

Supply Chain Management (5th Edition)

Chapter 2

Supply Chain Performance: Achieving Strategic Fit and Scope

Chapter 3

Supply Chain Drivers and Obstacles

What is Supply Chain Management?

- ◆ Managing supply chain flows and assets, *to maximize supply chain surplus*
- ◆ What is *supply chain surplus*?

Competitive and Supply Chain Strategies

- ◆ Competitive strategy: defines the set of customer needs a firm seeks to satisfy through its products and services.
- ◆ Competitive Strategy in all SCs is defined based on how the customer prioritizes product cost, delivery time, product variety and quality
- ◆ Figure 2-1 Shows the value chain of a company
- ◆ **Product development strategy**: specifies the portfolio of new products that the company will try to develop
- ◆ **Marketing and sales strategy**: specifies how the market will be segmented and product positioned, priced, and promoted
- ◆ **Supply chain strategy**:
 - determines the nature of material procurement, transportation of materials, manufacture of product or creation of service, distribution of product
 - Consistency and support between supply chain strategy, competitive strategy, and other functional strategies is important

The Value Chain: Linking Supply Chain and Business Strategy

Operations transforms inputs to outputs to create the product according to new product specifications. Distribution either takes the product to the customer or brings the customer to the product. Service responds to customer requests during or after the sale. These are core processes or functions that must be performed for a successful sale. Finance, accounting, information technology, and human resources support and facilitate the functioning of the value chain.

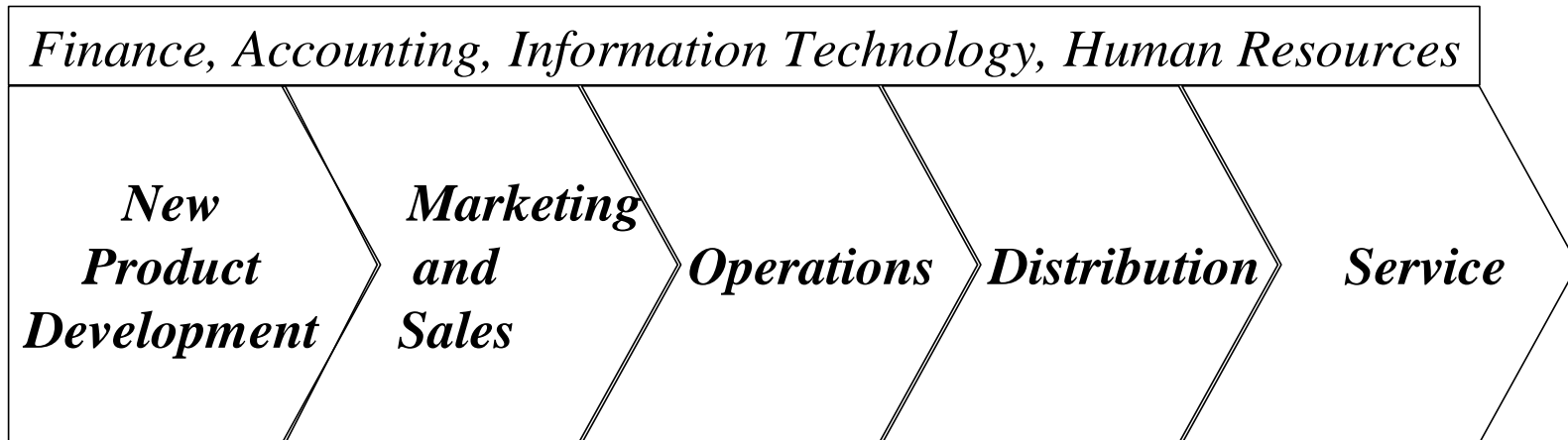


FIGURE 2-1 The Value Chain in a Company

Achieving Strategic Fit

Given its competitive strategy, what should a company's supply chain try to do particularly well?

◆ Strategic fit:

- Consistency between customer priorities of competitive strategy and supply chain capabilities specified by the supply chain strategy
- Requires that competitive and supply chain strategies have the same goals

For a company to achieve strategic fit, it must accomplish the following:

1. The competitive strategy and all functional strategies must fit together to form a coordinated overall strategy. Each functional strategy must support other functional strategies and help a firm reach its competitive strategy goal.
2. The different functions in a company must appropriately structure their processes and resources to be able to execute these strategies successfully.
3. The design of the overall supply chain and the role of each stage must be aligned to support the supply chain strategy.

- ❑ A company may fail because of a lack of strategic fit or because its processes and resources do not provide the capabilities to execute the desired strategy
- ❑ Example of strategic fit -- Dell

To elaborate on strategic fit, let us consider the evolution of Dell and its supply chain between 1993 and the present. Between 1993 and 2006, Dell's competitive strategy was to provide a large variety of customizable products at a reasonable price. Given the focus on customization, Dell's supply chain was designed to be very responsive. Assembly facilities owned by Dell were designed to be flexible and to easily handle the wide variety of configurations requested by customers.

The notion of strategic fit also extended to other functions within Dell. Dell PCs were designed to use common components and to allow rapid assembly. This design strategy clearly aligned well with the supply chain's goal of assembling customized PCs in response to customer orders. Dell worked hard to carry this alignment to its suppliers. Given that Dell produced customized products with low levels of inventory, it was crucial that suppliers and carriers be highly responsive. For example, the ability of carriers to merge a PC from Dell with a monitor from Sony allowed Dell not to carry any Sony monitors in inventory.

