

# IDENTIFICATION OF KEY ISSUES IN SCM LOGISTICS OPERATION THROUGH SIMULATOR

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## Abstract

*In any SCM process, there are multiple problems. However, key issues of Distribution – Logistics operations are very critical in nature as its impact will be seen by your customers directly. Logistics problems are similar in nature but reasons could be different.*

*Today's customers are very different, they expect the exact product they want, when they want it and at right price. The conventional ways of Inventory control like safety stock, reorder level, economical order quantity etc. need changes. These concepts were hold good when the demand was known and not having many competitors. These parameters are to be redefined.*

*In order to understand these parameters, we have created a scenario using VB .NET as well as ASP .NET technologies. It is a simulator. Hence, getting information becomes a part of fun through simulator. In this paper, we shall discuss the methodology and various policies, how we have implemented to understand grass root level causes for elimination.*

## Keywords

SCM, Scenario, Logistics, Simulator

## 1. Introduction :

The common way of incorporating uncertainty and understanding market condition is through scenarios. SCM planners use scenarios as a way of describing future conditions. Scenarios serve as a background for planning and evaluating alternative courses of action. The need to include scenarios in a model often becomes self-evident.

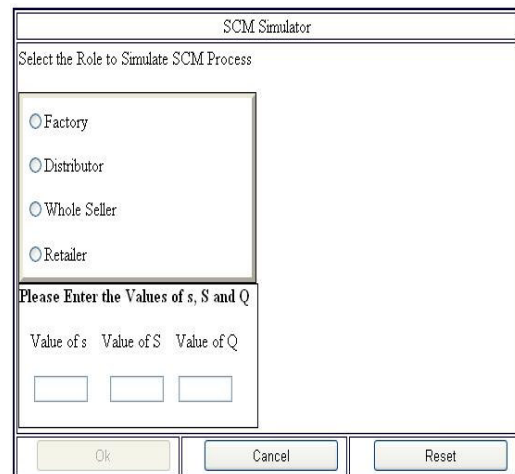
During evaluation, the desired future is to be modified to see what policy modification is again needed to make it become the projected future, and the process is continued.

Some of the problems noticed in Logistic operations are:

1. Goods/items are ready for dispatch and mode of transport is known in much advance but it is restricted by the vehicle capacity.
2. Many times the vehicle (carrying weight and size capacity) planned for transportation gets altered and create last moment critical problem.
3. There is a possibility of execution of several goods in the same transportation vehicle for the same destination or near by location. Grouping of goods with quantity under capacity is again a challenging problem.

## 2. Technology Used For Creating Scenario:

### 2.1 Front End ASP .NET



Screen 1 (Home Page)

### Components Used:

Panel: - This Component is used to hold the Web Controls.

RadioButtonList: - This is Group of Radio Buttons.

Button: - This is used to Generate Click events and useful when you want to navigate through Simulator.

TextBox: - This is used to Capture the data at Run Time

**Screen 2 (Simulator Page)**

**Components Used:**

- Panel: - This Component is used to hold the Web Controls.
- RadioButtonList: - This is Group of Radio Buttons.
- Button: - This is used to Generate Click events and useful when you want to navigate through Simulator
- TextBox: - This is used to Capture the data at Run Time
- Label: - This is used to Display Read Only Data.

Supplier	Customer	Shipment Quantity	Shipping Date
Factory	Distributor	2000	12/6/2005 8:01:50 AM
Distributor	Whole Seller	3000	12/6/2005 8:02:03 AM
Whole Seller	Retailer	4000	12/6/2005 8:02:15 AM
Retailer	Customer	1000	12/6/2005 8:02:20 AM
Distributor	Factory	1000	12/6/2005 8:02:34 AM
Whole Seller	Distributor	30000	12/6/2005 8:02:47 AM
Retailer	Whole Seller	10000	12/6/2005 8:02:55 AM
Whole Seller	Distributor	2000	12/6/2005 8:09:42 AM
Factory	Distributor	2010	12/7/2005 9:42:45 AM
Distributor	Whole Seller	2010	12/7/2005 9:43:07 AM

1 2 3 4 5 6 7 8 9

**Screen 3 (Shipment Data Display Page)**

**Components Used:**

- SqlDataSource: - This Component is used to fetch data from the Transaction Table.
- GridView: - This Component is used to Show data which is cached by SqlDataSource Component.

Button: - This is used to Generate Click events and useful when you want to navigate through Simulator

OrderFrom	OrderTo	OrderQuantity	OrderDate
Whole Seller	Distributor	6000	12/27/2005 9:14:16 AM
Whole Seller	Distributor	6000	12/27/2005 9:14:27 AM
Whole Seller	Distributor	6000	12/27/2005 11:02:42 AM
Whole Seller	Distributor	600000	12/27/2005 11:02:55 AM
Retailer	Whole Seller	6000	12/27/2005 11:03:13 AM
Retailer	Whole Seller	400000	12/27/2005 11:03:18 AM

Main Page

**Screen 4 (Order Data Display Page)**

**Components Used:**

- SqlDataSource: - This Component is used to fetch data from the Transaction Table.
- GridView: - This Component is used to Show data which is cached by SqlDataSource Component.
- Button: - This is used to Generate Click events and useful when you want to navigate through Simulator

**2.2 Back End Database**

We have used Microsoft SQL Server as a Backend in our SCM Simulator Project.

