

Chapter 10

Coordination in a Supply Chain

Learning Objectives

- Describe supply chain coordination and the bullwhip effect, and their impact on supply chain performance.
- Identify obstacles to coordination in a supply chain.
- Discuss managerial levers that help achieve coordination in a supply chain.
- Understand the different forms of collaborative planning, forecasting, and replenishment possible in a supply chain.

Lack of Supply Chain Coordination and the Bullwhip Effect

- Supply chain coordination – all stages of the chain take actions that are aligned and increase total supply chain surplus
- Requires that each stage share information and take into account the effects of its actions on the other stages
- Lack of coordination results when:
 - ↪ Objectives of different stages conflict
 - ↪ Information moving between stages is delayed or distorted

Bullwhip Effect

- Fluctuations in orders increase as they move up the supply chain from retailers to wholesalers to manufacturers to suppliers
- Distorts demand information within the supply chain
- Results from a loss of supply chain coordination

Demand at Different Stages

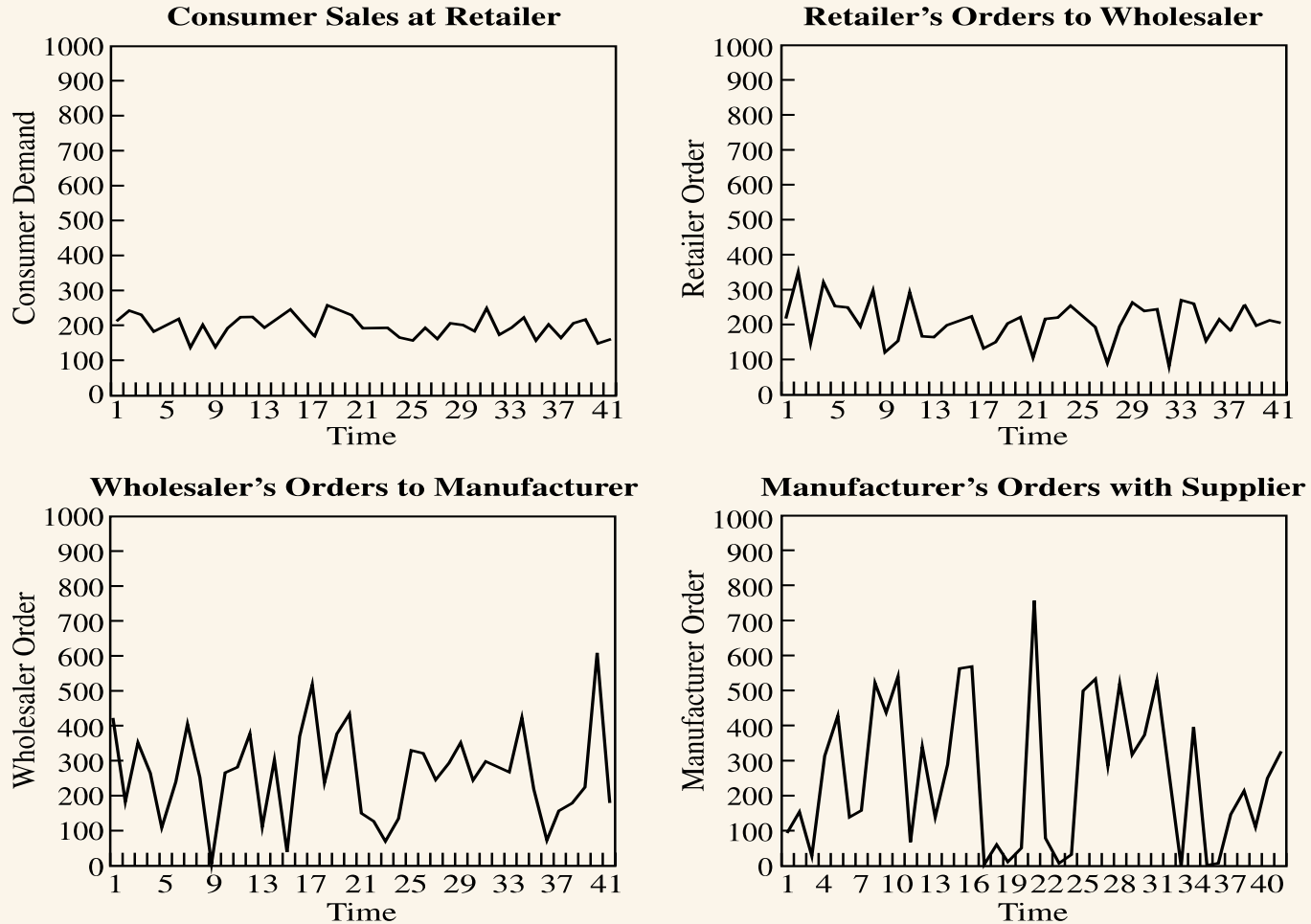


Figure 10-1

The Effect on Performance

- Supply chain lacks coordination if each stage optimizes only its local objective
- Reduces total profits
- Performance measures include
 - ~ Manufacturing cost
 - ~ Inventory cost
 - ~ Replenishment lead time
 - ~ Transportation cost
 - ~ Labor cost for shipping and receiving
 - ~ Level of product availability
 - ~ Relationships across the supply chain

The Effect on Performance

Performance Measure	Impact of the Lack of Coordination
Manufacturing cost	Increases
Inventory cost	Increases
Replenishment lead time	Increases
Transportation cost	Increases
Shipping and receiving cost	Increases
Level of product availability	Decreases
Profitability	Decreases

Table 10-1

Obstacles to Coordination in a Supply Chain

- Incentive Obstacles
- Information Processing Obstacles
- Operational Obstacles
- Pricing Obstacles
- Behavioral Obstacles

Incentive Obstacles

- Occur when incentives offered to different stages or participants in a supply chain lead to actions that increase variability and reduce total supply chain profits
- Local optimization within functions or stages of a supply chain
- Sales force incentives

Information Processing Obstacles

- When demand information is distorted as it moves between different stages of the supply chain, leading to increased variability in orders within the supply chain
- Forecasting based on orders, not customer demand
- Lack of information sharing

Operational Obstacles

- Occur when placing and filling orders lead to an increase in variability
- Ordering in large lots
- Large replenishment lead times
- Rationing and shortage gaming