Starting in 2007, however, Dell altered its competitive strategy and had to change its supply chain accordingly. With a reduced customer focus on hardware customization, Dell branched out into selling PCs through retail stores such as Walmart. Through Walmart, Dell offers a limited variety of desktops and laptops. It is also essential that monitors and other peripherals be available in inventory because a customer buying a PC at Walmart is not willing to wait for the monitor to show up later. Clearly, the flexible and responsive supply chain that aligns well with customer needs for customization does not necessarily align well when customers no longer want customization but prefer low prices. Given the change in customer priorities, Dell has shifted a greater fraction of its production to a build-to-stock model to maintain strategic fit.

How is Strategic Fit Achieved?

- ◆ Step 1: Understanding the customer and supply chain uncertainty
- ◆ Step 2: Understanding the supply chain
- ◆ Step 3: Achieving strategic fit

Step 1: Understanding the Customer and Supply Chain Uncertainty

- ◆ Identify the needs of the customer segment being served (e.g. Seven-Eleven vs Sam's Club)

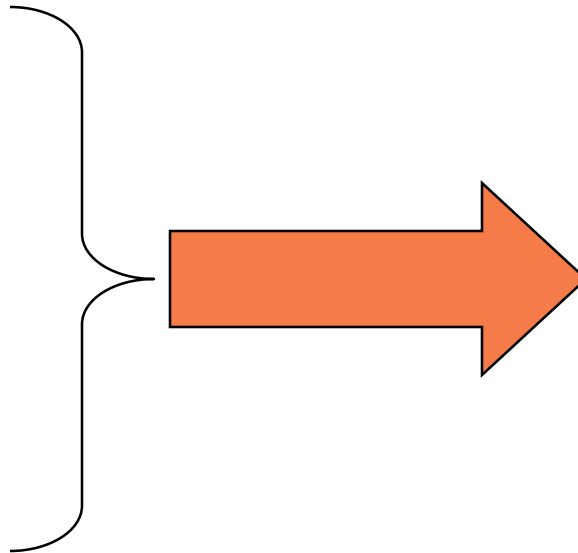
Let us compare Seven-Eleven Japan and a discounter such as Sam's Club (a part of Walmart). When customers go to Seven-Eleven to purchase detergent, they go there for the convenience of a nearby store and are not necessarily looking for the lowest price. In contrast, low price is very important to a Sam's Club customer. This customer may be willing to tolerate less variety and even purchase large package sizes as long as the price is low. Even though customers purchase detergent at both places, the demand varies along certain attributes. In the case of Seven-Eleven, customers are in a hurry and want convenience. In the case of Sam's Club, they want a low price and are willing to spend time getting it. In general, customer demand from different segments varies along several attributes, as follows:

- *Quantity of the product needed in each lot:* An emergency order for material needed to repair a production line is likely to be small. An order for material to construct a new production line is likely to be large.
- *Response time that customers are willing to tolerate:* The tolerable response time for the emergency order is likely to be short, whereas the allowable response time for the construction order is apt to be long.
- *Variety of products needed:* A customer may place a high premium on the availability of all parts of an emergency repair order from a single supplier. This may not be the case for the construction order.
- *Service level required:* A customer placing an emergency order expects a high level of product availability. This customer may go elsewhere if all parts of the order are not immediately available. This is not apt to happen in the case of the construction order, for which a long lead time is likely.
- *Price of the product:* The customer placing the emergency order is apt to be much less sensitive to price than the customer placing the construction order.
- *Desired rate of innovation in the product:* Customers at a high-end department store expect a lot of innovation and new designs in the store's apparel. Customers at Walmart may be less sensitive to new product innovation.

Achieving Strategic Fit

◆ Understanding the Customer

- Lot size
- Response time
- Service level
- Product variety
- Price
- Innovation



*Implied
Demand
Uncertainty*

Step 1: Understanding the Customer and Supply Chain Uncertainty

- ◆ Overall attribute of **customer demand**
- ◆ Demand uncertainty: uncertainty of customer demand for a product
- ◆ Implied demand uncertainty: resulting uncertainty for the supply chain given the portion of the demand the supply chain must handle and attributes the customer desires

Step 1: Understanding the Customer and Supply Chain Uncertainty

- ◆ Implied demand uncertainty also related to customer needs and product attributes
- ◆ Table 2.1
- ◆ Table 2.2
- ◆ Figure 2.2
- ◆ First step to strategic fit is to understand customers by mapping their demand on the implied uncertainty spectrum

Impact of Customer Needs on Implied Demand Uncertainty (Table 2.1)

Customer Need	Causes implied demand uncertainty to increase because ...
Range of quantity increases	Wider range of quantity implies greater variance in demand
Lead time decreases	Less time to react to orders
Variety of products required increases	Demand per product becomes more disaggregated
Number of channels increases	Total customer demand is now disaggregated over more channels
Rate of innovation increases	New products tend to have more uncertain demand
Required service level increases	Firm now has to handle unusual surges in demand

Correlation Between Implied Demand Uncertainty and Other Attributes (Table 2.2)

Attribute	Low Implied Uncertainty	High Implied Uncertainty
Product margin	Low	High
Avg. forecast error	10%	40%-100%
Avg. stockout rate	1%-2%	10%-40%
Avg. forced season-end markdown	0%	10%-25%

Levels of Implied Demand Uncertainty

First, let us take an example of a product with low implied demand uncertainty—such as table salt. Salt has a low margin, accurate demand forecasts, low stockout rates, and virtually no markdowns. These characteristics match well with Fisher’s chart of characteristics for products with highly certain demand.

