

## Reducing Costs through Production and Supply Chain Management

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### Executive Summary

- There are numerous drivers of production and the supply chain, and there are several processes under each driver. These processes are associated with high overheads and offer opportunities for cost reduction.
- Cost reduction requires a complete knowledge and mapping of all costs, cycle times, purchases, inventories, suppliers, customers, logistics, and other service providers throughout the supply chain.
- Cost reduction in the supply chain often requires trade-off analysis amongst conflicting alternatives using the total cost approach.
- Successfully achieving supply chain cost savings requires the use of cross-functional teams with representation from marketing, design, procurement, production, distribution, and transportation employing an organized approach.

### Introduction

IKEA, the Swedish home products retailer, is known for its good-quality, inexpensive products, which are typically sold at prices 30–50% below those of its competitors. While the price of products from other companies continues to rise over time, IKEA claims that its retail prices have been reduced by a total of 20% over the last four years. At IKEA, the process of cost reduction starts at product conception and continues throughout the process of design, sourcing of materials and components, production, and distribution. For example, the “Bang” mug has been redesigned many times to realize shipping cost savings. Originally, 864 mugs would fit into a pallet. After redesign a pallet held 1,280 mugs, and with a further redesign 2,024 mugs could be squeezed into a pallet, reducing shipping costs by 60%.

Organizations today are looking for opportunities to improve operational efficiencies and reduce cost without having a negative effect on customer service levels. Production and supply chain management can help to reduce costs by connecting every unit in the supply chain, fostering collaboration among supply chain partners, and offering visibility into the demand and supply side of the chain.

Production and supply chain management involves a number of drivers through which acquired raw materials are converted into finished goods for sale to customers. In turn, these drivers involve several processes that offer opportunities for cost reduction. Common drivers include procurement, design of the supply chain, inventory, transportation, warehousing, and collaboration. Cost reduction requires timely and improved decision-making for common processes under each driver.

### Procurement

Procurement, also known as purchasing, is the process of acquiring raw materials, components, products, services, and other resources necessary either for the production processes themselves or for the support of production processes. Procurement processes ensure that supplies are available in the right place, in the right quantity, and at the right time. Buyers can play a major role in reducing supply chain costs by taking actions to reduce costs incurred in the flow of products from the suppliers to the ultimate customers. Some of the actions are discussed below.

Buyers must increase the flow of information throughout the supply chain, from the customer to the manufacturer and on to the supplier. This will make each entity in the chain aware of the inventory carried by the others and work towards the reduction of inventory without sacrificing customer service levels. Buyers must also take action to reduce cycle times, which will make the supply chain more responsive. To achieve a reduction in lead times, buyers must track and measure supplier lead-times, analyze trade-offs that result from lead time reduction, and then negotiate shorter lead times. Another action buyers can undertake to

reduce supply chain cost is to select suppliers on the basis of their total supply chain capability and not just price, lead time, and quality levels.

## Design of Supply Chain

There are several principles under design of the supply chain that can help to reduce costs. These include component commonality, component modularity, and postponement.

**Component commonality:** The principle of component commonality focuses on the design and use of common components for families of products. When there are a large number of products in a supply chain, the inventory of components will naturally be large. Component commonality calls for the use of common components in a variety of products. This reduces costs not only by reducing inventory cost but also through reduced material cost, reduced production cost, and reduced product obsolescence. For example, a computer manufacturer can design common components such as memory and disk drives and use different combinations of these components to produce different finished products.

**Component modularity:** The principle of component modularity recommends that common subsystems be designed as modules to meet a broad range of feature requirements. This reduces the number of components that must be produced, kept in materials and repair parts inventory, and integrated into the product during the production process. This reduces procurement, manufacturing, and inventory costs, leading to a lower supply chain cost. Manufacturers of electronic products, for example, use the principle of modularity to design and assemble printers, computers, and so on.

**Postponement:** Postponement means delaying the bringing of products into their final form until close to the point of sale, when customer demand is known with greater accuracy. This results in a better match between supply and demand, leading to reduced costs mainly through inventory reductions. For example, a traditional garment manufacturer might dye the thread before knitting it into sweaters, whereas a garment manufacturer using postponement would postpone dyeing until the last point in the supply chain, when customer color preferences are known with a greater degree of certainty.

## Inventory

Inventory resides at several locations in a supply chain, and the goal of inventory management is to reduce or eliminate inventory wherever it exists in the supply chain. This increases the velocity of movement of material through the chain, reducing the time from the point where material enters to the point of final consumption or sale. Slow movement of material leads to higher average inventories throughout the supply chain and results in higher inventory carrying costs. Techniques that can help reduce these costs include the following.

The first technique is to use models such as vendor-managed inventory (VMI) and drop-shipments to reduce the number of locations where inventory is stored. With VMI the buyer of a product provides certain information to a vendor of that product, and the vendor takes full responsibility for maintaining an agreed level of inventory of the material, usually at the location where the buyer uses it.

Second, the same strategy should not be used to manage and control all inventory items regardless of their value. Instead, use ABC analysis (not the same as activity-based costing) to classify inventory into different classes and to maintain appropriately safe stock levels based on the class. ABC analysis makes use of Pareto's Law and classifies inventory into classes A, B and C. A-class items are high in value and low in number, requiring tight control, while C-class items are low-value, high-number items that can be loosely controlled. Items classed as B include medium-value, medium-number items and typically require a blanket policy for control.

Other inventory management techniques include reducing the amount of transportation/pipeline inventory, and application of lean and just-in-time techniques to reduce or eliminate waste.

