

## Inventory Management: Trade-Off

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### ABSTRACT

Global supply chain is significantly under duress for past few months due to a paradigm shift of consumer behavior, mindset and new rules of business. The shipment delays, widespread supplier closures, manufacturing strains has led to delayed lead-time, unexpected unplanned inventory levels and difficult to control service lines. An adaptive, autonomous and resilient Inventory management becomes vital meet frenetic consumer behavior, blossom lean retail stores, and build new rules of engagement in product rationalization. Unpredictable demands demand interesting inventory mix that needs new tools and processes to stay viable.

### KEYWORDS

Inventory planning, Supply chain, Modelling, Optimization, Data Analytics, MBE, Product inventory, Demand forecast, Tactical decision, Strategy, Supply chain cost, Customer behavior

### INTRODUCTION

**Inventory planning** is a venerable area of supply chain management [1-3]. Traditionally, planning systems based on demand forecasts for decades use inventory models to select

- Reorder points
- Replenishment quantities and
- Safety stocks

### Manually Dependent Decisions

For times immemorial, product inventories at facilities across a supply chain [4,5] and across time are completely dependent on decisions made by

- Buyers about purchases

Fundamentally, material balance equation [MBE] for a particular time at each facility describes the underlying dynamics of inventory planning and control

$$\begin{array}{|c|} \hline \text{Material or} \\ \text{Product inventory} \\ \text{held at the end} \\ \text{date} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Same inventory} \\ \text{held at the onset} \\ \text{of the cycle date} \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Stock purchased} \\ \text{or manufactured} \\ \text{during the cycle} \\ \hline \end{array} - \begin{array}{|c|} \hline \text{Supply} \\ \text{shipped out} \\ \text{during the} \\ \text{cycle period} \\ \hline \end{array}$$

- Plant managers about manufacturing plans
- SALES and transportation managers about shipping within supply chain and to customers [6]

### Factors Contributing to Cost

Cost efficiency of inventory depends on coordinated decision-making across

- Purchase
- Production
- Distribution

Depending on industry, inventory costs due to capital investment, space utilization, spoilage, and other factors will vary between 5% and 20% of total supply chain cost [6-11].

### Harnessing Realms of Supply Chain

Current realms of supply chain management reels under an ineffective and in efficient inventory management by ignoring decisions affecting 80% or more of total supply chain cost [12-14].

1. Inventory planning has to account for other supply chain decisions and costs
2. Supply chain plans need to take into account the inventory consequences

*Strategic Decisions:* Have to overcome shortcomings across business functions, geographically dispersed facilities across planning horizons [15]. What needs to be done is,

1. Optimal deployment of inventories as per their location and pre-determined outputs; E.g. whether or not to have one or more distribution centers dedicated to slow or fast moving items
2. Critically acclaim strategic innovative modeling methods of one year
3. Data churning and analysis of constant changing customer behavior and informed decision making as a continuous process in demand - supply equations

*Tactical Decisions:* Determining monthly targets for products or product families held in different locations have not stood their ground [16]:

1. Fixed product mix and run of the mill product selection needs revolutionary change
2. New blue print and dashboards of tactical inventory planning analysis is needed to

minimize total supply chain cost.

3. Addressing the build-up of inventories in distribution centers to meet seasonal demand
4. Assignment of forecasted market demand to manufacturing facilities, or the transshipment of work-in-process from one plant to another

*Optimization:* Recent modeling methods are giving holistic optimization models [17]. With optimization, more autonomous decision making models have gained advantage in supply chain network saving costs by implementing real time data analytics. Inevitably, what we need on the ground is,

- Tactical inventory planning to provide a major bridge in translating long-term strategic plans into efficient, short-term inventory plans [18].
- Daily or weekly time series tracking of inventory through MBE.

### CONCLUSION

Three imperatives for improvements

**Mandate 1:** Bring autonomous Inventory decision-making within Holistic Supply Chain Decision Making

**Mandate 2:** Impregnate Inventory Decision Making across Strategic, Tactical and Operational Planning Horizons

**Mandate 3:** Implement Real time Data Analytics with new Business Processes to optimize Inventory Planning Methods

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