On the other end of the spectrum, a new cell phone has high implied demand uncertainty. It will likely have a high margin, inaccurate demand forecasts, high stockout rates (if it is successful), and large markdowns (if it is a failure). This, too, matches well with Table 2-2.

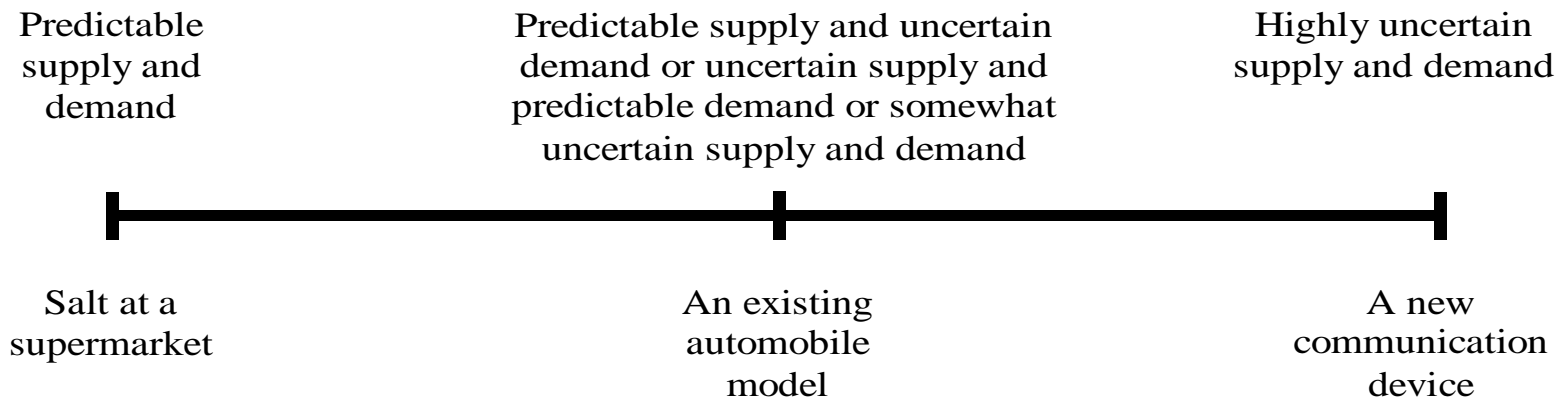


Figure 2.2: The Implied Uncertainty (Demand and Supply)

Lee (2002) pointed out that along with demand uncertainty, it is important to consider uncertainty resulting from the capability of the supply chain.

TABLE 2-3 Impact of Supply Source Capability on Supply Uncertainty

Supply Source Capability	Causes Supply Uncertainty to . . .
Frequent breakdowns	Increase
Unpredictable and low yields	Increase
Poor quality	Increase
Limited supply capacity	Increase
Inflexible supply capacity	Increase
Evolving production process	Increase

Source: Adapted from Hau L. Lee, “Aligning Supply Chain Strategies with Product Uncertainties.” *California Management Review* (Spring 2002), 105–119.

Key Point

The first step in achieving strategic fit between competitive and supply chain strategies is to understand customers and supply chain uncertainty. Uncertainty from the customer and the supply chain can be combined and mapped on the implied uncertainty spectrum.

