
Evaluating and Assessing Your Supply Chain

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Introduction

The business literature is replete with books on supply chain management. The supply chain is described from many different perspectives, ranging from information flow, to physical distribution flow, to the process to satisfy a customer's order perfectly 100% of the time. In our work with Fortune 200 companies, and based on the feedback from training we have accomplished, the most universal definition of the supply chain is as follows:

A supply chain is the set of activities required to provide products and services to customers, starting at the point of product design and ending with the delivery and installation of the product or provision of a service for customers.

Supply chains can be effectively linked through information technology solutions, better planning and forecasting, efficient manufacturing practices, and tighter, closely linked relationships with suppliers. This requires cross-functional involvement and focus on the key aspects of supply chain management such as:



Once this chain of activities is understood, further breakdowns of sub-activities can be established. From that point, specific sub-activities can be defined from a cost, quality and delivery standpoint. This paper offers a preliminary tool that can be used and further developed by cross-functional supply management teams to evaluate the efficiency of the supply chain based on:

- Cost
- Quality Performance
- Lead Time

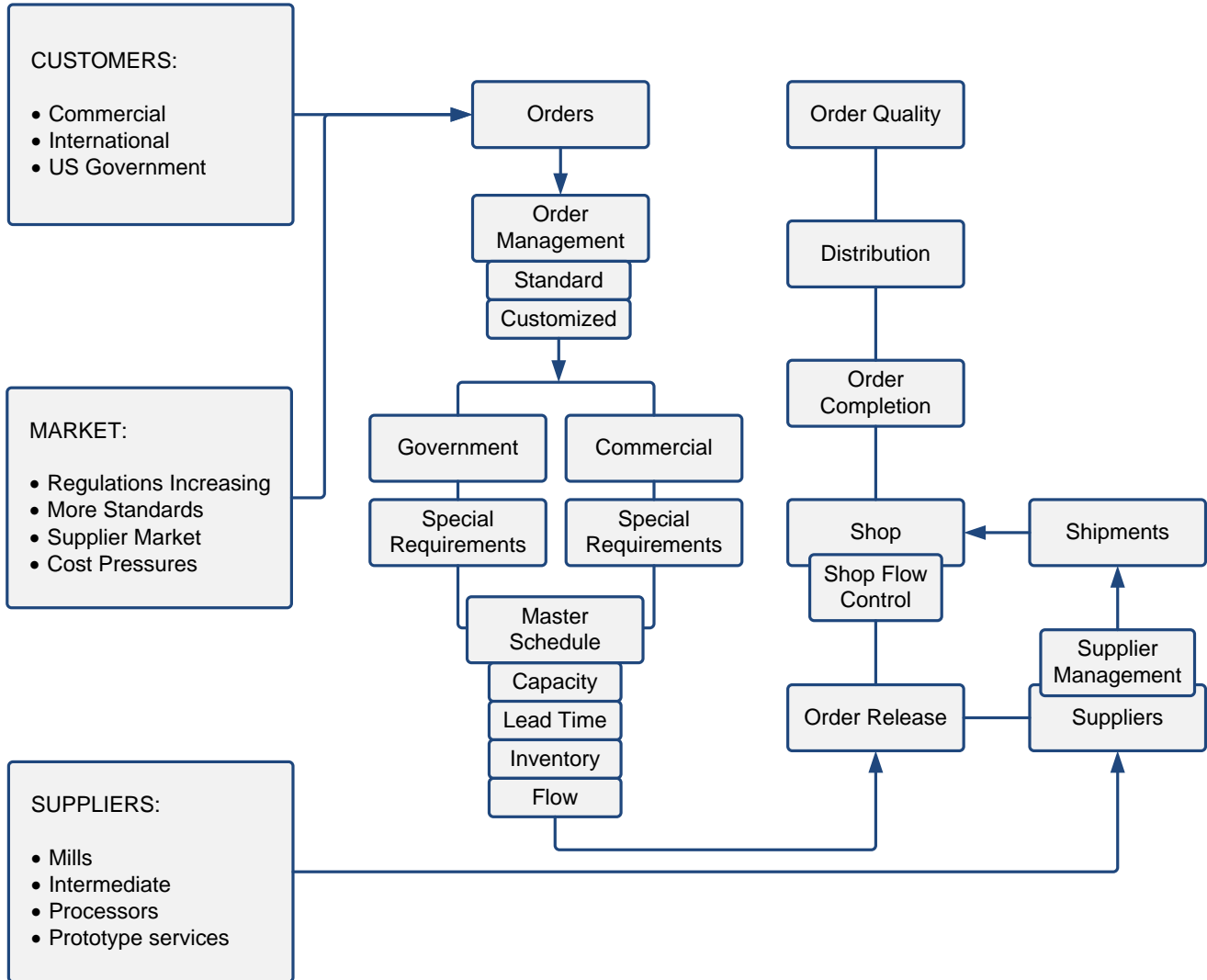
Many of the assumptions included in developing this tool can be revised to fit with the user's industry.

