

# The Consumption Model – How to develop a demand plan for your “Big Box” Customer

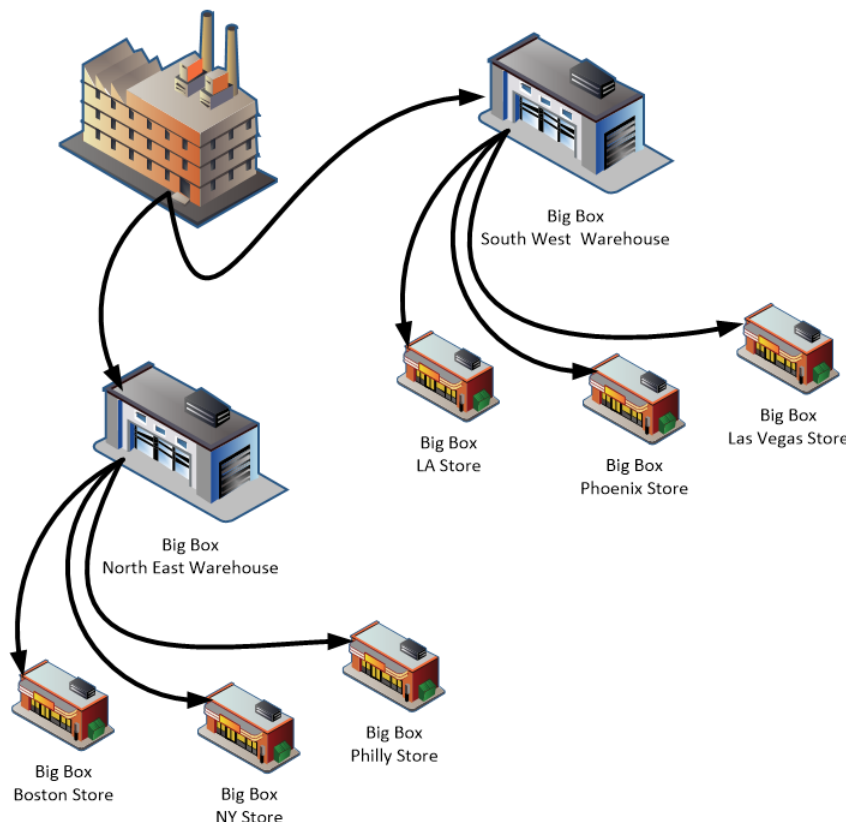
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Published: July 1, 2017

**It’s not sold until the consumer buys it!** Shipments into the outbound supply chain that build inventory do not represent real demand unless they are sold through to a customer. If consumers don’t consume, there will be no need to replenish the supply chain there may even be returns from the channel resulting in negative sales.

With outbound supply chains where you are insulated from consumer demand by distributors and retailers, many of our clients find it difficult to sense actual consumer demand. This is typical of the “Big Box Store” supply chains but exists *whenever there is channel inventory between you and the end consumer.*

I first heard the term “**Consumption Model**” from Mark Ortiz at Lamplight. While the concept is not new I really liked the name Lamplight had given it. Other labels such as “Sell Through” or “Sales In/Sales Out” really don’t create the image that the prime demand driver is the end consumer’s consumption. Thanks Mark. Modeling demand based on forecasted and actual consumer demand, is becoming a standard demand planning approach for suppliers selling through an outbound supply chain. Let’s look at the following illustration:



Goods are shipped from the supplier’s factory to the two Big Box warehouses or distribution centers. These goods may be stocked at the distribution centers or simply cross-docked and shipped to the appropriate stores.

Typically goods will not be transferred between distribution centers or stores (this is not the case in the automotive dealership supply chain where dealers often access and sell other dealers’ inventory.)

To plan the demand on the factory, we need to look at the forecasted consumer demand, the inventory in the stores and the inventory in the distribution centers as all of these can impact the demand on the factory. The “Consumption Model” is designed to address this outbound supply chain planning. In this article I will briefly review the following key elements of this model:

- Planning/forecasting consumer demand
- Planning/forecasting channel inventory
- Integrating this data into a factory demand plan

## Planning and Forecasting Consumer Demand

The availability of Point Of Sale or POS data is a requirement for using the Consumption Model. The retailers provide their suppliers with consumption data on a regular basis expecting them to use it to plan their production.

End consumer demand is pure demand. It is not distorted by the non-consumption (inventory) based supply chain activities that drive the “Bull Whip”. Typical forecasting algorithms tend to be more applicable to end-consumer demand than they are to demand plans deeper in the supply chain. As a result, historical POS demand is often a good starting point for forecasting future consumer consumption.

