



7thonline[®]

Demand – Driven Allocation

Integrated Planning & Execution
White Paper Series

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The Allocation Management Imperative

The nature of Retail Planning & Execution is undergoing unprecedented change. The model of merchandise management “offer and purchase” whereby the retail management team could dictate the terms of engagement are long over. Today’s retail consumer is highly educated, deeply engaged and social connected; further, she effortlessly navigates digital methods to refine purchase preferences, thereby demanding products and services be available anywhere, anytime. Clearly, the game has changed...

As a response to these new rules of engagement, retail management teams must find new ways to abbreviate the supply chain to ensure that products and services are in the right place at the right price and at the right time. Correspondingly, a new premium has been placed on methods of fulfillment, especially methods surrounding seasonal product allocation. In particular, Allocation Management methods must embrace the following imperatives:

1. Develop and Deliver a Seamless Integrated Merchandising and Fulfillment Model
2. Establish Holistic Allocation Strategies that support Stock Balance and Efficiency, coupled with Broad-based Reporting Capabilities
3. Provide for Integrated Allocation Methodologies that feature a Seasonal Forecast Algorithm Framework, an approach to leverage Marginal Selling Propensity, foundational System Calculated and User Defined Logic Drivers, and an Inventory Control Regime to enable Merchandising Teams to Execute Sales, Margin and Inventory Objectives

The focus of this White Paper will be on this third component of the Allocation Imperative: the Allocation Methodologies that fully support retail teams in their mission to harness consumer demand, while fully offering a consumer shopping experience that meets expectation across any channel, anywhere and anytime.

Integrated Allocation Methodology: An Overview

An Integrated Allocation Methodology is comprised of the following components:

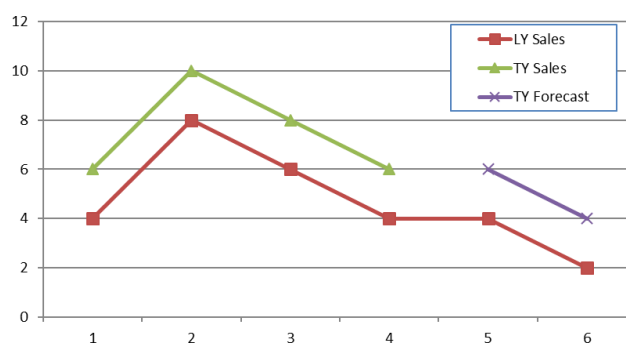
1. Seasonal Forecast Algorithm Framework
2. Marginal Sales Analysis
3. System Calculated and User Defined Logic Drivers
4. Inventory Control Regime: Push vs. Pull

Seasonal Forecast Algorithm Framework

The heart of an Integrated Allocation Solution is a Seasonal Forecast Algorithm Framework that supports both Fashion and Basic product profiles across the merchandising cycle. The Seasonal Forecast Algorithm Framework is comprised of two distinct approaches: Case Based Reasoning for fashion product profiles and Log-Linear Forecasting for basic product profiles.

Case-Based Reasoning

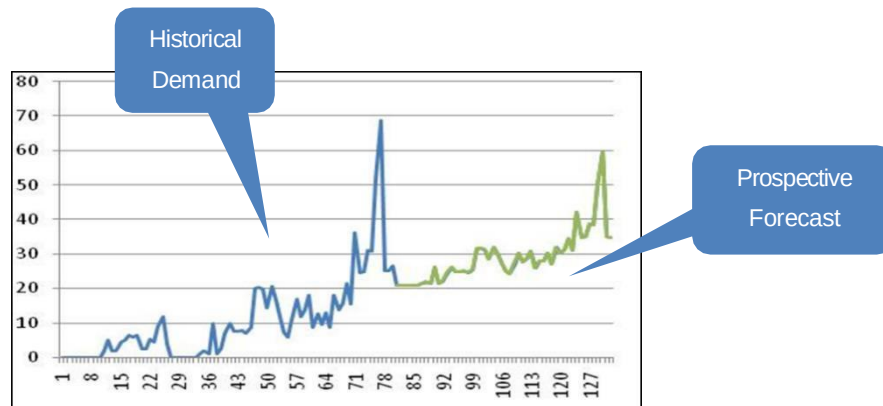
The challenge of allocating highly seasonal fashion product is based on a short selling life, coupled with the potential for high levels of gross margin attainment. In order to achieve a strong margin with rapid sell through, Case-Based Reasoning is employed to mitigate the risk inherent in Fashion merchandise cycles. Case-Based Reasoning is a machine learning technique whereby historical selling patterns are detected and calibrated to new fashion offerings. The Case-Based Reasoning methodology looks for products that have an identified sales pattern at specific locations and attempts to “model” new fashion items, subject to user-based inputs, such as weeks of supply targets or promotional calendar cadences. The effect of this methodology is to maximize sales and margin productivity, while optimizing inventory investment in newer fashion offerings. The diagram below illustrates this product-to-product modeling approach:



Through the use of Case-Based Reasoning, forecast algorithms can be developed and executed, thereby eliminating much of the risk and guesswork associated with fashion allocation.