Supply Chain Description

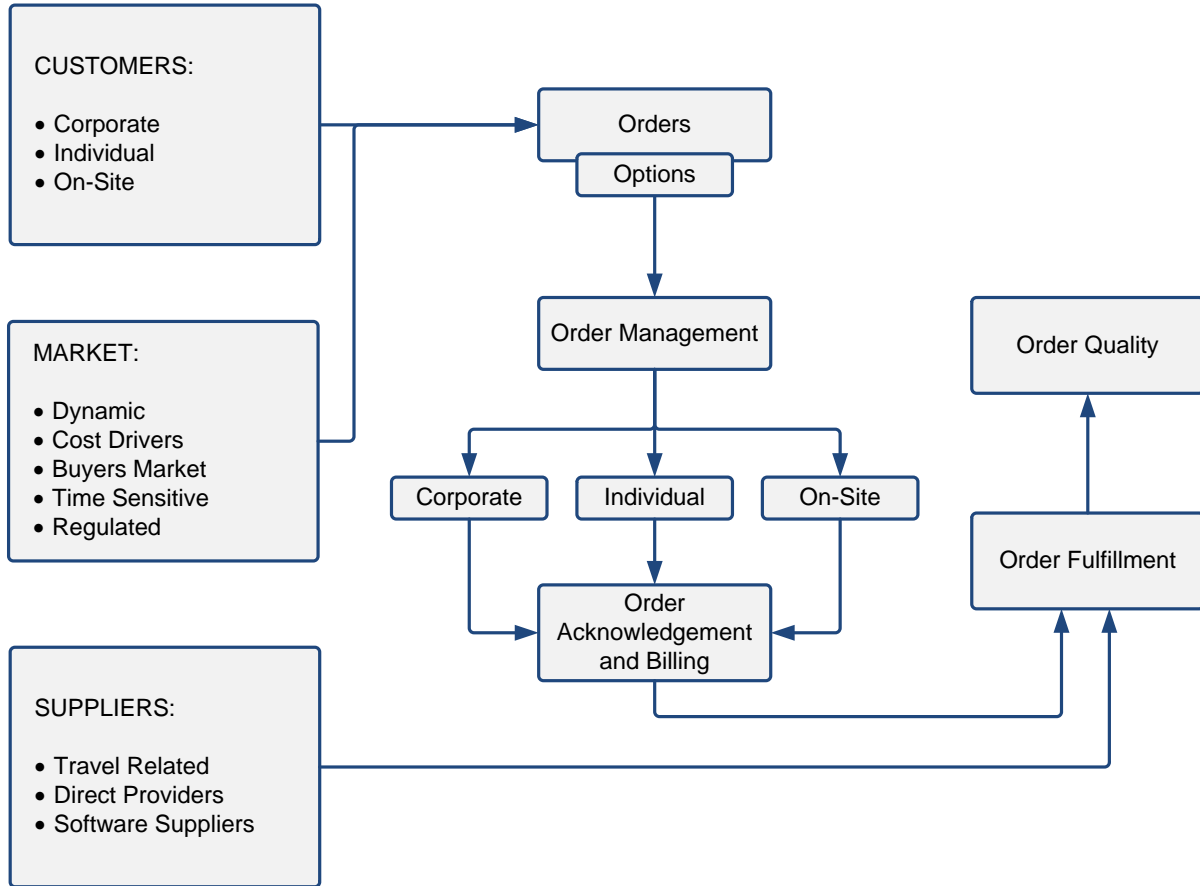
The best way to portray a specific supply chain is to develop a flowchart of the various steps of the “chain.”