Operational Obstacles

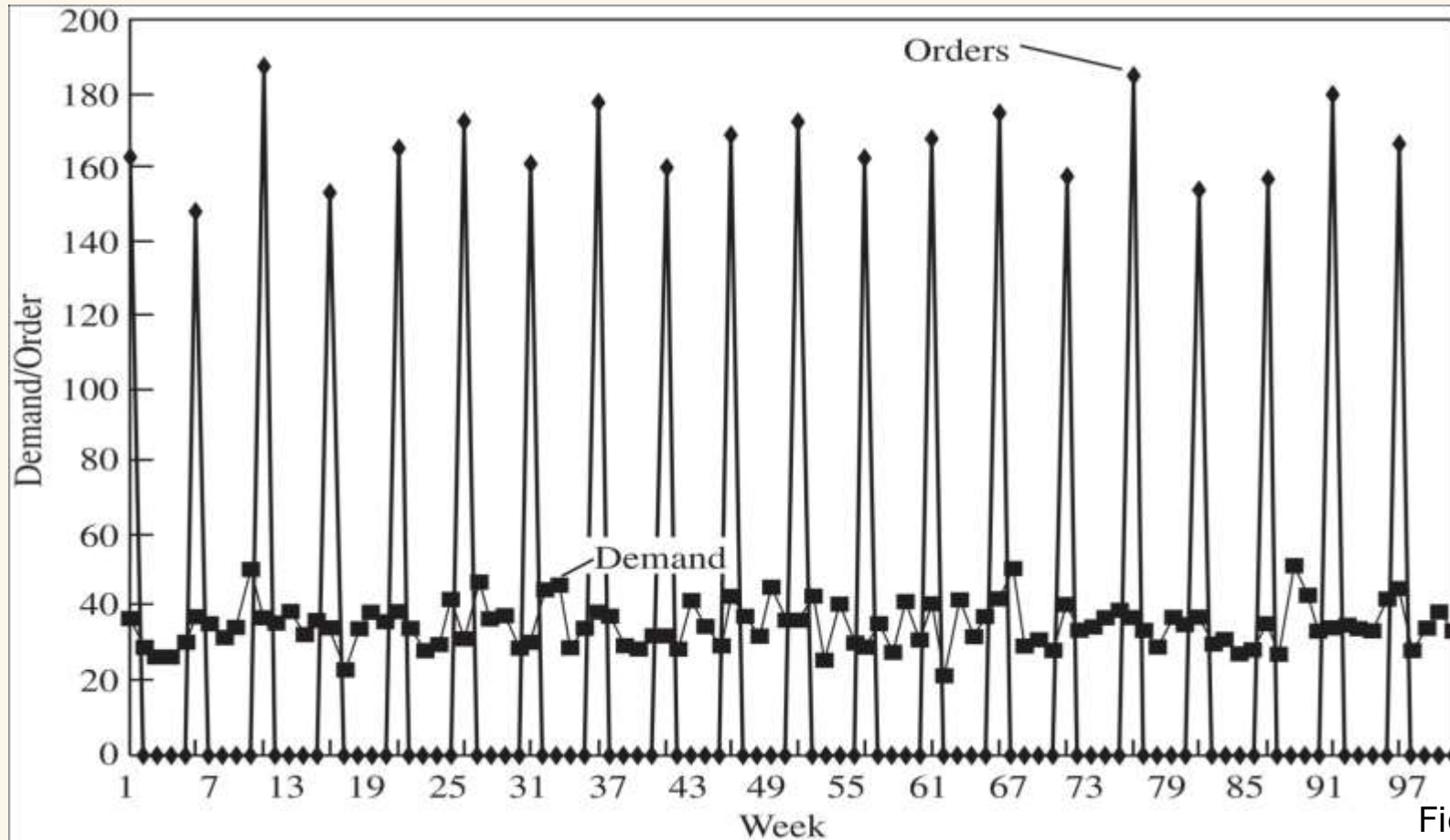


Figure 10-2

Pricing Obstacles

- When pricing policies for a product lead to an increase in variability of orders placed
- Lot-size based quantity decisions
- Price fluctuations

