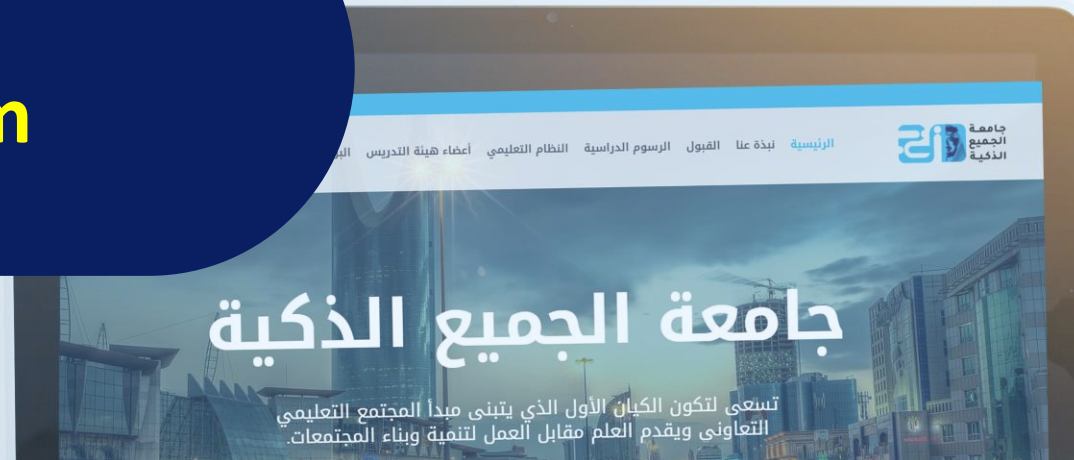


Supply chain Management

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Lecture 11



PMG 660

Sourcing Decisions in a Supply Chain



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Learning Objectives

After reading this chapter, you will be able to:

- 1. Understand the role of sourcing in a supply chain.**
- 2. Discuss factors that affect the decision to outsource a supply chain function.**
- 3. Identify dimensions of supplier performance that affect total cost.**
- 4. Structure successful auctions and negotiations.**
- 5. Describe the impact of different contracts on supplier performance and information distortion.**
- 6. Categorize purchased products and services and identify the desired focus of procurement in each case.**

The role of sourcing in a supply chain

Purchasing, also called procurement, is the **process by which companies acquire raw materials, components, products, services, or other resources from suppliers to execute their operations.**

Sourcing is the entire set of business processes required to purchase goods and services. For any supply chain function, the most significant decision is whether to outsource the function or perform it in-house.

Outsourcing results in the supply chain function being performed by a third party.

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Outsourcing is one of the most important issues facing a firm, and actions across industries tend to be varied.

For example, WW. Grainger, a MRO distributor, has consistently owned and managed its distribution centers.

In contrast, outbound transportation of packages from distribution centers to customers has consistently been outsourced to a third party.

Some of the benefits from effective sourcing decisions are the following:

- **Better economies of scale can be achieved if orders within a firm are aggregated.**
- **More efficient procurement transactions can significantly reduce the overall cost of purchasing. This is most important for items for which a large number of low value transactions occur.**
- **Design collaboration can result in products that are easier to manufacture and distribute, resulting in lower overall costs. This factor is most important for supplier products that contribute a significant amount to product cost and value.**

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- **Good procurement processes can facilitate coordination with the supplier and improve forecasting and planning. Better coordination lowers inventories and improves the matching of supply and demand.**
- **Appropriate supplier contracts can allow for the sharing of risk, resulting in higher profits for both the supplier and the buyer.**
- **Firms can achieve a lower purchase price by increasing competition through the use of auctions.**

In-house or outsource

The decision to outsource is based on the growth in supply chain surplus provided by the third party and the increase in risk incurred by using a third party.

A firm should consider outsourcing if the growth in surplus is large with a small increase in risk.

Performing the function in-house is preferable if the growth in surplus is small or the increase in risk is large.

How do third parties increase the supply chain surplus

Third parties increase the supply chain surplus if they either increase value for the customer or decrease the supply chain cost relative to a firm performing the task in-house.

Third parties can increase the supply chain surplus effectively if they are able to aggregate supply chain assets or flows to a higher level than a firm itself.

We will discuss various mechanisms that third parties can use to grow the surplus.

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1. Capacity aggregation.