**Database Design**

**Table 1: Role Master Table**

**Description:**

Role\_id: - Role\_id is used to store the ID of the Role who is Simulating SCM Process (Primary Key)

Role\_name: - Role Name is used to store the name of the Role who is Simulating SCM Process

Current\_stock:- Initial Value of the Stock to Start the SCM Simulation Process

Status: - Status of the Role (Advanced Use)

Shiprate: - Shipping Rate of the Particular Player

Retrate: - Rate of Returning Goods

Column Name	Data Type	Allow Nulls
OrderTo	varchar(15)	<input type="checkbox"/>
OrderQuantity	numeric(18, 0)	<input type="checkbox"/>
OrderDate	datetime	<input type="checkbox"/>

**Table 4: Order Table**

Description:

OrderFrom:- The Role who is Sending the Order

OrderTo: - The role who is receiving the Order

OrderQuantity: - The Quantity of the order placed by the Role

OrderDate: - The Date of Order

Column Name	Data Type	Allow Nulls
Type_id	nchar(5)	<input type="checkbox"/>
Role_id	nchar(5)	<input type="checkbox"/>
Type_Name	nvarchar(20)	<input type="checkbox"/>
Quantity	numeric(18, 0)	<input type="checkbox"/>
Qty_Date	datetime	<input type="checkbox"/>

**Table : 2 Type Master Table**

**Description:**

Type\_id: - Used to Store the ID of Type of the Values which is used to Start the SCM Simulation Process

Role\_id: - Foreign Key to Role\_master Table

Type\_name: - Used to Store the Name of Type of the Values which is used to Start the SCM Simulation Process

Quantity: - It is for storing the Initial value of Type Name

Qty\_Date: - It is used to store the Date from which this Initial value is effective

**3. Applied policies**

SIX Policies were applied to Simulate SCM Process Define s, S and Q for all Roles.

Where s – Minimum inventory

S – Maximum inventory

Q – Economical order quantity

P1.  $s < S$  when inventory falls below s, the system places an order to bring inventory to S. (Ex: you may set  $s=4$  and  $S=30$ )

P2.  $s < Q$  When inventory falls below s, the system places an order for Q.

Define Phase as week or dates 1, 11 and 21 of a month.

P3. Order to S on each phase, the system places an order to bring inventory to S.

Order to Q on each phase, the system places an order for Q.

P5. Current Stock is continuously updated.

The maximum possible order size is S. When order is placed and shipments take place, this field is updated for all roles.

P6. Shipment Qty. Create transactions randomly for Qty.

Factory to Distributor

(-) (+)

Distributor to Wholesaler

(-) (+)

Wholesaler to Retailer

(-) (+)

Column Name	Data Type	Allow Nulls
supplier	varchar(15)	<input type="checkbox"/>
customer	varchar(15)	<input type="checkbox"/>
shipment	int	<input type="checkbox"/>
shipdate	datetime	<input checked="" type="checkbox"/>

**Table 3: Transaction Table (Transact Table)**

Description:

Supplier: - The Role who is Sending the Shipments

Customer: - The role who is receiving the shipments

Shipment:- Shipment Quantity

Shipdate:- Shipment Date

In case of goods return, the operation becomes reverse with qty being negative.

Note: Policies P1 and P2 are applicable when shipments (transactions) takes place by role.

Policies P3, P4 and P5 are applicable automatically by system.

P3 and P4 after each phase

P5 after each shipments or orders (P1 or P2 or P3 or P4)

Simulate SCM Process for 4 to 5 similar organizations and derive analysis of the Simulator. Record all findings.

#### **4. Conclusion:**

We are sure that scenario described in our paper will be a great success in collecting the data for further analysis. The efficient and economical Lunch Delivery system in MUMBAI, the milk collection and distribution system of AMUL are examples of fine SCM process. The co-operative model remains a powerful grass root level tool to empower the masses and generate value.

The Mahila Gruh Udyog “LIJJAT PAPAD” units are all working on these principles. To get quality products for its distribution, it is essential to remove grass root level problems whereby process will get improved and hence the product.

#### **5. References**

- [1] Jay Heizer and Barry Render, “Production and Operations Management Strategies and Tactics”, 3<sup>rd</sup> Edition, Allyn and Bacon, Boston, P. 124
- [2] Desai Subhash G.  
“Supply Water for Milk Supply”, 2005 Proceedings of National Conference ETA-2005 at Rajkot, India
- [3] Desai Subhash G., Buddhadev B. V.  
“Dabbawala: Efficient and Economical Lunch Delivery SCM”, 2004 Proceedings of National Conference – BIG 2004 at Kolkata, India
- [4] Desai Subhash G., Buddhadev B. V.  
“Manpower SCM Model for Indian Rural Development”, 2004 Proceedings of National Seminar on ETA-2004 at Rajkot, India
- [5] Desai Subhash G., Buddhadev B. V.  
“Mobile Communication and its effect on SCM Process in Rural Areas”, 2003 Proceedings of National Seminar on ETA-2003 at Rajkot, India
- [6] Desai Subhash G., Buddhadev B. V.  
“Improvement of SCM Processes and Forecasting in DRP”, 2003 Proceedings of National Seminar on Innovations in Information Systems for Rural Development at Saradar Patel University, Vallabh Vidhyanagar, India