DS3000: Entrepreneurship & Management functions

Session 9- Bull Whip Effect

https://sites.google.com/a/iiitdm.ac.in/sudhirvs/courses/entrepreneurship-management

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY, DESIGN AND MANUFACTURING, KANCHEEPURAM

- Dr. Sudhir Varadarajan
- Dr. Suresh Varadarajan

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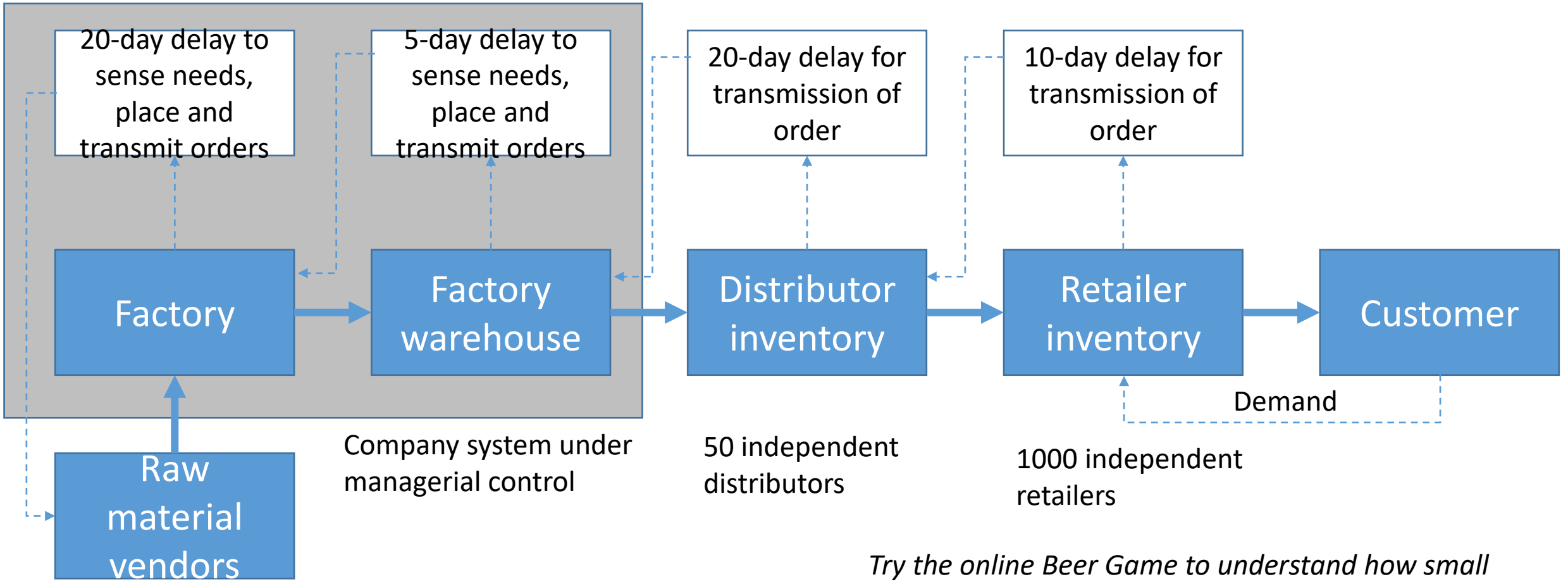
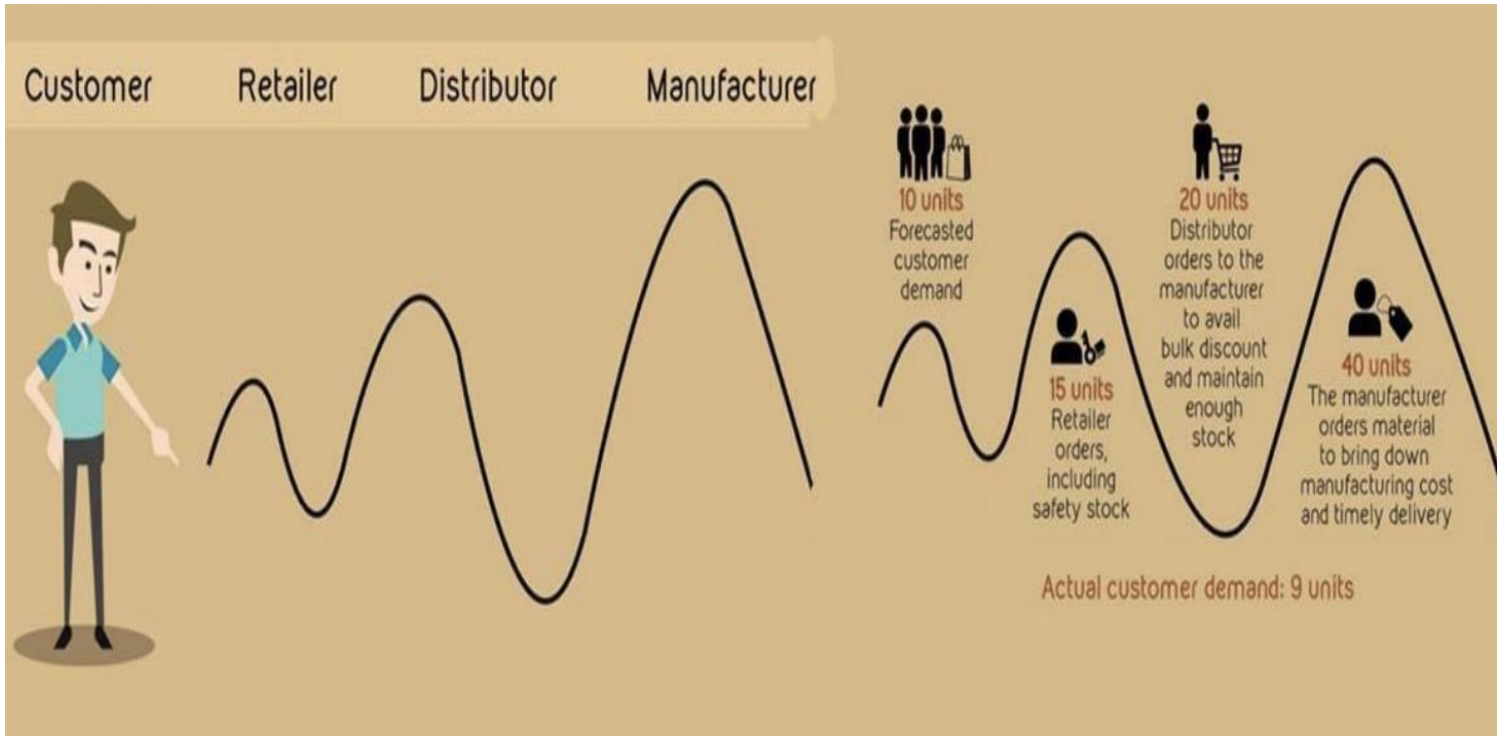
A typical production-distribution system