Log-Linear Forecasting

Basic product profiles present a different set of challenges, apart from fashion allocation. In most organizations, basic products have a long, defined life cycle whereby in-stock measurements and stock service levels are of paramount performance. To aid the planning and execution of basic product profiles, Log-Linear Forecasting is employed to drive a stable, predictable forecast over a defined period of time. Log-Linear Forecasting can be applied to both mid-cycle Seasonal Basics as well as Low Volume Basics to ensure that seasonal demand trends are captured and articulated into a time-phased forecast. The following diagram illustrates the approach:



Log-Linear methodologies utilize past demand patterns to create a “smoothed” forward forecast that allows for seasonal sales trends, while minimizing long-term risk to stock investment.

Benefits Realization

To meet the challenge of supporting both Fashion and Basic product profiles, 7thonline offers the opportunity for retail management teams to differentiate and understand the product population, capture the nuances of the merchandise cycle and apply the demand-driven components of the Seasonal Forecast Algorithm Framework to solve both short cycle and de-seasonalized product fulfillment challenges. In turn, the Framework allows retail teams to leverage a system-generated forecast to ensure the correct balance of inventory investment, subject to seasonal sales and margin objectives.

Marginal Sales Analysis

When considering an allocation strategy, both Relative and Marginal Selling Propensity must be evaluated across a population of stores and between stores within the population. Relative Sales Propensity defines how stores will sell within a store population, whereas Marginal Sales Propensity defines how stores sell in relation to one another. Effective allocation management depends upon an understanding of Margin Sales Analysis.

Marginal Sales Propensity

Any given store within a store population displays unique demand tendencies, which must be evaluated to optimize allocated product, especially against constrained stocks. Consider the following two stores:

Store 1			Store 2		
Uncensored Demand Units	Probability of Observing	Cumulative Demand Probability	Store	Allocated Quantity	Probability of Selling An Additional Unit
0	.05	0.05	Store 1	0	0.95
1	.1	0.15	Store 2	0	0.9
2	.2	0.35			
3	.4	0.75			
4	.2	0.95			
5	.05	1			

After demand has been evaluated for both Store 1 and Store 2, it becomes evident that cumulative demand probabilities for Store 1 would indicate a 95% chance of selling the first allocated item, whereas Store 2 has a 90% chance of selling that same, first allocated item. By comparing the marginal propensity for the first sale occurring in Store 1, it follows that the first item of allocation should go to Store 1. Marginal propensity analysis provides for a system-generated approach to reducing the risk of under or over allocation at the individual store level.

Benefits Realization

Understanding the distinction between Relative and Marginal Sales Propensity across a diverse store population is significant. By utilizing the 7thonline Demand-Driven Allocation Solution, retail teams eliminate the “guesswork” in associating an optimal match between individual store cumulative demand probability and the placement of seasonal store product. This approach leads to more effective “up-front” product allocation, which can materially reduce unplanned seasonal markdown, while supporting efficient seasonal inventory turnover.

System Calculated and User Defined Logic Drivers

Effective Allocation Management must utilize System Logic Drivers to support both pre-season and in-season allocation strategy. In particular, Sales Indexing and Size Profiling provide a system calculated and user-defined approach to driving profitable seasonal allocation.

Sales Indexing

Sales Indexing provides the answer to “what proportion of a given order is each store expected to sell?” Consider the following diagram:

Example Sales Index Calculation

Store	FE Sales	Sales Index
Store 1	200	2
Store 2	100	1
Store 3	75	0.75
Store 4	25	0.25
Average	100	1

Example Allocation Quantity Calculation

Group of Styles
have total order
quantity = 200
units

Store	Total Quantity
Store 1	100
Store 2	50
Store 3	38
Store 4	13
Average	50

From the diagram above, it appears that Store 2 is an “average” selling store for the product and time frame under consideration. This is valuable information in a “constrained order” situation where a style population of 200 items must be allocated. Using the guidelines of the Sales Index Calculation, the 200 units in question are allocated in order of selling proportion as illustrated in the Allocation Quantity Calculation, which is the result of alignment back to the Sales Index Calculation.