A third party can increase the supply chain surplus by aggregating demand across multiple firms and gaining production economies of scale that no single firm can on its own. This is the most common reason for outsourcing production in a supply chain.

One of the reasons that **Dell** outsources design and production of the processors in its PCs to **Intel** is that Intel supplies many computer manufacturers and gains economies of scale that are not available to Dell if it designs and produces its own processors.

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2. Inventory aggregation.

A third party can increase the supply chain surplus by aggregating inventories across a large number of customers. W.W. Grainger and McMaster-Carr are MRO suppliers that provide value primarily by aggregating inventory for hundreds of thousands of customers.

Aggregation allows them to significantly lower overall uncertainty and improve economies of scale in purchasing and transportation.

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3. Transportation aggregation by transportation intermediaries.

A third party may increase the surplus by aggregating the transportation function to a higher level than any shipper can on its own.

UPS, FedEx, and a host of LTL carriers are examples of transportation intermediaries that increase the supply chain surplus by aggregating transportation across a variety of shippers. The value provided in each case is driven by the inherent economies of scale in transportation.

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4-Transportation aggregation by storage intermediaries

A third party that stores inventory can also increase the supply chain surplus by aggregating inbound and outbound transportation.

For example, storage intermediaries such as W.W. Grainger and McMaster-Carr stock products from over a thousand manufacturers each and sell to hundreds of thousands of customers. On the inbound side they are able to aggregate shipments from several manufacturers onto a single truck. This results in a lower transportation cost than could be achieved by each manufacturer independently. On the outbound side they aggregate packages for customers at a common destination, resulting in a significantly lower transportation cost than can be achieved by each customer separately.

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5. Warehousing aggregation.

A third party may increase the supply chain surplus by aggregating warehousing needs over several customers. The growth in surplus is achieved in terms of lower real estate costs as well as lower processing costs within the warehouse.

Savings through warehousing aggregation arise if a supplier's warehousing needs are small or if its needs fluctuate over time.

An example is Safexpress, a third-party logistics provider in India. Safexpress owns warehouses distributed throughout the country that are used by many of their customers. Most of its customers do not have warehousing needs that are large enough to justify a warehouse of their own in each region

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6. Procurement aggregation.

A third party increases the supply chain surplus if it aggregates procurement for many small players and facilitates economies of scale in production and inbound transportation. Procurement aggregation is most effective across many small buyers. A good example is Fleet X change, a firm that offers small truck fleets lower prices for truck equipment and services through aggregate buying.

Procurement aggregation is not likely to be a big factor in a situation with a few large customers.

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7. Information aggregation.

A third party may increase the surplus by aggregating information to a higher level than can be achieved by a firm performing the function in-house. All retailers aggregate information on products from many manufacturers in a single location.

This information aggregation reduces search costs for customers. eBags is an example of a retailer that provides primarily information aggregation, and little else. eBags hold very little inventory but is a single point of display for information on bags from many manufacturers.

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By aggregating product information, eBags significantly reduces search costs for the online customer. Relative to eBags, if each manufacturer set up its own Web site and online store, search costs for the customer would be higher and each manufacturer would have to invest in the information infrastructure.

Thus, eBags increases the supply chain surplus through information aggregation by making search cheaper and reducing investment in information technology.

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8. Receivables aggregation.

A third party may increase the supply chain surplus if it can aggregate the receivables risk to a higher level than the firm or it has a lower collection cost than the firm. Bright Star is a distributor for Motorola in most Latin American countries other than Brazil. Cell phones in the area are sold through many small, independently owned retail outlets. Collecting receivables from each retail outlet is a very expensive proposition for a manufacturer. Given that a retailer buys from many manufacturers, the power of each manufacturer to collect is also reduced. Bright star, as a distributor, is able to aggregate collection across all manufacturers (that it serves), reducing the collection cost

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9. Relationship aggregation.

An intermediary can increase the supply chain surplus by decreasing the number of relationships required between multiple buyers and sellers.

Without an intermediary, connecting a thousand sellers to a million buyers requires a billion relationships. The presence of an intermediary lowers the number of relationships required to just over a million.

Relationship aggregation is most effective when many buyers sporadically purchase small amounts at a time but each order often has products from multiple suppliers. Thus, Grainger can increase the surplus by being a relationship aggregator for MRO products.

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10. Lower costs and higher quality.