Try the online Beer Game to understand how small variations create the bull-whip effect in the supply chain

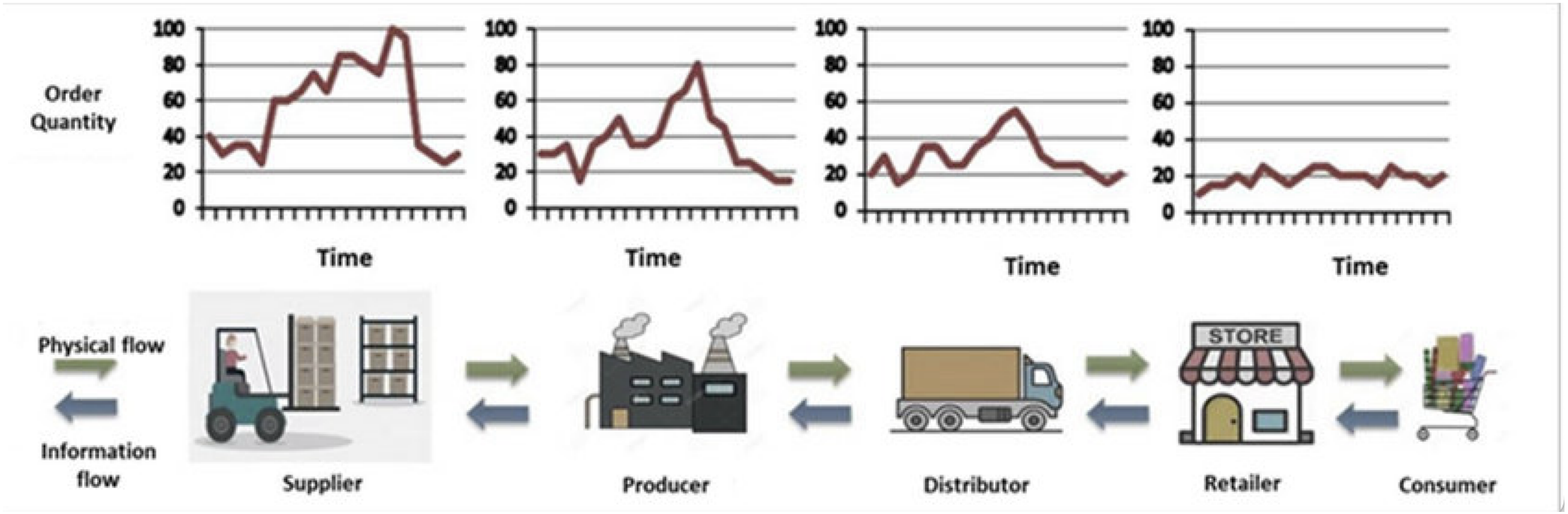
Bull Whip Effect in Supply Chains



- describes how small fluctuations in demand at the retail level can cause progressively larger fluctuations in demand at the wholesale, distributor, manufacturer, and raw material supplier levels.
- can be costly to all the organizations in the supply chain.
- Excess inventory can result in waste, while insufficient inventory can lead to reduced lead time, poor customer experience, and lost business.

The bullwhip effect refers to the phenomenon where order variability increases as the orders move upstream in the supply chain."

Bull Whip Effect : Order flow amplification



Key components:

