VENDOR MANAGED INVENTORY BASED SUPPLY CHAIN ROLE PLAY GAME

Introduction on Supply Chain:

A supply chain contains geographically dispersed *facilities* where raw materials, intermediate products, or finished products are acquired, transformed, stored, or sold and *transportation links* that connect facilities along which products flow. That is, supply chain consists of various stages that are directly or indirectly involved in fulfilling a customer request. Downstream stage is the direction towards the end customer and upstream stage is the direction towards the end supplier. Information sharing among the entities/stages in a supply chain is essential for their better coordination and for minimizing the system wide cost.

Supply Chain Scenario:

In this role play game, the supply chain consists of four stages: Retailer – Wholesaler – Distributor – Factory, to meet the demand of a customer. The retailer is getting an item from another organization which we call as wholesaler. The wholesaler may be getting this from a distributor. The distributor gets this item from a factory with unlimited raw materials to make the item. The players take the role of each of these stages. Retailer faces the demand from customer, wholesaler faces demand from retailer, and so on.

Vendor Managed Inventory:

VMI is a supply chain coordination system, in which the vendor (wholesaler) assumes responsibility for managing the stock. Retailer allows the vendor to access its real-time inventory level. Retailer may set certain service-level and/or shelf-space requirements which will be taken into consideration by the wholesaler. Retailer's role shifts from managing inventory to simply allocating retailing space. The wholesaler has the freedom to plan its own production and decide the replenishment schedules as long as the agreed retailer service levels are met.

VMI-Based Supply Chain Role Play Game:

It is a software package developed for evaluating the performance of a four stage serial supply chain under VMI information sharing. Three or four participants are required to conduct the experiment and each one acts as a stage in the supply chain. In case of four

participants, in each week, customer places an order to the retailer; the retailer allocates shelf space to wholesaler, wholesaler places an order to distributor, distributor places an order factory and factory gets from the production. The role of the customer is played by the computer. Before the game starts the instructor has to set the demand for the play duration. The retailer ships the quantity against the order placed by the customer. The shipment quantity depends on the inventory available. It can be same as the customer order received if sufficient inventory is available; otherwise whatever inventory is available will be shipped. The demand which is not met may be backordered or considered as lost sales. The retailer also shows his inventory details and allocates the size of the shelf space to the wholesaler. Wholesaler takes the decision based on end period inventory, maximum allocated shelf space from the retailer and ships the quantity to the retailer. Wholesaler also decides the order to be placed to the next higher level that is to the distributor. The distributor decides the size of the order to be placed to the next higher level, that is, the factory. Factory issues the production orders. Order and shipment flows are shown in Figure1. The main objective while taking these decisions at each stage is to maximize the fill rate, to minimize the inventory held and supply chain cost.

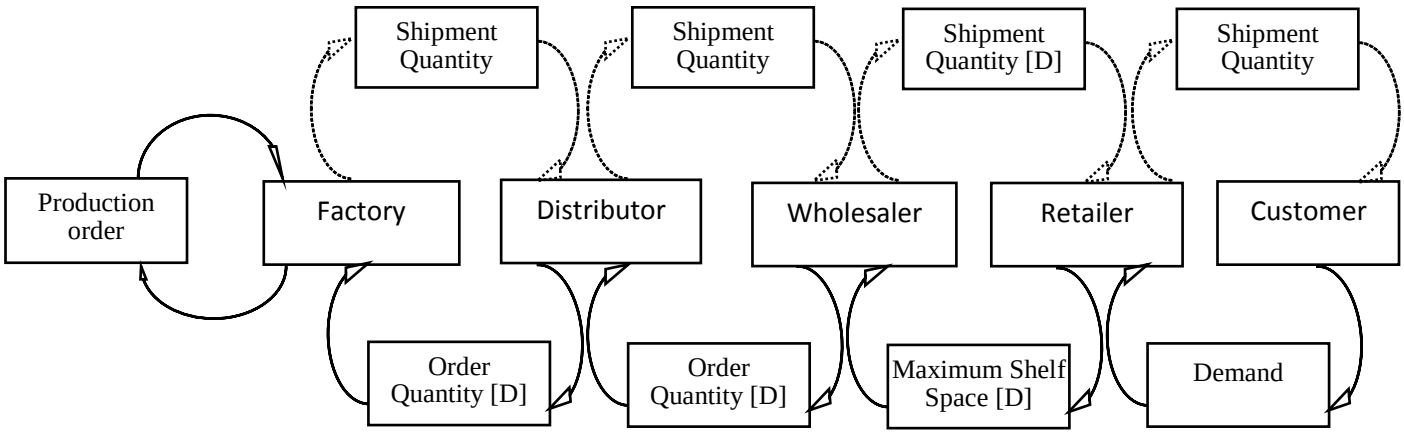

Fig.1. Order and Shipment flows in Supply Chain (where [D] is decision to be made by player)

In case of three participants the role of the customer is played by the computer and retailer maximum shelf space is fixed during the play and it is set by the administrator. Even though there is no retailer role all the operations from the retailer is visible to the wholesaler. Wholesaler, Distributer and Factory roles are same as four participant's game play.

Assumptions of VMI-Based Supply Chain Role Play Game:

- No ordering and transportation cost.
- Each stage receives shipment at the beginning of a period, which is supplied by its supplier (Replenishment).
- Shipment for the demand raised is made after replenishment from upstream stage.
- Order is placed at the end of the period.
- Review is made at each period.
- Demand from customer for each period is faced by Retailer.
- Max shelf space allowing from retailer shows to wholesaler in immediate week
- There is no storage capacity constraint at any stage of the supply chain except retailer.
- The factory has infinite production capacity and enough raw materials for production.