A third party can increase the supply chain surplus if it provides lower cost or higher quality relative to the firm. If these benefits come from specialization and learning, they are likely to be sustainable over the longer term.

A specialized third party that is further along the learning curve for some supply chain activity is likely to maintain its advantage over the long term.

Risks of using a third party

Firms must evaluate the following risks when they move any function to a third party.

1. The process is broken. The biggest problems arise when a firm outsources supply chains functions simply because it has lost control of the process. Keep in mind that introducing a third party into a broken supply chain process only makes it worse and harder to control. The first step should be to get the process under control, then do a cost-benefit analysis, and only then decide on outsourcing.

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2. Underestimation of the cost of coordination.

A common mistake when outsourcing is to underestimate the effort required to coordinate activities across multiple entities performing supply chain tasks.

This is especially true if a firm plans to outsource specific supply chain functions to different third parties.

Outsourcing functions to many third parties is feasible (and can be very effective) if the firm views being a coordinator as one of its core strengths.

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3. Reduced customer/supplier contact.

A firm may lose customer/supplier contact by introducing an intermediary.

The loss of customer contact is particularly significant for firms that sell directly to consumers but decide to use a third party to either collect incoming orders or deliver outgoing product.

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4. Loss of internal capability and growth in third-party power.

A firm may choose to keep a supply chain function in-house if outsourcing will significantly increase the third party's power. An example can be found in the electronics industry.

Companies such as HP and Motorola have moved most of their manufacturing to contract manufacturers but are reluctant to move either procurement or design, even though contract manufacturers have developed both capabilities.

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5. Leakage of sensitive data and information.

Using a third party requires a firm to share demand information and in some cases intellectual property. If the third party also serves competitors, there is always the danger of leakage.

Firms have often insisted on firewalls within the third party, but a firewall increases the specificity of assets, limiting the growth in surplus that the third party can provide. When leakage is an issue, especially with regard to intellectual property, firms often choose to keep the function in-house.

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6. Ineffective contracts.

Contracts with performance metrics that distort the third party's incentives often significantly reduce any gains from outsourcing. For example, cost-plus pricing of third-party services presents incentive problems even if the third party opens its books.

This form of pricing eliminates incentives for the third party to innovate further to reduce costs.

Supplier scoring and assessment

When comparing suppliers, many firms make the fundamental mistake of focusing only on the quoted price, ignoring the fact that suppliers may differ on other important dimensions that affect the total cost of using a supplier.

For instance, suppliers have different replenishment lead times. Does it pay to select a more expensive supplier with a the more reliable supplier worth the few extra pennies it charges per piece? In each of the aforementioned instances, the price charged by the supplier is only one of many factors that affect the supply chain surplus.

When scoring and assessing suppliers, the following factors other than quoted price must be considered:

- **Replenishment lead time**
- **On-time performance**
- **Supply flexibility**
- **Delivery frequency/minimum lot size**
- **Supply quality**
- **Inbound transportation cost**
- **Pricing terms**
- **Information coordination capability**
- **Design collaboration capability**
- **Exchange rates, taxes, and duties**
- **Supplier viability**

Supplier selection-auctions and negotiations



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Before selecting suppliers, a firm must decide whether to use single sourcing or multiple suppliers. Single sourcing guarantees the supplier sufficient business when the supplier has to make a significant buyer-specific investment.

The buyer-specific investment may take the form of plant and equipment designed to produce a part that is specific to the buyer or may take the form of expertise that needs to be developed. Single sourcing is also used in the automotive industry for parts such as seats that must arrive in the sequence of production.

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Coordinating such sequencing is impossible with multiple sources.

As a result, auto companies have a single seat source for each plant but multiple seat sources across their manufacturing network.

Having multiple sources ensures a degree of competition and also the possibility of a backup should a source fail to deliver.

Contracts and supply chain performance

A supply contract specifies parameters governing the buyer-supplier relationship.

In addition to making the terms of the buyer-supplier relationship explicit, contracts have significant impact on the behavior and performance of all stages in a supply chain.

Contracts should be designed to facilitate desirable supply chain outcomes and minimize actions that hurt performance.

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A manager should ask the following three questions when designing a supply chain contract:

- 1. How will the contract affect the firm's profits and total supply chain profits?**
- 2. Will the incentives in the contract introduce any information distortion?**
- 3. How will the contract influence supplier performance along key performance measures?**

The procurement process

Once suppliers have been selected, contracts are in place, and the product has been designed, the buyer and suppliers engage in procurement transactions that begin with the buyer placing the order and end with the buyer receiving and paying for the order.