In addition, there are a number of extrinsic factors that may be used modify forecasts based on historical demand some of which include:

- **In-store product placement.** The amount and position of product in the store has an impact on consumption, hence the desire for premium shelf space. If the placement has changed significantly year over year, then the historical data should be adjusted accordingly.
- **In-store promotions.** Pricing and special product placements will drive demand. If there is a change in the promotion program year over year the demand plan should be adjusted accordingly.
- **Catalogue/Flier positioning.** Back in the ‘70’s my uncle explained to me the difference between front cover, back cover, inside front cover, inside back cover and buried in the book. The impact of the catalogue on consumer sales declined in that order. His key objective was to get placed on one of the high visibility pages. If catalogue placement changes it will impact the sales plan.
- **Environmental conditions** – rain snow etc. Consumers tend to buy snow blowers when there is a lot of snow. The channel may stock up in anticipation of the upcoming season, but if the seasonal conditions are abnormal, then consumer demand will be abnormal. Unfortunately you often don’t find out until it is too late to adjust the supply plan.
- **Leading indicators** such as housing starts or building permits. Housing starts are an example of leading indicator where future demand for building components will be affected by increases or decrease in housing starts. There are many leading indicators and the onus is on you as the supplier to determine which ones impact the consumption of your product.

A basic premise of the Consumption Model is that the forecast for consumer consumption will be more accurate than the forecast for the demand that the retailer places on their supplier. The

first step in applying the Consumption Model is to validate that this premise is true for you. To do this you want to monitor the accuracy of your POS forecast to actual POS demand.

Even more importantly, the drivers that increase sales are at the retail level. This highlights the need for good communication with the retailer. The selling job for the supplier is really based on working with the retailer to improve presentation of the product to the consumer.

The following chart is a simple example of a POS forecast for a product family with a high degree of seasonality. Sales are driven by summer weather. The retailers give prime shelf space during the season and pull the product off the shelves in the winter.

Product Family "X"

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Last Year POS Actuals	0	0	0	4,900	16,152	19,509	26,322	20,168	9,905	3,900	0	0
POS Forecast	0	0	0	5,000	15,000	20,000	25,000	20,000	10,000	5,000	0	0

## Planning and Forecasting Channel Inventory

The out-bound supply chain has inventory in multiple places: stores, distribution centers, and in-transit between the distribution centers and the stores. Changes in these inventory levels will impact demand on the supplier.

For example, a seasonal product may not be in the stores in the off-season. As the season approaches, the distribution centers would be stocked and then stock would be moved to the stores to set the shelves for the season. The demand on the supplier will happen in advance of consumer demand and the quantity required to initially fill the shelves will usually be much larger than the consumption in the first period.

In order to calculate the demand on the supplier we must look at the retailers' inventory plans as well as the POS forecast. The method of forecasting the retailers' inventory plans is beyond the scope of this article and they will be different for different channels. Suffice to say you need to work out a way to forecast future channel inventories as part of the Consumption Model.

The following chart (with fictitious example data) represents the inventory forecast for the channel and the same product family "X". In this case there were three variables considered in developing the inventory plan:

1. **The stock required to fill the shelves in the stores.** In this example, stocking the shelves in all the stores takes 20,000 units. The stores will start to bleed off this inventory as the end of season approaches.
2. **The stock required to prime the Distribution Centers.** The distribution centers plan to carry some safety stock or back up inventory going into the season. They will start to bleed this off as they pass the high point of the season.
3. **The in-transit stock required between the Distribution Centers and the stores.** This is a function of the replenishment cycle for the stores. In this example I have just plugged a number.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>POS Forecast</b>	0	0	0	5,000	15,000	20,000	25,000	20,000	10,000	5,000	0	0
<b>Inventory</b>												
<i>Store facings</i>	0	0	0	20,000	20,000	20,000	20,000	20,000	10,000	5,000	0	0
<i>DC Stock</i>	0	0	0	1,000	3,000	4,000	2,000	0	0	0	5,000	5,000
<i>In Transit</i>	0	0	2,000	2,000	2,000	2,000	2,000	0	0	0	0	0
<b>Total Channel Inventory Forecast</b>	0	0	2,000	23,000	25,000	26,000	24,000	20,000	10,000	5,000	5,000	5,000
<b>Inventory Build (Shrink)</b>	0	0	2,000	21,000	2,000	1,000	-2,000	-4,000	-10,000	-5,000	0	0