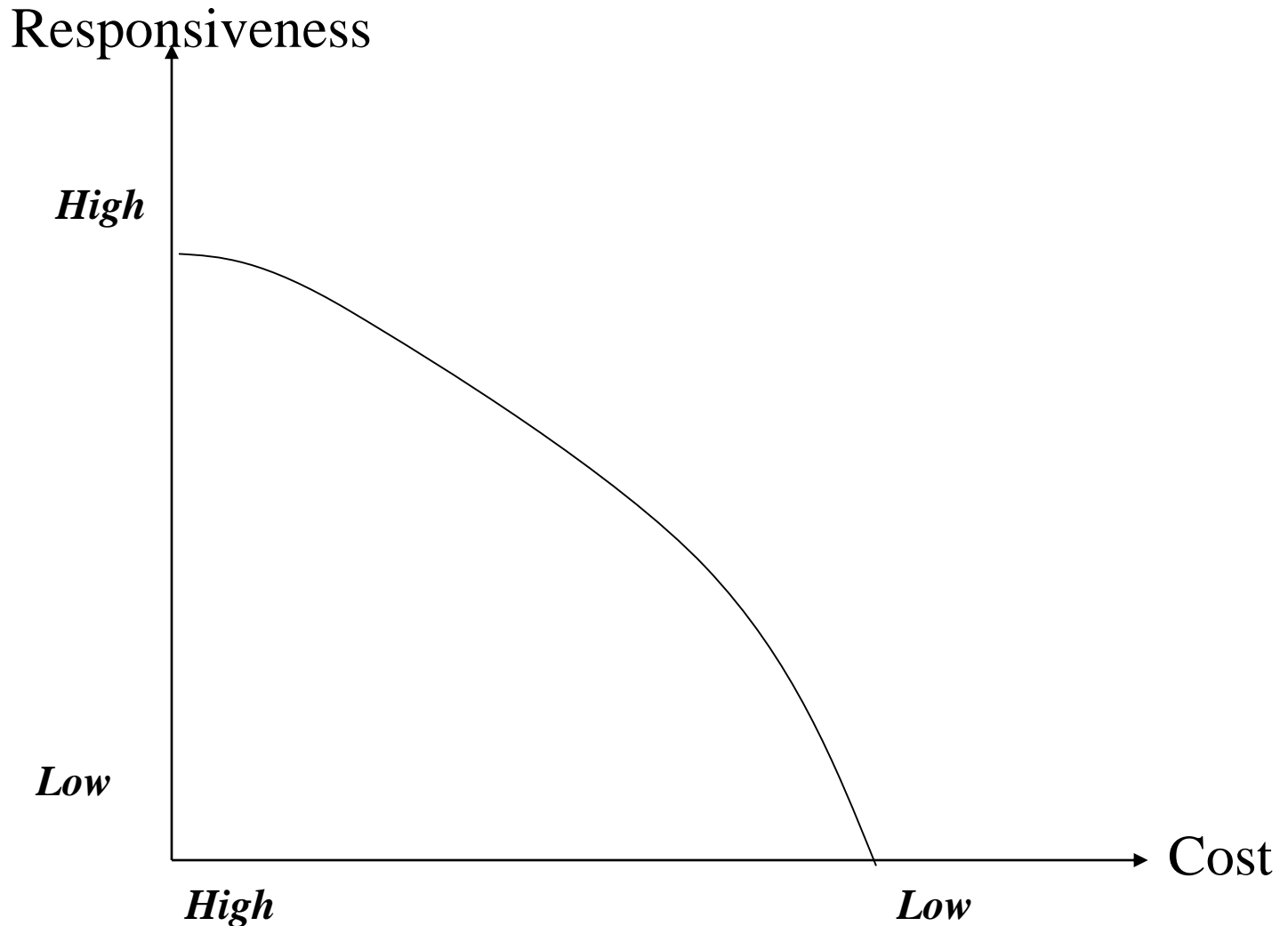
Step 2: Understanding the Supply Chain

- ◆ How does the firm best meet demand?
- ◆ Dimension describing the supply chain is supply chain responsiveness
- ◆ Supply chain responsiveness -- ability to
 - respond to wide ranges of quantities demanded
 - meet short lead times
 - handle a large variety of products
 - build highly innovative products
 - meet a very high service level
 - handle supply uncertainty

Step 2: Understanding the Supply Chain

- ◆ There is a cost to achieving responsiveness
- ◆ Supply chain efficiency: is the inverse of the cost of making and delivering the product to the customer
- ◆ Increasing responsiveness results in higher costs that lower efficiency
- ◆ Figure 2.3: cost-responsiveness efficient frontier
- ◆ Figure 2.4: supply chain responsiveness spectrum
- ◆ Second step to achieving strategic fit is to map the supply chain on the responsiveness spectrum

Understanding the Supply Chain: Cost-Responsiveness Efficient Frontier



Responsiveness Spectrum (Figure 2.4)