Pricing Obstacles

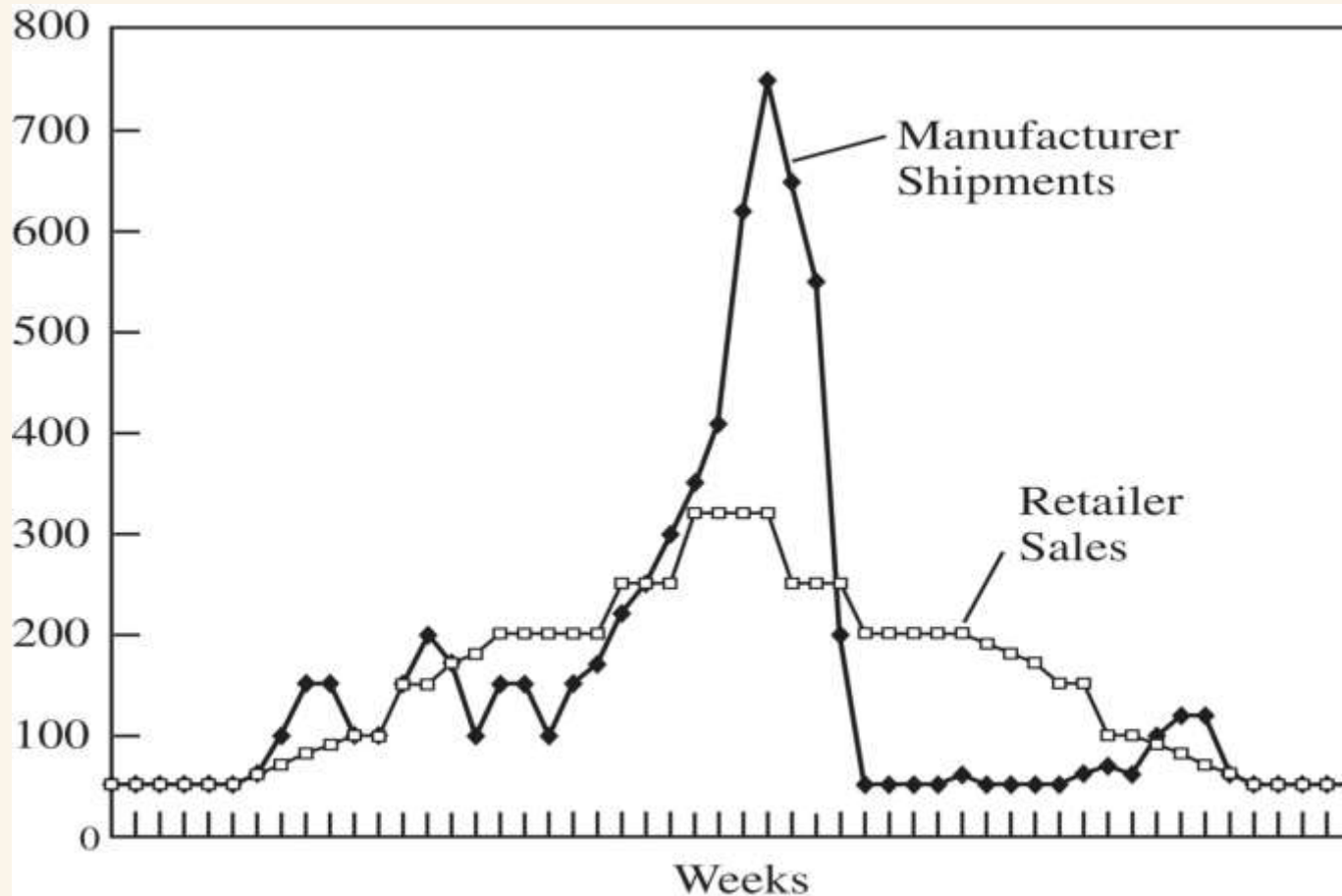


Figure 10-3

Behavioral Obstacles

- Problems in learning within organizations that contribute to information distortion
 - ↪ Each stage of the supply chain views its actions locally and is unable to see the impact of its actions on other stages
 - ↪ Different stages of the supply chain react to the current local situation rather than trying to identify the root causes
 - ↪ Different stages of the supply chain blame one another for the fluctuations
 - ↪ No stage of the supply chain learns from its actions over time
 - ↪ A lack of trust among supply chain partners causes them to be opportunistic at the expense of overall supply chain performance

Managerial Levers to Achieve Coordination

- Aligning goals and incentives
- Improving information accuracy
- Improving operational performance
- Designing pricing strategies to stabilize orders
- Building strategic partnerships and trust

Aligning Goals and Incentives

- Align goals and incentives so that every participant in supply chain activities works to maximize total supply chain profits
- Align goals across the supply chain
- Align incentives across functions
- Pricing for coordination
- Alter sales force incentives from sell-in (to the retailer) to sell-through (by the retailer)

Improving Information Visibility and Accuracy

- Sharing point of sale data
- Implementing collaborative forecasting and planning
- Designing single-stage control of replenishment
 - ↗ Continuous replenishment programs (CRP)
 - ↗ Vendor managed inventory (VMI)

Improving Operational Performance

- Reducing replenishment lead time
- Reducing lot sizes
