

**Homework No. 1**  
**(Solution)**

**Question 1.** *What is a supply chain?*

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves. Within each organization, such a manufacturer, the supply chain includes all functions involved in receiving and filling a customer's request. These functions include such things as new product development, marketing, operations, distribution, finance and customer service.

**Question 2.** *What is the objective of a supply chain?*

The objective of every supply chain is to maximize the surplus or overall value generated. Supply chain value is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer's request. The supply chain value is strongly correlated to supply chain profitability (which is the difference between revenue generated from the customer and the overall cost across the supply chain). Thus, we can also say that the objective of a supply chain is to maximize its profitability.

**Question 3.** *What are the three key supply chain decision phases and their significances?*

The three key supply chain decision phases are as follows:

**Supply chain strategy or design:** This represents the long range decision phase and involves decisions about the structure of the supply chain and what processes each stage will perform. Examples of strategic supply chain decisions include locations and capacities of facilities, products to be made or stored at various locations, modes of transportation and types and capabilities of information systems. Supply chain design decisions are long-term decisions and expensive to reverse. They must take market uncertainties into account and must support strategic objectives of the supply chain.

**Supply chain planning:** This phase involves setting of policies that govern medium term operations. Of course, they are guided by the configuration from the design phase. Examples of planning decisions include which markets to be supplied from which locations, what type of inventory policies to use, how to buildup of inventories, which subcontracting and backup locations to use and what should be the timing and size of market promotions. They must consider such things as demand uncertainty, exchange rates and competition when making such decisions.

**Supply chain operation:** Here the time horizon is weekly or daily and during this phase decisions regarding individual customer orders are emphasized. At this level, supply chain configurations are considered fixed and planning policies are already defined. The goal is to implement the operating policies such that the incoming customer orders are handled as effectively as possible. During this phase, firms allocate orders to inventory or production, set order due dates, generate pick lists at a warehouse, allocate an order to a particular shipment, set delivery schedules, place replenishment orders, etc.

**Question 4.** *What are the cycle and push/pull views of a supply chain?*

A cycle view of a supply chain divides processes into cycles, each performed at the interface between two successive stages of a supply chain. Each cycle starts with an order placed by one stage of the supply chain and ends when the order is received from the supplier stage. A push/pull view of a supply chain characterizes processes based on their timing relative to that of a customer order. Pull processes are performed in response to a customer order, whereas push processes are performed in anticipation of customer order.

**Question 5.** *How can supply chain macro processes be classified?*

All supply chain processes can be classified into three macro processes based on whether they are at the customer or supplier or are internal to the firm. The CRM (Customer Relationship Management) macro process consists of all processes at the interface between the firm and the customer that work to generate, receive, and track customer orders. The ISCM (Internal Supply Chain Management) macro process consists of all supply chain processes that are internal to the firm and work to plan for and fulfill customer orders. The SRM (Supplier Relationship Management) macro process consists of all supply chain processes at the interface between the firm and its suppliers that work to evaluate and select supplies and then source goods and services from them.

**Question 6.** *Why is achieving strategic fit critical to a company's overall success?*

A lack of strategic fit between the competitive and supply chain strategy can result in the supply chain taking actions that are not consistent with customer needs, leading to a reduction in supply chain surplus and decreasing supply chain profitability. Strategic fit requires that all functions within a firm and stages in the supply chain target the same goal, one that is consistent with customer needs.

**Question 7.** *How does a company achieve strategic fit between its supply chain strategy and its competitive strategy?*

To achieve strategic fit, a company must first understand the needs of the customers being served, understand the uncertainty of the supply chain, and identify the implied uncertainty. The second step is to understand the supply chain's capabilities in terms of efficiency and responsiveness. The key to strategic fit is ensuring that supply chain responsiveness is consistent with customer needs, supply capabilities, and the resulting implied uncertainty.

**Question 8.** *What are the major drivers of supply chain performance?*

There are three logistical drivers (viz., facilities, inventory and transportation) and three cross-functional drivers (viz., information, sources and pricing) that determine the performance of any supply chain. These drivers interact with each other to determine the supply chain's performance in terms of responsiveness and efficiency.

**Question 9.** *What is the role of each driver in creating strategic fit between supply chain strategy and competitive strategy?*

A company achieving strategic fit has found the right balance between responsiveness and efficiency. Each driver affects this balance. Having more facilities generally makes a chain more responsive, while having fewer central facilities creates higher efficiency. Holding higher levels of inventory increases the responsiveness of a supply chain, while keeping inventory low increases the chain's efficiency. Using faster modes of transportation increases a chain's responsiveness, while using slower modes generally increases efficiency. Investing in information can vastly improve the supply chain performance on both dimensions. The investment, however, must be made on the strategic position supported by the other drivers. Appropriate sourcing decision raise supply chain profits by assigning supply chain functions to the right party, who brings higher economy of scale or a higher level of aggregation of uncertainty. Pricing can be used to attract customers who value responsiveness as well as customers who want efficiency. The supply chain

can then be structured to provide responsiveness to some customers while improving overall efficiency.

**Question 10.** *What are the major obstacles to achieving strategic fit?*

Increasing product variety, decreasing product life cycles, demanding customers, and global competition all make creating supply chain strategies more difficult, as these factors can hamper supply chain performance. The increase in globalization of the supply chain and fragmentation of supply chain ownership has also made it more difficult to execute supply chain strategies.

**Problem 11.**

Month	Forecast based on	
	3-month moving average	5-month moving average
Jan	168.33	156
Feb	190	170
Mar	213.33	189
Apr	230	210
May	230	210
Jun	230	210

**Comparison**

Since the forecast using the moving average is based on the most recent values of the moving average, the forecast based on the 3-month moving average is higher than 5-month moving average. This is because of higher demand values during the last few months. The increase in demand is picked up by the 3-month moving average since it is more sensitive than the 5-month moving average.

**Problem 12.**

When  $\alpha = 0.1$ , we get the following values at

$t$	1	2	3	4	5	6	7	8
Forecasted Values	5.0	5.5	6.0	6.4	6.8	7.1	7.4	7.7

With  $\alpha = 0.6$ , we get

$t$	1	2	3	4	5	6	7	8
Forecasted Values	5.0	8.0	9.2	9.7	9.9	10.0	10.0	10.0

This indicates that using a high value of  $\alpha$  will allow errors to be damped. This method is great when you are not sure of initial conditions.  $\alpha$  must, of course, be reduced once errors are reasonable.