Size Profiling

Size Profiling provides an alternative view to the constrained order problem by evaluating the relative efficiency of sales at the size level within a given product population. Consider the following:

Door 1: In-Stock Weeks & Total Sales Units							
	Size S		Size M		Size L		Total Product Sales
	In-Stock Weeks	Total Sales Units	In-Stock Weeks	Total Sales Units	In-Stock Weeks	Total Sales Units	
Style 1	8	109	7	190	9	148	447
Style 2	10	129	7	193	9	142	464
Style 3	7	83*	10	255	9	150	405

Door 1: Sales Rate & Sales Proportion (Sales Rate = Total Sales Units/In-Stock Weeks)						
	Size S		Size M		Size L	
	Sales Rate	Sales Proportion	Sales Rate	Sales Proportion	Sales Rate	Sales Proportion
Style 1	13.63	24%	27.14	47%	16.44	29%
Style 2	12.90	23%	27.57	49%	15.78	28%
Style 3	11.86	22%	25.50	47%	16.67	31%

Upon close examination, it appears that Size Medium is the most efficient selling size: it has produced the most amount of sales with the least amount of “in-stock” weeks. From this information, an allocation strategy can be developed to ensure that size optimization is achieved:

Benefits Realization

Retail teams are constantly trying to balance the often competing variables of store size and volume variation, assortment mix, color spread and size distribution. Through the use of the 7thonline Integrated Logic Drivers, these store/size variables and attributes can be interpreted into sound allocation strategies to support pre-season, as well as in-season fulfillment planning and execution. The result is a seasonal delivery cycle that harnesses the dynamics of store-level demand, while optimizing store-level style/color/size inventory investment.

Inventory Control Regime: Push vs. Pull

Most allocation strategies tend to center on a “push” methodology, which is focused on calibrating an assortment plan with a seasonal allocation. However, there are opportunities to consider a demand “pull” approach which allows for a level of reserve stock that can be applied to prospective demand at the individual store level. Consider the following:

Store	Min	Max	Suggested Allocation	Pull Quantity	Push Quantity
Store 1	10	16	20	16	16
Store 2	10	16	18	16	16
Store 3	8	12	11	11	12
Store 4	8	12	10	10	12
Store 5	6	10	6	6	8
Store 6	6	10	6	6	7
				Pull Reserve	Push Reserve
				6	0

A Closer Look at the Inventory Control Regime

Upon examination of the store sequence above, there is an opportunity to evaluate whether all products should be released in the initial allocation or if some quantities should be held for a later allocation. In this example, Store1 and Store 2 are constrained by user-imposed maximum values, so the “push” and “pull” quantities are equivalent. However, for Store 3 through Store 6, an alternative decision must be made: push the maximum quantity or reserve quantities to support future demand. In each case, a proactive allocation decision can be made with a view to maximizing sales and margin, while optimizing inventory investment at the individual store level.

Benefits Realization

7thonline has taken a fresh perspective to solving the “push” vs “pull” dilemma by allowing retail teams to determine an optimal fulfillment approach within a single allocation instance. By providing visibility to an inventory control regime,

retail teams make smarter allocation decisions, subject to user-defined constraints and dynamic demand patterns across diverse groupings of seasonal merchandise, thereby enabling a more productive allocation.

Demand-Driven Allocation: Realizing the Value of an Integrated Approach

To meet the challenge of satisfying today's Omni-channel consumer, the 7thonline Allocation Solution leverages a flexible, demand-driven Allocation Management approach that features the following capabilities:

- *Dynamic store modeling instead of static store quantity to enable store-level demand, thereby allowing flexible product delivery*
- *Ability to consolidate discrete items (e.g. online returns, broken sizes) with advanced allocation models to drive full-price selling*
- *Leverage sales indexing instead of top-down clustering to maximize individual store sales and margin potential*
- *Proprietary algorithms incorporate demand to capture lost sales and drive seasonal full-price sell-through*
- *Integrated sales forecasting methodologies to anticipate dynamic, in-season trends*
- *Industry-specific color dispersion algorithms for optimal assortment color mix by selling door*
- *Robust stock-balancing capability to support multi-echelon allocation strategies*
- *Exception-based reporting and analysis to drive product management efficiency and scale*

The 7thonline Allocation Solution provides today's retailers dramatic new capabilities to systemically impact margins based on an unprecedented understanding of store-level demand. Combined with the balance of the 7thonline Merchandise and Assortment Planning Suite, Demand-Driven Allocation is a critical component of proactive supply chain planning and execution.

About 7thonline

7thonline is a leading provider of cross-channel merchandise and assortment planning and allocation management solutions to the Apparel, Footwear, and Accessories industries. Deployed in the cloud or as enterprise software, 7thonline solutions enable more effective planning, demand forecasting, and inventory optimization for fast-growing, Omni-channel, leading brands. With embedded business intelligence and rich analytics, the company's solutions offer complete demand visibility and planning capabilities for wholesale, retail, and e-commerce—enabling increased sales, reduced markdowns, improved margins, and enhanced profitability. Customers include Bestseller, Colony Brands, Calvin Klein, EILEEN FISHER, G-III Apparel Group, Michael Kors, Nautica, Oakley, Patagonia, PVH and VF, among others. 7thonline is headquartered in New York, NY and has global offices in mainland China. For more information, please visit: www.7thonline.com