In designing the procurement process, it is important to consider goods that the process will be used to purchase. There are two main categories of purchased goods: direct and indirect materials.

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Direct materials are components used to make finished goods. For example, memory, hard drives, and CD drives are direct materials for a PC manufacturer. Indirect materials are goods used to support the operations of a firm.

PCs are examples of indirect materials for an automotive manufacturer. All procurement processes within a company relate to the purchase of direct and indirect materials. Important differences between direct and indirect materials that affect procurement are shown in Table 14-7.

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TABLE 14-7 Differences Between Direct and Indirect Materials

	<i>Direct Materials</i>	<i>Indirect Materials</i>
Use	Production	Maintenance, repair, and support operations
Accounting	Cost of goods sold	SG&A
Impact on production	Any delay will delay production	Less direct impact
Processing cost relative to value of transaction	Low	High
Number of transactions	Low	High

Sourcing planning and analysis

Periodically, each firm must analyze its procurement spending and supplier performance and use this as input for future sourcing decisions.

One important analysis is the aggregation of spending across and within categories and suppliers.

Aggregation provides visibility into what a company is purchasing and from whom the product is being purchased.

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Managers can use this information to determine economic order quantities, volume discounts, and projected quantity discounts on future volumes.

A simple step is to consolidate spending and ensure that the firm's economic order quantity matches the supplier's economic production quantity.

Managers can thus realize better economies of scale and utilize resources more effectively.

The role of IT in sourcing

Sourcing-related IT has had the most ups and downs of any supply chain software sector.

The sourcing software world created many electronic marketplaces in the late 1990s that were expected to transform the purchase of goods and services.

Firms such as Chemdex and Vertical Net promised to be the one-stop shop where all members of an industry would buy and sell their goods.

For a time, it seemed that sourcing software firms would create the tools of these new hubs of commerce through which every transaction would flow. They were selling the picks and shovels to all the metaphorical gold mining marketplaces.

Risk management in sourcing

Sourcing risks may result in an inability to meet demand on time, an increase in procurement costs, or the loss of intellectual property.

It is important to develop mitigation strategies that help mitigate a significant part of the risk.

An inability to meet demand on time arises because of disruption or delay from the supply source

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The risk of supply disruption may be serious, especially with a single or very few sources. This was particularly evident when one of two suppliers of flu vaccine to the United States was unable to do so in 2004 because of contamination. Disruption risk can be mitigated by developing multiple sources.

Given the high cost of developing multiple sources and the resulting loss of economies of scale, it is best to do so for products with relatively high demand.

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Developing multiple sources is very expensive for products with low demand. Delays from a supply source can be mitigated by carrying inventory or developing a backup source that is more responsive.

Carrying inventory is best for low-value products that do not become obsolete quickly, whereas developing a responsive backup source is preferred for high-value, short-life-cycle products.

Making sourcing decisions in practice

1. Use multifunctional teams.

Effective strategies for sourcing result from multifunctional collaboration within the firm. A sourcing strategy from the purchasing group is likely to be relatively narrow and focus on purchase price.

A strategy developed with the collaboration of purchasing, manufacturing, engineering, and planning is much more likely to identify the correct drivers of total cost.

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2. Ensure appropriate coordination across regions and business units.

Coordination of purchasing across all regions and business units allows a firm to maximize economies of scale in purchasing and also to reduce transaction costs. Other opportunities from improved sourcing, such as better supply chain coordination and design collaboration, however, may require strong involvement at the business-unit level to be really effective.

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3. Always evaluate the total cost of ownership.

An effective sourcing strategy should not make price reduction its sole objective. All factors that influence the total cost of ownership should be identified and used in selecting suppliers.

Supplier performance along all relevant dimensions should be measured, and its impact on total cost should be quantified.

Focusing on the total cost of ownership also allows a buyer to better identify opportunities for better collaboration in design, planning, and fulfillment.

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4. Build long-term relationships with key suppliers.

A basic principle of good sourcing is that a buyer and supplier working together can generate more opportunities for savings than the two parties working independently.

Solid cooperation is likely to result only when the two parties have a long-term relationship and a degree of trust.

Reference

Supply chain management
Strategy, Planning, and Operation
By: Sunil Chopra-3rd ed.

Chapter 14