## Transportation

Transportation is used to move products from one location in the supply chain to another and is a significant component of the supply chain cost. A responsive transportation system can help to lower supply chain costs by achieving a high level of product availability at a reasonable price. A common technique for making a transportation system responsive is “cross-docking.” Under cross-docking, products from a supplier are aggregated into trucks that arrive at distribution centers. At these centers the process of cross-docking means that products are exchanged between different trucks so that each truck leaving for a given retail location is loaded with products from several suppliers.

Transportation planners can reduce supply chain costs by reducing transportation costs by selecting low-cost modes of transport and using software to plan optimal routes and delivery schedules. The various modes of transport include water, rail, truck, intermodal, and air, and package carriers such as DHL, FedEx, and UPS. Having a low-cost supply chain depends closely on the selection and use of an appropriate mode of transport. Water is typically the least expensive, although slowest, whereas air is the most expensive and fastest. Transportation planners often use the approach of total cost analysis to select the best mode. This requires finding the total cost for each mode of transportation and using the mode that has the lowest total cost. The total cost is made up of, and considers, the trade-off between the cost of transport, cost of inventory at the origin, cost of inventory in the pipeline, and cost of inventory at the destination. Several companies develop and provide software that helps planners to construct transportation routes and schedules. Planners also use satellite-based global positioning systems to lower costs while still maintaining a responsive transport system.

## Warehousing

Warehouses are locations in the supply chain to and from which inventory is transported. Supply chain planners can help to reduce costs by making good decisions about warehousing strategies, such as the location and capacity of warehouses, and operational decisions such as the functions to be performed at the warehouse, the order-fulfilment methodology to be used, etc.

When deciding on the location of warehouses, planners use a trade-off analysis to choose between a large centralized location, which is more efficient, and multiple decentralized locations that offer a higher level of responsiveness. A number of factors including the quality, cost and availability of the workforce, tax effects, and proximity to customers are used in the analysis. Capacity decisions typically involve decisions on the need for and amount of extra capacity. Warehouses with excess capacity offer flexibility at a cost, while those with little excess capacity are more efficient. Trade-off analysis is also used to make decisions on warehouse capacity. Operational decisions deal with day-to-day processes such as stock placement, stock picking, and cycle counting. Warehouse planners use warehouse management system (WMS) software to plan and execute these processes.

## Collaboration

Collaboration in a supply chain focuses on joint planning, coordination, and process integration between the firm and its suppliers, customers, and other partners such as the logistics providers. In addition to cost reduction, collaboration offers the advantages of business expansion to other areas, increased return on assets, improved customer service, reduced lead times, increased reliability and responsiveness to market trends, and a shorter time to market. Several options are available for achieving collaboration in a supply chain. These include:

- systems that transmit information between partners using technologies such as fax, e-mail, electronic data interchange (EDI), or extensible markup language (XML);
- systems such as electronic hubs and portals that facilitate the procurement of goods or services from electronic marketplaces, catalogs, and auctions;
- systems such as collaborative planning, forecasting and replenishment (CPFR) that permit shared collaboration rather than just a simple exchange of information amongst the supply chain partners.

The three systems identified above offer different levels of benefits and are associated with varying levels of expected costs. Organizations need to examine and quantify the benefits and costs of the alternative systems before selecting an appropriate system.

## Case Study

### Transportation Analysis Pays Off for Computer Products Firm

A leading US manufacturer of computer accessories makes many products in China and then funnels them into a single distribution center on the West Coast that serves hundreds of retail clients. The company contracted with various freight services to send the products to retail customers using different modes of transportation, including small-package air, small-package ground, less-than-truckload, truckload, and heavy-weight air freight. The company wanted to have a better understanding of transportation processes and to control transportation costs. To do so, it hired the services of UPS Consulting (UPSC).

UPSC undertook a careful analysis and helped the manufacturer to reduce its domestic transportation costs by approximately 30% by the following means:

- negotiation of better rates with new freight service providers;
- setting up a returns program with a single carrier that picks up and returns the product using the most cost-effective transportation mode;
- development of a user-friendly one-page guide to carrier and mode selection that matches the weight and size of a parcel shipment with the preferred shipping method;
- helping employees to understand shipping parameters;
- establishing a compliance system that requires weekly meetings to review shipping activities and handle any special issues that arise.

## Conclusion

This article has explored major sources of cost savings in a production and supply chain and identified some techniques used by supply chain personnel such as buyers, inventory managers, and transportation planners. The techniques identified were discussed by grouping supply chain processes under the common supply chain drivers of procurement, design of the supply chain, inventory, transportation, warehousing, and collaboration.

## More Info

### Books:

- Chopra, Sunil, and Peter Meindl. *Supply Chain Management: Strategy, Planning & Operations*. 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2006.
- Jacobs, F. Robert, and Richard B. Chase. *Operations and Supply Management: The Core*. Boston, MA: McGraw-Hill/Irwin, 2008.

### Websites:

- Council of Supply Chain Management Professionals: [cscmp.org](http://cscmp.org)
- Supply Chain Council: [www.supply-chain.org](http://www.supply-chain.org)
- UPS Supply Chain Solutions: [www.ups-scs.com](http://www.ups-scs.com)

## See Also

### Best Practice

- [Countering Supply Chain Risk](#)
- [Financial Techniques for Building Customer Loyalty](#)

- Profitability Analysis Using Activity-Based Costing
- Reducing Costs and Improving Efficiency by Outsourcing and Selecting Suppliers

## Checklists

- Business Process Reengineering
- Performing Total Cost of Ownership Analysis
- Understanding Economic Efficiency Theory
- Understanding Pareto's Law

## Thinkers

- Michael Eugene Porter

## Finance Library

- Reengineering the Corporation: A Manifesto for Business Revolution

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