- Rationing based on past sales and sharing information to limit gaming

Designing Pricing Strategies to Stabilize Orders

- Encouraging retailers to order in smaller lots and reduce forward buying
- Moving from lot size-based to volume-based quantity discounts
- Stabilizing pricing
- Building strategic partnerships and trust

Continuous Replenishment and Vendor-Managed Inventories

- A single point of replenishment
- CRP – wholesaler or manufacturer replenishes based on POS data
- VMI – manufacturer or supplier is responsible for all decisions regarding inventory
- Substitutes

Collaborative Planning, Forecasting, and Replenishment (CPFR)

- Sellers and buyers in a supply chain may collaborate along any or all of the following
 - ↪ Strategy and planning
 - ↪ Demand and supply management
 - ↪ Execution
 - ↪ Analysis
- Retail event collaboration
- DC replenishment collaboration

Common CPFR Scenarios

CPFR Scenario	Where Applied in Supply Chain	Industries Where Applied
Retail event collaboration	Highly promoted channels or categories	All industries other than those that practice EDLP
DC replenishment collaboration	Retail DC or distributor DC	Drugstores, hardware, grocery
Store replenishment collaboration	Direct store delivery or retail DC-to-store delivery	Mass merchants, club stores
Collaborative assortment planning	Apparel and seasonal goods	Department stores, specialty retail

Table 10-2

Collaborative Planning, Forecasting, and Replenishment (CPFR)

- Store replenishment collaboration
- Collaborative assortment planning
- Organizational and technology requirements for successful CPFR
- Risks and hurdles for a CPFR implementation

Collaborative Planning, Forecasting, and Replenishment (CPFR)