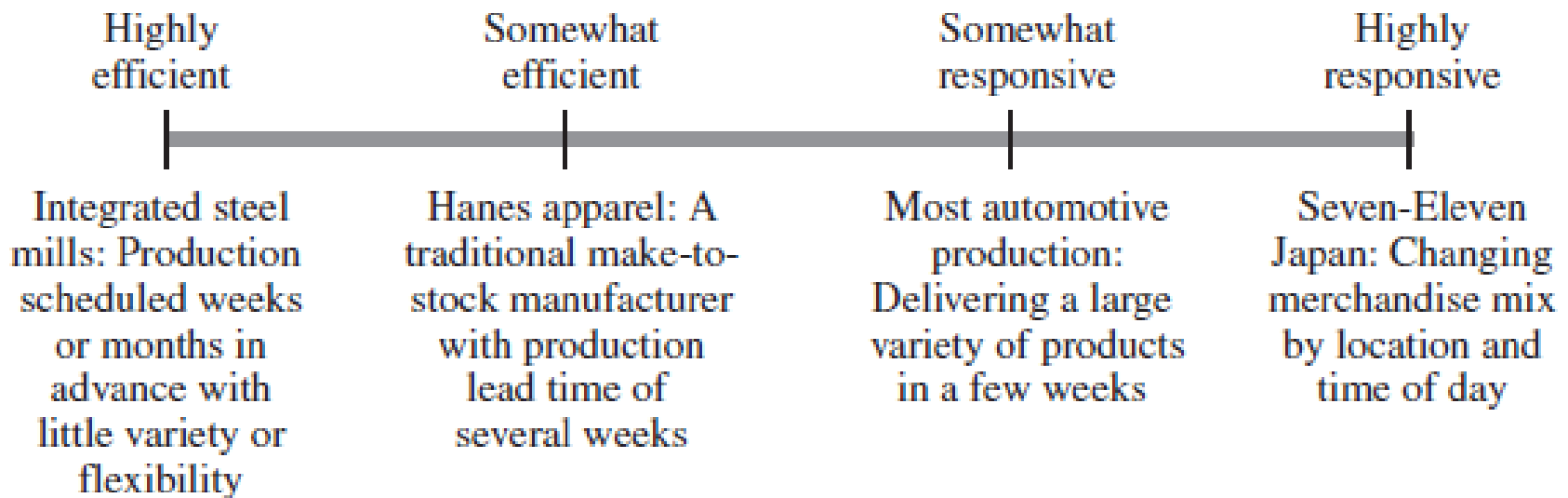


FIGURE 2-4 The Responsiveness Spectrum

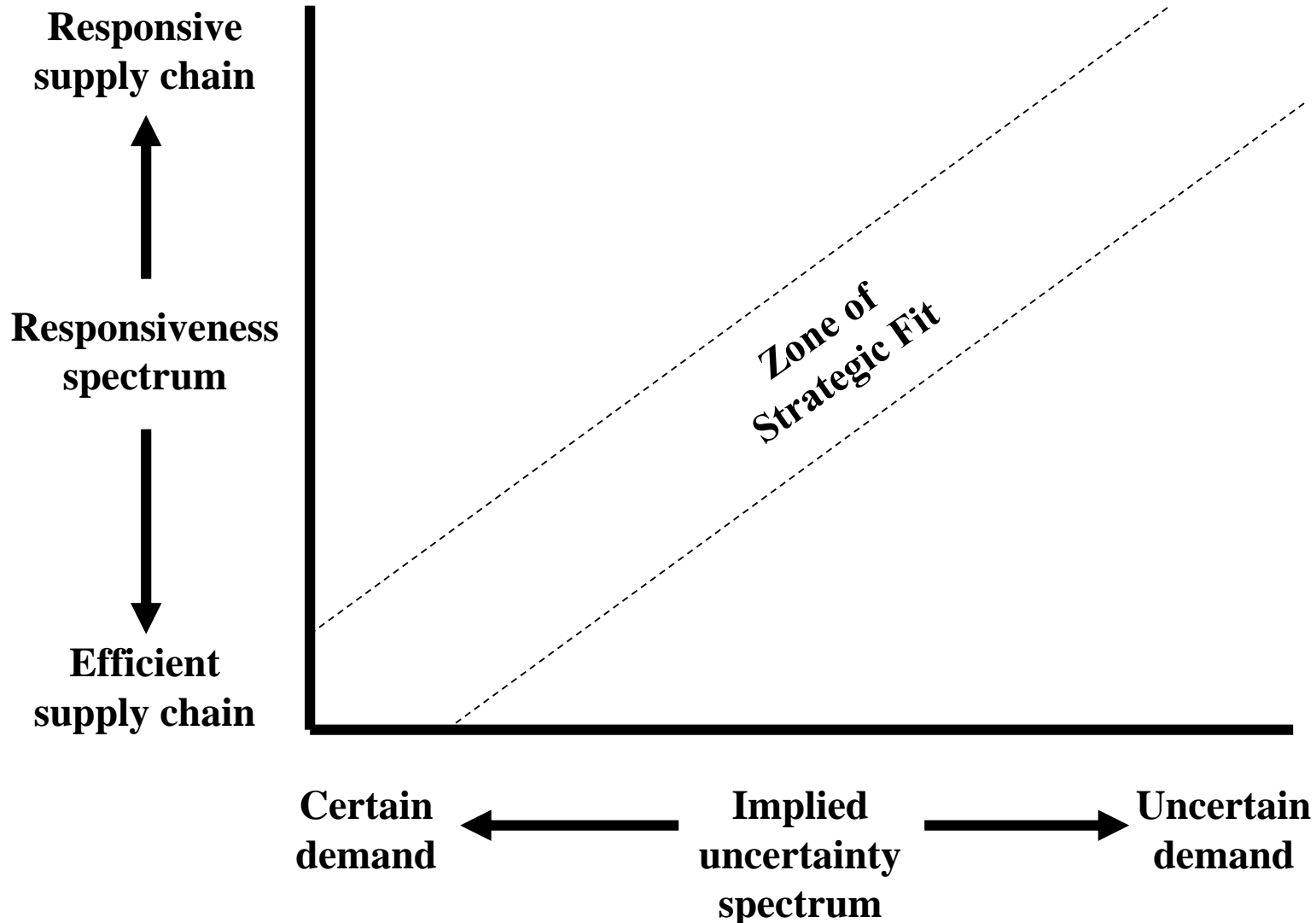
Key Point

The second step in achieving strategic fit between competitive and supply chain strategies is to understand the supply chain and map it on the responsiveness spectrum.

Step 3: Achieving Strategic Fit

- ◆ Step is to ensure that what the supply chain does well is consistent with target customer's needs
- ◆ All functions in the value chain must support the competitive strategy to achieve strategic fit.
- ◆ Fig. 2.5: Uncertainty/Responsiveness map
- ◆ Fig. 2.5: Zone of strategic fit
- ◆ Examples: **Dell (Responsive SC), Barilla (efficient SC)**
- ◆ Two key points
 - there is *no* right supply chain strategy independent of competitive strategy
 - there *is* a right supply chain strategy for a given competitive strategy

Achieving Strategic Fit Shown on the Uncertainty/Responsiveness Map (Fig. 2.5)



Comparison of Efficient and Responsive Supply Chains (Table 2.4)

TABLE 2-4 Comparison of Efficient and Responsive Supply Chains

	Efficient Supply Chains	Responsive Supply Chains
Primary goal	Supply demand at the lowest cost	Respond quickly to demand
Product design strategy	Maximize performance at a minimum product cost	Create <i>modularity</i> to allow postponement of product differentiation
Pricing strategy	Lower margins because price is a prime customer driver	Higher margins because price is not a prime customer driver
Manufacturing strategy	Lower costs through high utilization	Maintain capacity flexibility to buffer against demand/supply uncertainty
Inventory strategy	Minimize inventory to lower cost	Maintain <i>buffer inventory</i> to deal with demand/supply uncertainty
Lead-time strategy	Reduce, but not at the expense of costs	Reduce aggressively, even if the costs are significant
Supplier strategy	Select based on cost and quality	Select based on speed, flexibility, reliability, and quality

Source: Adapted from Marshall L. Fisher, "What Is the Right Supply Chain for Your Product?" *Harvard Business Review* (March–April 1997), 83–93.