- **Information Flow**
- **Physical goods (inventory) flow**

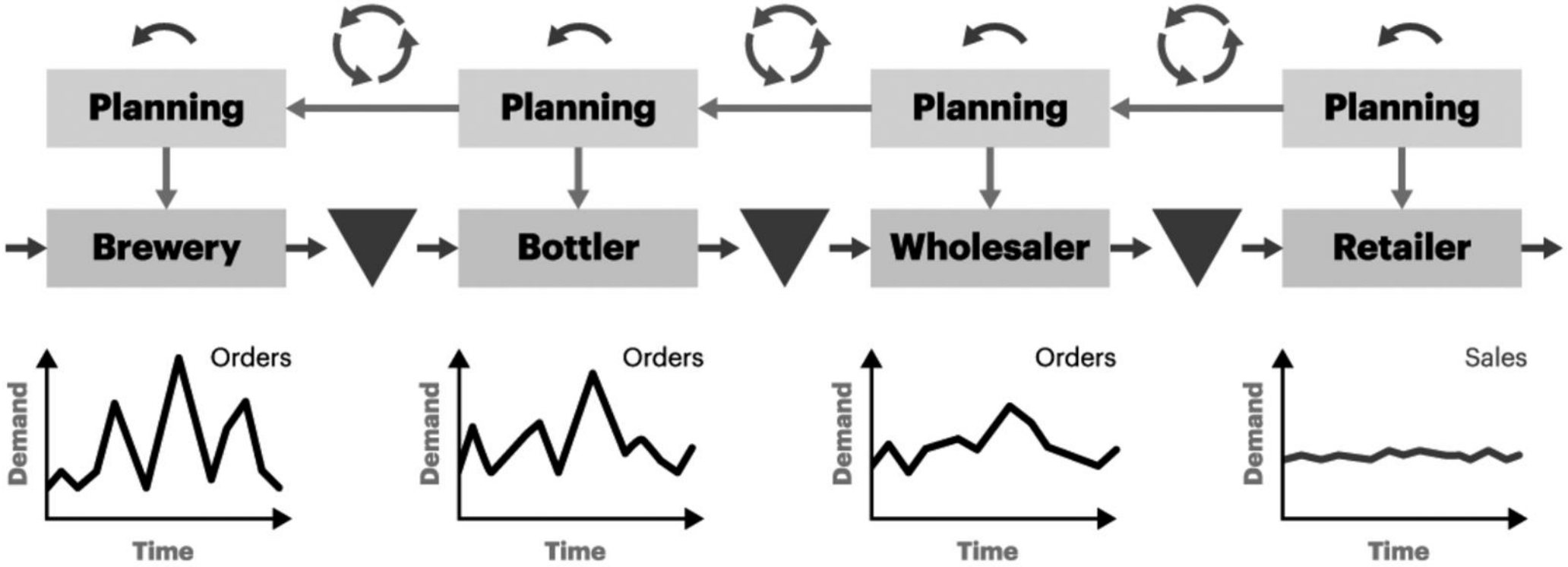
Typical Causes of Bull Whip Effect

- Demand forecast updating
- Lead times
- Order batching
- Price fluctuation
- Rationing and shortage gaming

Steps to mitigate the bullwhip effect

- Improve forecasting accuracy.
  - By using more sophisticated forecasting methods and by sharing data with their suppliers, retailers can improve the accuracy of their demand forecasts.
- Reduce lead times.
  - Companies can reduce lead times by streamlining their production and distribution processes and by working closely with their suppliers.
- Use smaller batch orders.
  - By using smaller batch orders, retailers can reduce the risk of over-ordering.
- Coordinate with suppliers.
  - By sharing information and coordinating their plans, retailers and suppliers can help to reduce the bullwhip effect.