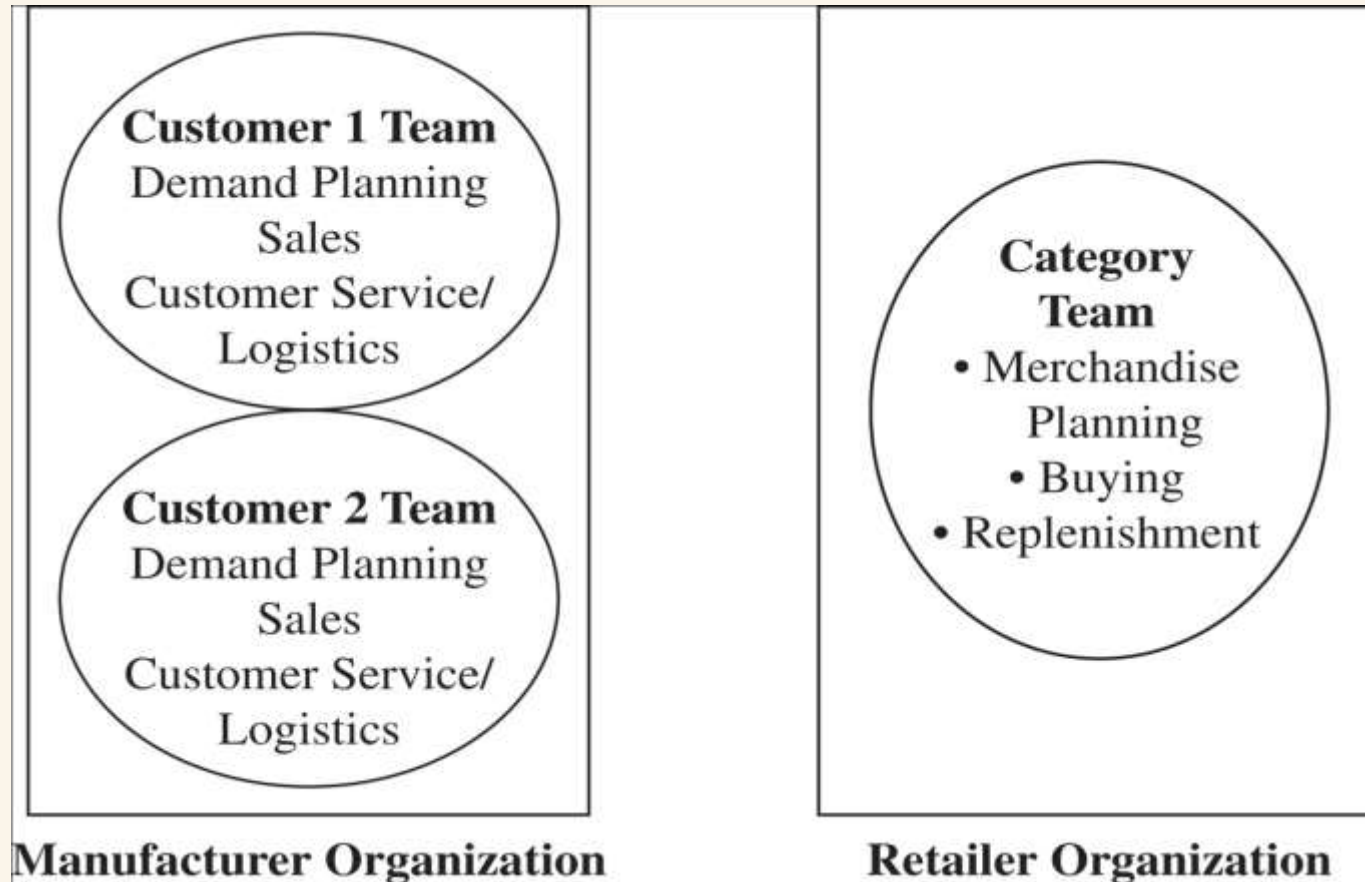


Figure 10-4

Learning Objectives

- Quantify the bullwhip effect
- Get top management commitment for coordination
- Devote resources to coordination
- Focus on communication with other stages
- Try to achieve coordination in the entire supply chain network
- Use technology to improve connectivity in the supply chain
- Share the benefits of coordination equitably

Summary of Learning Objectives

- Describe supply chain coordination and the bullwhip effect, and their impact on supply chain performance
- Identify obstacles to coordination in a supply chain
- Discuss managerial levers that help achieve coordination in a supply chain
- Understand the different forms of CPFR possible in a supply chain