Expanding Strategic Scope

◆ Scope of strategic fit

- The functions and stages within a supply chain that devise an integrated strategy with a shared objective
- One extreme: each function at each stage develops its own strategy
- Other extreme: all functions in all stages devise a strategy jointly

Intraoperation Scope: Minimizing Local Cost

The *intraoperation scope* has each stage of the supply chain devising its strategy independently. In such a setting, the resulting collection of strategies typically does not align, resulting in conflict. This limited scope was the dominant practice during the 1950s and 1960s, when each operation within each stage of the supply chain attempted to minimize its own costs. As a result of this narrow scope, the transportation function at many firms may have shipped full truckloads without any regard for the resulting impact on inventories or responsiveness, or the sales function may have offered trade promotions to enhance revenue without any consideration for how those promotions affected production, warehousing, and transportation costs. The resulting lack of alignment diminished the supply chain surplus.

Intrafunctional Scope: Minimizing Functional Cost

Over time, managers recognized the weakness of the intraoperation scope and attempted to align all operations within a function. For example, the use of air freight could be justified only if the resulting savings in inventories and improved responsiveness justified the increased transportation cost. With the *intrafunctional* view, firms attempted to align all operations within a function. All supply chain functions, including sourcing, manufacturing, warehousing, and transportation, had to align their strategies to minimize total functional cost. As a result, product could be sourced from a higher-cost local supplier because the resulting decrease in inventory and transportation costs more than compensated for the higher unit cost.

Interfunctional Scope: Maximizing Company Profit

The key weakness of the intrafunctional view is that different functions within a firm may have conflicting objectives. Over time, companies became aware of this weakness as they saw, for example, marketing and sales focusing on revenue generation, and manufacturing and distribution focusing on cost reduction. Actions the two functions took were often in conflict, hurting the firm's overall performance. Companies realized the importance of expanding the scope of strategic fit and aligning strategy across all functions within the firm. With the interfunctional scope, the goal is to maximize company profit. To achieve this goal, all functional strategies are developed to align with one another and with the competitive strategy.

Intercompany Scope: Maximizing Supply Chain Surplus

The goal of only maximizing company profits can sometimes lead to conflict between stages of a supply chain. For example, both the supplier and the manufacturer in a supply chain may prefer to have the other side hold most of the inventory, with the goal of improving their own profits. If the two parties cannot look beyond their own profits, the more powerful party will simply force the other to hold inventories without any regard for where inventories are best held. The result is a decrease in the supply chain surplus—the total pie that both parties get to share.

The intercompany scope proposes a different approach. Instead of just forcing the inventory onto the weaker party, the two parties work together to reduce the amount of inventory required. By working together and sharing information, they can reduce inventories and total cost, thus increasing the supply chain surplus. The higher the supply chain surplus, the more competitive the supply chain is.

Key Point

The intercompany scope of strategic fit requires firms to evaluate every action in the context of the entire supply chain. This broad scope increases the size of the surplus to be shared among all stages of the supply chain. The intercompany scope of strategic fit is essential today because the competitive playing field has shifted from company versus company to supply chain versus supply chain. A company's partners in the supply chain may well determine the company's success, as the company is intimately tied to its supply chain.

A good example of the intercompany approach is how Walmart and P&G plan promotions jointly. The two companies have a team (with employees from both parties) that works to ensure that the promotion is timed and executed to benefit both sides. Before the initiation of this collaborative effort, promotions at Walmart sometimes required P&G to run its facilities with overtime at high cost. The result was a decrease in the supply chain surplus because the product was sold at a discount at a time when it was being produced at high marginal cost. The collaborative teams now try to increase the supply chain surplus by timing the promotion to have high sales impact while minimizing the marginal cost increase. They work to ensure that the product is produced in such a manner that all promotion demand is met without generating excess unsold inventories.

Agile Intercompany Scope

Up to this point, we have discussed strategic fit in a static context; that is, the players in a supply chain and the customers' needs do not change over time. In reality, the situation is much more dynamic. Product life cycles are getting shorter, and companies must satisfy the changing needs of individual customers. A company may have to partner with many firms, depending on the product being produced and the customer being served. Firms' strategies and operations must be agile enough to maintain strategic fit in a changing environment.

Agile intercompany scope refers to a firm's ability to achieve strategic fit when partnering with supply chain stages that change over time. Firms must think in terms of supply chains consisting of many players at each stage. For example, a manufacturer may interface with a different set of suppliers and distributors depending on the product being produced and the customer being served. Furthermore, as customers' needs vary over time, firms must have the ability to become part of new supply chains while ensuring strategic fit. This level of agility becomes more important as the competitive environment becomes more dynamic.

Key Point

The final step in achieving strategic fit is to match supply chain responsiveness with the implied uncertainty from demand and supply. The supply chain design and all functional strategies within the firm must also support the supply chain's level of responsiveness.

Challenges to achieving and managing strategic fit

- ◆ Increasing product variety and shortening life cycles of products
- ◆ Globalization and increasing uncertainty
- ◆ Fragmentation of supply chain ownership
- ◆ Changing technology and business environment
- ◆ The environment and sustainability

Key Point

Many challenges, such as rising product variety and shorter product life cycles, have made it increasingly difficult for supply chains to achieve strategic fit. Overcoming these challenges offers a tremendous opportunity for firms to use supply chain management to gain competitive advantage.

