Partnerships & Strategic Alliances Bring Important Mutual Benefits
- Reduced transaction costs (cost of information gathering, negotiation, contracting, billing)
 - Improved resource planning & investment decisions
 - Greater production predictability & efficiency
 - Improved deployment of complementary capabilities

- Greater knowledge integration and R&D effectiveness
- Incentives for increased innovation (through cost-sharing, risk-sharing, knowledge-sharing)
- Increased mutual commitment to improving joint long-term competitive performance

F) Lean Supplier Networks Offer Significant Competitive Advantages

- Exhibit superior performance system-wide -- greater efficiency, lower cycle time, higher quality
- Not an accident of history but result of a dynamic evolutionary process
- Not culture dependent but are transportable worldwide
- Can be built through a proactive, well-defined, process of change in supply chain management

CONCLUSION

Lean is how a properly designed and operated supply chain should function. A lean supply chain process has been streamlined to reduce and eliminate waste or non-value added activities to the total supply chain flow and to the products moving within the supply chain. Waste can be measured in time, inventory and unnecessary costs. Value added activities are those that contribute to efficiently placing the final product at the customer. The supply chain and the inventory contained in the chain should flow. Any activity that stops the flow should create value. Any activity that touches inventory should create value [7].

Supply chains gain waste and non-value added activities for many reasons, both internal to the company and external. Regaining the lean supply chain may mean addressing many of the same issues that created the problems of extra and unneeded time, inventory and costs. The ideal approach is to design the perfect supply chain and fit your company's operation onto it. Supply chain management is meant to reduce excess inventory in the supply chain. A supply chain should be demand driven. It is built on the pull approach of customers pulling inventory, not with suppliers pushing inventory. Excess inventory reflects the additional time with the supply chain operation. So the perfect supply chain would be lean with removing wasteful time and inventory.

Lean supply chain management is about identifying and eliminating waste as measured in time, inventory and cost across the complete supply chain. This requires continuous effort and improvement.

A lean supply chain can take reduce time by 10 to 40%, inventories by 10% to 30% and costs

by 10% to 25%. Continuous improvements can take payback to the upper range-and beyond. This is a significant benefit to ROI and to the bottom line.

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