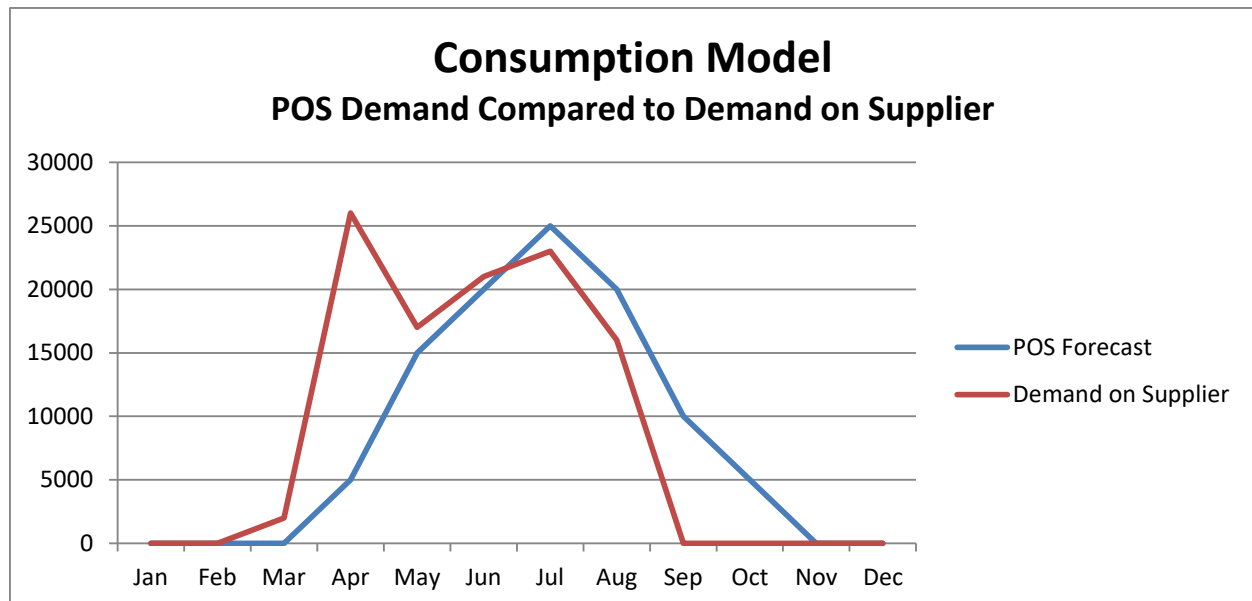
The number we are really interested in is the *Inventory Build/Shrink*. Increases to channel inventory will increase demand on the supplier and decreases (shrinkage) will reduce demand.

## Developing the Suppliers demand Plan based on the POS and Inventory Forecast

The demand on the supplier is a combination of the POS demand and the Inventory Build/Shrink. The following chart shows this relationship for the POS and Inventory plans outlined earlier.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
POS Forecast	0	0	0	5000	15000	20000	25000	20000	10000	5000	0	0
Inventory Build/Shrink	0	0	2000	21000	2000	1000	-2000	-4000	-10000	-5000	0	0
<b>Demand on Supplier</b>	0	0	2000	26000	17000	21000	23000	16000	0	0	0	0

Graphing the POS forecast and the demand plan for the supplier highlights the difference between the two. As we would expect, the demand on the supplier leads the POS demand. Consumers can't consume until the product is on the shelf. We can also see a large demand spike in the supplier demand plan as the shelves are stocked and a sharp drop off as the channel burns off inventory at the end of the season.



Developing the supplier demand plan without using the consumption model has a number of issues or risks including:

- The demand on the supplier includes actual consumption as well as changes in the inventory plan. While the actual consumption (POS) may be fairly predictable year over year, the inventory plans typically are not. Looking at supplier demand data only, it is impossible to separate the impact of consumer consumption and inventory changes.
- Inventory changes especially when a product is not sold throughout the year can create spikes in supplier demand. These are difficult to see without using the consumption model.
- The POS data supplied by the channel typically includes sales and inventory data. With this data it is possible to monitor performance to plan and adjust based on which of the two variables has changed.

Talking to suppliers, I often hear how unpredictable and random their actual demand is in this supply chain model. Looking at their historical demand, these concerns are often valid. However, looking at their customers POS data, it is usually very predictable. In fact, it is often more difficult to forecast the channel inventory changes than it is the consumer consumption.

If you are selling through an outbound supply chain and have access to POS data then you should look into using the Consumption Model for planning this type of demand. As you gain experience you will enhance the model to deal with nuances such as: promotions, changes to the planograms, and adding or deleting stores and distribution centers from the channel.

## **DBM's Three-step Plan for Consumption Model Implementation**

1. **Validate that consumer demand can be forecast more accurately than demand on the supplier.** Start by using basic forecasting techniques and POS data to forecast future demand. Measure the forecast accuracy and compare it to the accuracy of the forecast for demand on the supplier. It may take a few iterations to determine the best forecasting technique here but there is lots of literature out there to help you with this step. Ultimately you want to share this plan with the retailer to make sure you are both on the same page.
2. **Determine a mechanism to forecast changes to the channel inventory.** This takes some work and some knowledge about how the retailer manages their supply chain. The POS forecast will be a primary input in this part of the model so it is important that the retailer and the supplier are using the same POS forecast. You will only be able to manage this plan in the areas where data is provided. For example, if the retailer does not provide Distribution Center inventory data, then you will have to assume that this inventory is steady state and does not impact demand. This assumption may not be valid but it is the best you can do without actual inventory data.
3. **Develop a model to calculate the supplier demand based on the POS forecast and the channel inventory forecast.** You will want to check the accuracy of this forecast to the forecast based on historical shipments from the supplier.

Assuming the retailer is providing you with good and timely data, I would be very surprised if this approach was not more accurate than simply basing future supplier demand on historical supplier shipments. Try it out and let me know.