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Chapter 3 Supply Chain Drivers and Obstacles

Outline

- ◆ Drivers of supply chain performance
- ◆ A framework for structuring drivers
- ◆ Facilities
- ◆ Inventory
- ◆ Transportation
- ◆ Information
- ◆ Sourcing
- ◆ Pricing
- ◆ Obstacles to achieving fit

Drivers of Supply Chain Performance

- ◆ Facilities
 - places where inventory is stored, assembled, or fabricated
 - production sites and storage sites
- ◆ Inventory
 - raw materials, WIP, finished goods within a supply chain
 - inventory policies
- ◆ Transportation
 - moving inventory from point to point in a supply chain
 - combinations of transportation modes and routes
- ◆ Information
 - data and analysis regarding inventory, transportation, facilities throughout the supply chain
 - potentially the biggest driver of supply chain performance
- ◆ Sourcing
 - functions a firm performs and functions that are outsourced
- ◆ Pricing
 - Price associated with goods and services provided by a firm to the supply chain

A Framework for Structuring Drivers

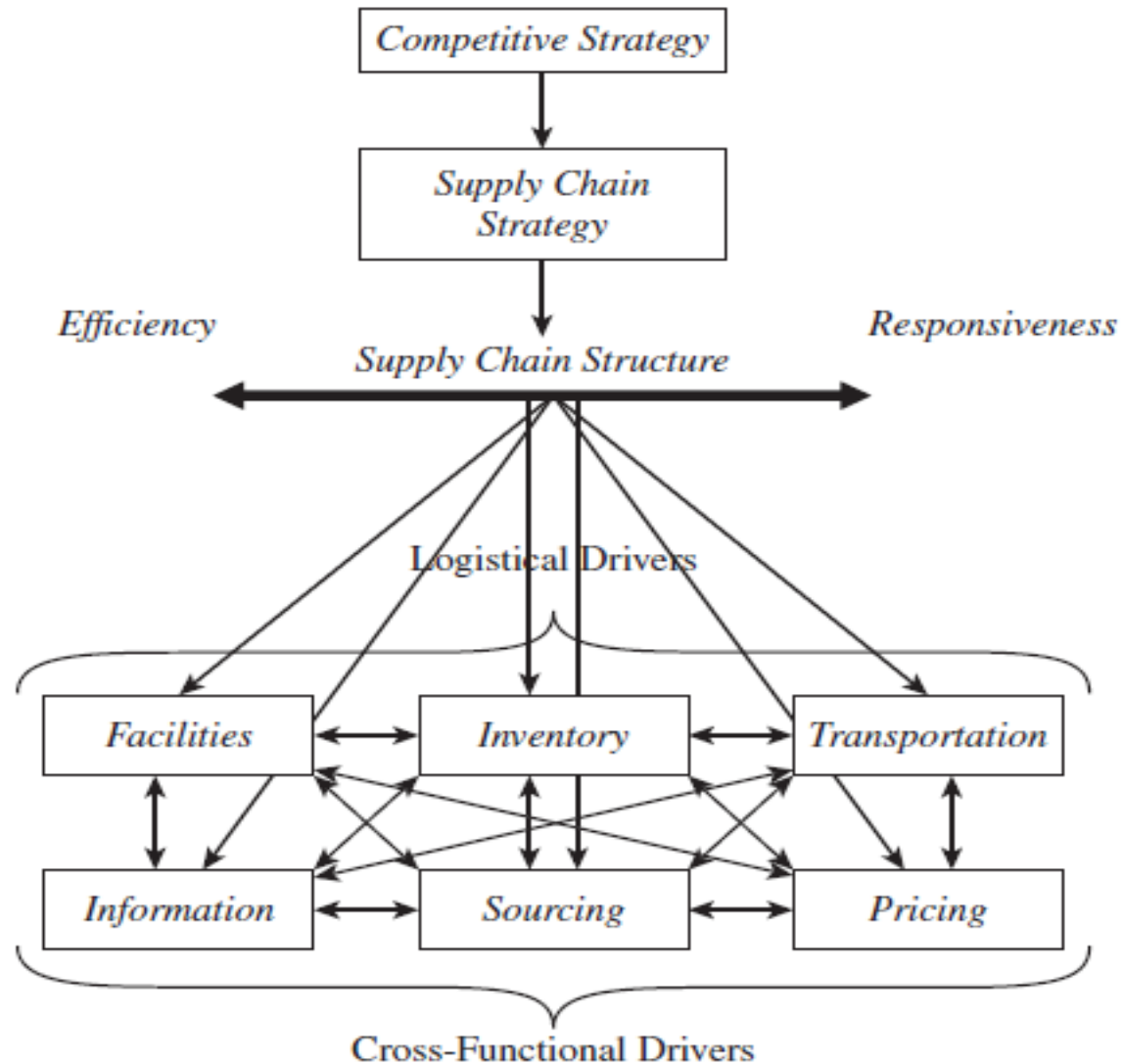


FIGURE 3-1 Supply Chain Decision-Making Framework

Facilities

- ◆ Role in the supply chain
 - the “where” of the supply chain
 - manufacturing or storage (warehouses)
- ◆ Role in the competitive strategy
 - economies of scale (efficiency priority)
 - larger number of smaller facilities (responsiveness priority)
- ◆ Example 3.1: Toyota and Honda
- ◆ Components of facilities decisions

