

WHITE PAPER



Supply Chain Management



What is supply chain management? According to the Council of Supply Chain Management Professionals (CSCMP), supply chain management encompasses the planning and management of all activities involved in:

- + Sourcing (raw materials)
- + Procurement (suppliers)
- + Conversion (manufacturing)
- + Logistics (management)



When integrating subsystems typically found in supply chain management endeavors, the following represent some of the problems that must be addressed when taking a macro-level view:

- + Distribution Network Configuration: number, location and network missions of suppliers, production facilities, distribution centers, warehouses, cross-docks and customers.
- + Distribution Strategy:
 1. Delivery scheme (e.g., direct shipment, pool point shipping, cross docking, DSD (direct store delivery), closed-loop shipping)
 2. Mode of transportation (e.g., motor carrier, including truckload, parcel; railroad; intermodal transport, including TOFC (trailer on flatcar) and COFC (container on flatcar); ocean freight; airfreight; replenishment strategy (e.g., pull, push or hybrid))
 3. Transportation control (e.g., owner-operated, private carrier, common carrier, or contract carrier).



- + Information: integration of processes through the supply chain to share valuable information, including demand signals, forecasts, inventory, transportation, potential collaboration, etc.
- + Inventory Management: quantity and location of inventory, including raw materials, work-in-process (WIP) and finished goods.
- + Cash-Flow: arranging the payment terms and methodologies for exchanging funds across entities within the supply chain.

Supply chain execution means managing and coordinating the movement of materials, information, and funds across the supply chain. The flow is bidirectional.

Why is Supply Chain Management important for small and medium-sized companies?

One of the biggest challenges that they will face, especially when in a start-up or restructuring mode, is identifying their inventory needs and implementing an effective supply chain management process. In the beginning, it seems like a simple process. The stories that we have heard in the past go something like this:

We can just build it and ship it out. Why would we ever need to worry about inventory or work flow?

This, in fact, is a relatively naive viewpoint. Companies that achieve a competitive advantage are able to understand the complexities involved with supply chain management and look to achieve efficiencies by minimizing inventory requirements (a potential reduction in overhead costs) while maximizing production capacity. Further efficiencies can be achieved through streamlined distribution methods.

Below is a list of common micro-level problems that occur within various companies.

- + **Failure to identify pre-production inventory requirements:** Production of the final product often requires the acquisition of the proper subcomponents, which are ordered based on production orders that often vary in size. So – for starters – it is essential that enough warehouse space is allocated for arriving subcomponents. This, however, requires optimization. Some choose a “just-in-time” stocking approach, which can be both effective and detrimental.

- + **Work Flow:** Two areas that companies often fail to address are:
 1. Flow of materials (raw, sub-components, final products, etc.)
 2. Flow of personnel (which is often completely ignored)

- + **Number of Production Lines:** Just because you have the ability to create additional production lines does not mean that you absolutely should. Variations in the number of production lines have both upstream and downstream effects across the entire supply chain.

- + **Layout of the facility:** Efficient and effective use of available space is often overlooked or considered only as an afterthought, which might be too late to change.

- + **Forecasting requirements:** Must have a long-term viewpoint if you are going to be competitive.

Fortunately, there are proven operations research techniques designed to address each of the aforementioned problems.

- + **Inventory Models:** Inventory is an idle stock of items for future use.

- + **Work Flow Models:** Network Analysis and Project Planning using PERT (Program Evaluation and Review)/CPM (Critical Path Method)

- + **Production Lines:** Queuing Systems and line improvement measures (e.g. use of conveyors, which is tied to facility layout).



- + **Facility Layout:** Mathematical Programming to include Integer and Mixed-Integer Programming.
- + **Forecasting:** Forecasting is predicting or estimating the future value of a variable. Quantitative forecasting techniques such as regression methods and smoothing techniques are available.

When it comes to supply chain management, company leadership must develop a vision and supporting strategy designed to meet the needs of the customer at the most efficient and effective production levels possible. OSI provides operations research tools so that small- to medium-sized businesses can optimize their supply chain management.



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