Demand amplification across the supply chain



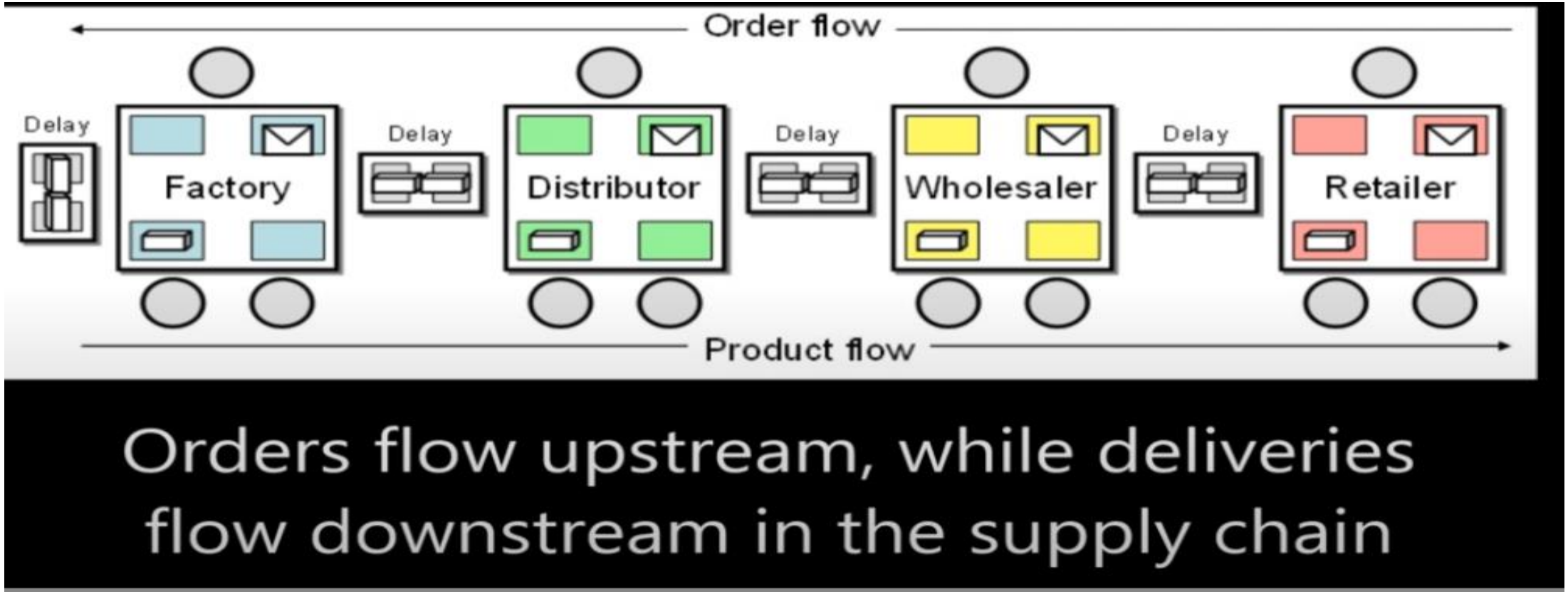
Beverage Game

About the Game

- The game developed by Professors of MIT in 1960 as " ***The Beer Game"*** is a role –play simulation to experience typical problems like coordination, information sharing and visibility in supply chain networks
- Although the original intention of the simulation game was to investigate the consequence of systems structures on the behavior of people, the game can be used to reveal the benefits of information sharing, supply chain management, and association.**
- The Game simulates a typical beverage distribution system that has 4 distinct entities, namely, Retailer, Wholesaler, Distributor and Factory. Each entity is managed by one person (or a group) who is free to make any decision they choose with the goal of minimizing inventory carrying or stock-out costs.
- The Game cycles on a weekly basis with both delivery and orders occurring sequentially.
- Each player in the Game must balance the challenges of managing inventory, responding to fluctuating demand, and minimizing costs, all while operating with limited information and communication

** https://www.linkedin.com/pulse/beer-game-riya-sehgal

Beverage Supply Chain



Prominent players ion the Beverage supply chain

- Retailer: The retailer sells beverages directly to consumers.
- Wholesaler: The wholesaler buys beverages from the distributor and sells it to the retailer.
- Distributor: The distributor buys beverages from the manufacturer and sells it to the wholesaler.
- Manufacturer: The manufacturer produces beverages and sells it to the distributor.
- Supplier : Provides raw materials/ingredients to the manufacturer to manufacture the beverage

Rules to play the game

- Based on the stated structure 4 different persons need to assume the roles of Retailer, wholesaler, Distributor and Factory Manager
- Beginning Inventory at the four entities will be published by the Facilitator
- The customer demand for each period will be published to the facilitator
- Communication between entities is limited to demand Data (orders) and deliveries. For example, the retailer places an order on the wholesaler based on his assessment of the demand /inventory situations and so on.
- Barring Customer demand and Supply order by the entities, all other data is derived based on assumptions and policy

Assumptions for the game

- Only Inventory and Back-order costs are to be considered to simplify the game

- Lead time for deliveries are not considered
- No communication between 4 members
- Download the excel sheet "*Bull whip effect Beverage Distribution simulation from the drive"*
- Each Entity is represented by a separate worksheet, Choose the worksheet as per your role

References

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