The following flowcharts are examples of supply chains of a forging manufacturer and for a travel services company.

Supply Chain: A Forging Supplier



Supply Chain: Travel Services



Note that these flowcharts begin with the customer order or forecast. Since organizations vary in how new product/service introduction plans are developed, this is an acceptable first step of any supply chain.

Once a specific supply chain has been developed, then relationships can be drawn in the areas of cost, quality, and lead-time. Algorithms can be used to describe those relationships, and the entire claim can be then evaluated. Once this is accomplished, alternate steps can be substituted and the effect on the supply chain can be measured.

Describing the Relationships

In order to provide quantitative impacts of various supply chain steps, key aspects of the cost, quality, and lead-time equation must be broken down into sub elements. Each of these elements can be described quantitatively as follows:

COSTS <i>Total Costs of:</i>	DELIVERY <i>Total Lead Time of:</i>	QUALITY <i>Levels Based On:</i>
<ul style="list-style-type: none"> • Purchase Price • Transportation • Payment Terms • Tooling 	<ul style="list-style-type: none"> • MPS/MRP Planning • Order Placement • Supplier Lead Time • Transport Time to Buyer's Plant • Inspect Time • Time to Stock or Deliver to Point of Use 	<ul style="list-style-type: none"> • Incoming Quality • In-Process Quality • At Final Inspection and Test • Field Failure

The quantitative components of these three elements can be easily included in a spreadsheet database to get a reasonable evaluation of the efficiency of a specific supply chain.

Supply Chain Total Cost Analysis

The cost elements of the supply chain can be further exploded to include a more substantive and realistic list. Some of these costs are line item costs and some are lump sum factors. The specific costs can be portrayed to include the following list:

Price Factors

1. Unit Price
2. Transportation
3. Payment Terms
4. Tooling
5. Delivery Performance
6. Quality Performance
7. Inventory Carrying List
8. Customs/Duties
9. Premiums or Surcharges
10. Other Additional Unit Costs

These costs can be summarized, compared to other alternatives, and then analyzed for continuous improvement.

Lead Time

The supply chain lead time for a given supplier-provided product or service can be broken down into three components:

- Pre-manufacture
- Manufacture
- Post Manufacture

The specific Elements of each of these components are as follows:

PRE-MANUFACTURE	MANUFACTURE	POST MANUFACTURE
<ul style="list-style-type: none">• Backlog Queue• Master Scheduling• Material Acquisition (Administration)• Material Acquisition Lead-time (Longest Gating Lead Time)• Receiving• Incoming Inspection• Delivery to Stockroom• Kit Material• Deliver Material to Process Operation #1	<ul style="list-style-type: none">• Setup Time• Mfg. Process Time• Queue Time• Move Time• Critical Path Movement of Material	<ul style="list-style-type: none">• Transport Time• Customs Clearance Time• In-Country Transit• Receiving Time• Inspection Time• Move/Time to Storage or Point of Use

The cumulative total of these three components can be evaluated for acceptability. Each of the three areas can be broken down in a spreadsheet format; then each sub-component can be established and evaluated.

Quality

The assessment of quality is more difficult than cost and delivery, which are more linear and sequential. Yet quality along the supply chain can be predicted based on expected quality output at the end of each step.

Either historical data or industry information can be used to develop the quality expectations of your supplier. These quality expectations can be generated through reviewing:

- Quality at outgoing from the supplier's facility/plant
- Damage during transit
- Receiving discrepancies
- Incoming inspection output
- In-process quality yield

The Entire System

A tool can now be developed to consider all the cost, lead-time, and quality elements. Not all sub-elements or sub-components of each of these areas must be addressed, just the ones that are relevant to your specific purchase.

The tool can be used to evaluate make vs. buy decisions, to work with suppliers on improvement opportunities, to identify key cost, quality, and lead time drivers, and to provide an aggregated and composite assessment of the entire supply chain to make a specific product or provide a service.