Components of Facilities Decisions

- ◆ Location
 - centralization (efficiency) vs. decentralization (responsiveness)
 - other factors to consider (e.g., proximity to customers)
- ◆ Capacity (flexibility versus efficiency)
- ◆ Manufacturing methodology (product focused versus process focused)
- ◆ Warehousing methodology (SKU storage, job lot storage, cross-docking)
- ◆ Overall trade-off: Responsiveness versus efficiency

Inventory

- ◆ Role in the supply chain
- ◆ Role in the competitive strategy
- ◆ Components of inventory decisions

Inventory: Role in the Supply Chain

- ◆ Inventory exists because of a mismatch between supply and demand
- ◆ Source of cost and influence on responsiveness
- ◆ Impact on
 - material flow time: time elapsed between when material enters the supply chain to when it exits the supply chain
 - throughput
 - » rate at which sales to end consumers occur
 - » $I = RT$ (Little's Law)
 - » I = inventory; R = throughput; T = flow time
 - » Example
 - » Inventory and flow time are “synonymous” in a supply chain

Inventory: Role in Competitive Strategy

- ◆ If responsiveness is a strategic competitive priority, a firm can locate larger amounts of inventory closer to customers
- ◆ If cost is more important, inventory can be reduced to make the firm more efficient
- ◆ Trade-off
- ◆ Example 3.2 – Amazon

Components of Inventory Decisions

◆ Cycle inventory

- Average amount of inventory used to satisfy demand between shipments
- Depends on lot size

◆ Safety inventory

- inventory held in case demand exceeds expectations
- costs of carrying too much inventory versus cost of losing sales

◆ Seasonal inventory

- inventory built up to counter predictable variability in demand
- cost of carrying additional inventory versus cost of flexible production

◆ Overall trade-off: Responsiveness versus efficiency

- more inventory: greater responsiveness but greater cost
- less inventory: lower cost but lower responsiveness

Transportation

- ◆ Role in the supply chain
- ◆ Role in the competitive strategy
- ◆ Components of transportation decisions

Transportation: Role in the Supply Chain

- ◆ Moves the product between stages in the supply chain
- ◆ Impact on responsiveness and efficiency
- ◆ Faster transportation allows greater responsiveness but lower efficiency
- ◆ Also affects inventory and facilities

Transportation: Role in the Competitive Strategy

- ◆ If responsiveness is a strategic competitive priority, then faster transportation modes can provide greater responsiveness to customers who are willing to pay for it
- ◆ Can also use slower transportation modes for customers whose priority is price (cost)
- ◆ Can also consider both inventory and transportation to find the right balance
- ◆ Example 3.3: Blue Nile

Components of Transportation Decisions

- ◆ Mode of transportation:
 - air, truck, rail, ship, pipeline, electronic transportation
 - vary in cost, speed, size of shipment, flexibility
- ◆ Route and network selection
 - route: path along which a product is shipped
 - network: collection of locations and routes
- ◆ In-house or outsource
- ◆ Overall trade-off: Responsiveness versus efficiency

Information

- ◆ Role in the supply chain
- ◆ Role in the competitive strategy
- ◆ Components of information decisions

Information: Role in the Supply Chain

- ◆ The connection between the various stages in the supply chain – allows coordination between stages
- ◆ Crucial to daily operation of each stage in a supply chain – e.g., production scheduling, inventory levels

Information: Role in the Competitive Strategy

- ◆ Allows supply chain to become more efficient and more responsive at the same time (reduces the need for a trade-off)
- ◆ Information technology
- ◆ What information is most valuable?

Components of Information Decisions

- ◆ Push (MRP) versus pull (demand information transmitted quickly throughout the supply chain)
- ◆ Coordination and information sharing
- ◆ Forecasting and aggregate planning
- ◆ Enabling technologies
 - EDI
 - Internet
 - ERP systems
 - Supply Chain Management software
- ◆ Overall trade-off: Responsiveness versus efficiency

Sourcing

- ◆ Role in the supply chain
- ◆ Role in the competitive strategy
- ◆ Components of sourcing decisions

Sourcing: Role in the Supply Chain

- ◆ Set of business processes required to purchase goods and services in a supply chain
- ◆ Supplier selection, single vs. multiple suppliers, contract negotiation

Sourcing: Role in the Competitive Strategy

- ◆ Sourcing decisions are crucial because they affect the level of efficiency and responsiveness in a supply chain
- ◆ In-house vs. outsource decisions- improving efficiency and responsiveness
- ◆ Example 3.6: Cisco

Components of Sourcing Decisions

- ◆ In-house versus outsource decisions
- ◆ Supplier evaluation and selection
- ◆ Procurement process
- ◆ Overall trade-off: Increase the supply chain profits

Pricing

- ◆ Role in the supply chain
- ◆ Role in the competitive strategy
- ◆ Components of pricing decisions

Pricing: Role in the Supply Chain

- ◆ Pricing determines the amount to charge customers in a supply chain
- ◆ Pricing strategies can be used to match demand and supply

Pricing: Role in the Competitive Strategy

- ◆ Firms can utilize optimal pricing strategies to improve efficiency and responsiveness
- ◆ Low price and low product availability; vary prices by response times
- ◆ Example 3.7: Amazon

Components of Pricing Decisions

- ◆ Pricing and economies of scale
- ◆ Everyday low pricing versus high-low pricing
- ◆ Fixed price versus menu pricing
- ◆ Overall trade-off: Increase the firm profits