

# The current practice of managing supply chains

Written by Amir Schragenheim

**It is Wednesday afternoon. I'm entering the grocery store and want to purchase some green peppers. However, they don't have any on stock. I can't find any good looking tomatoes either. I'm continuing to the Office Depot store. I heard great reviews about a new mouse that Microsoft issued and I would like to get one. However, I come to an empty shelf with only the item description stating "out of stock".**

How many times did you go to a shoe store, tracked a wonderful pair of shoes you wanted to purchase but they didn't have any in your size?

Why do stores don't keep the right stocks to fulfill the demand? Why can't they do anything right?

Supply chains in our modern age operate in a way that seems to make a lot of sense. Manufacturers have robotic machinery to automate processes; many manufacturers operating nowadays have already installed new state-of-the-art ERP systems to help them manage their shop-floors.

Distributors and manufacturers have very sophisticated forecasting software to predict exactly how many items will be sold of each product or SKU (Stock Keeping Unit). Therefore, they should know how many units they would like to send the consumption points (retail stores) and when.

How is it that organizations still experience problems in managing the supply chains? Is technology not enough?

## The natural tendency for push behavior

What is the manufacturer/distributor point of view when he's deciding on how much stock to keep at each location? He has two main questions in mind:

- How much to keep upstream the supply chain?
- How much to keep downstream the supply chain?

The natural tendency is to keep the stock as close to the consumers as possible - if a product is not at the consumption point, then there is a (much) smaller chance the item will be sold. Only a few consumers would let their vendors ship the product to them in a few days instead of taking it right away – immediate consumption is the name of the game. Therefore, it is only logical that the manufacturer/distributor should keep most of the stock as close to the consumer as possible – as far downstream as he can manage – usually at the retail level.

This is a typical push behavior: pushing the products downstream in order to increase consumption. However, the push behavior requires a good forecasting model, in order to predict where and when the stocks will be needed at the stock locations.

## Why is it impossible to find a good forecasting model?

The advanced forecasting modules existing today try to model the demand and create a good answer to the availability question: What to hold at which place and when. However, the forecasting mechanism, no matter how good it is, cannot really predict what the demand would be like. Doing very accurate market researches might give some answers, but one must at all times consider some facts of life regarding statistics.

The first fact is that the narrower the aggregation, the worse the answer becomes – meaning that the question of "how much will be sold from the product overall?" will yield a much better answer than the question: "How much will we sell from the product at this specific location?" This phenomenon stems from the fact that

fluctuations average out on the aggregated events (assuming they are independent events). If we predict the sales at 100 different locations, we might get an answer that sales in an average location will range from 10 to 25 units a day. If we ask the same question on the overall quantity that we need to manufacture, we will get a much more accurate answer – probably something like ranging from 1650 to 1850. If we would just take the lows and highs of each consumption point and aggregate them we will get a much worse answer – from 1000 to 2500.

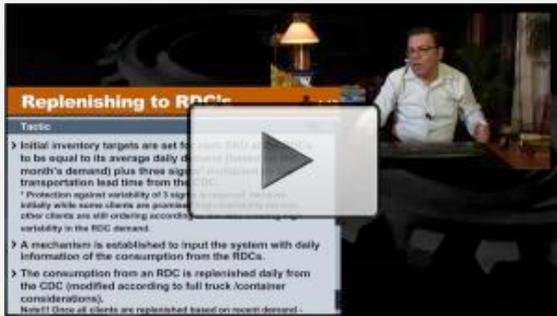
The second phenomenon is the wrong interpretation of data - people using statistics must have good understanding of the aggregation mechanism. There are some large mistakes being carried out on a daily basis all over the world, because of lack of understanding of statistics. For example – a clever man but not experienced in statistics might deduct from the example above that the consumption will be between 1650 to 1850 for all consumption points that each consumption point will have a consumption between 16.5 to 18.5 – keeping 18 units for each location and running out of stock in a fairly large number of them, while others will be left with a lot of stock they can't sell. The fact that we got an aggregated sum does not mean that it can be applied to the points that make out this sum. Another man might suggest protecting availability by putting 25 units at each location – increasing substantially the investment and increasing substantially the number of consumption points in which we'll have excess stock – taking unnecessary space and investment. The more sophisticated the algorithm, the more sophisticated the end user has to be in order to use correctly this algorithm

Another problem is that no forecasting model can take into account sudden change in consumption patterns. An example might be a very enthusiastic article in a paper (or vice versa) that suddenly changes the consumption pattern in a whole region. In today's dynamic market such event are becoming quite frequent.

As the forecast of a single SKU at a specific location is subject to the above mentioned impacts of fluctuations and uncertainty, it is a very poor base for determining the required stock level of that SKU at that specific location. It's clear that another mechanism is needed in order to reach this decision.

# Determining Inventory Targets

by Dr. Eliyahu M. Goldratt



In this extract from the **Goldratt's Strategy and Tactics for MTS to MTA** Goldratt presents and explains the strategy, tactics and corresponding assumptions for determining proper inventory targets, a critical piece for aligning production to actual demand when producing to availability.

**Length:** Full Video: 20min

**Language:** English

**Format:** DVD, OnDemand internet video streaming

**Level of TOC knowledge:** Advanced

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