

SUPPLY CHAIN EFFICIENCY THROUGH INTELLIGENCE



An intelligent supply chain is key to delivering the highest quality customer experience and managing optimum margins in your business.

Introduction

If you are a retailer or a trader and your customers are getting what they want, when they want and at the best price then you have all the reasons to be successful and profitable. In a situation like this, likely, your business is not just meeting the category standards of DoH (Days of Holding) in each category on your shelves but also delivering a high-quality customer experience. In modern times when the omnichannel model of doing business is becoming the core of every distribution and retail trade. The intelligent supply chain is the key to delivering the highest quality customer experience and managing optimum margins in your business. This document is an attempt to cover the nuances around the intelligent supply chain and to also highlight some emerging aspects to empower your supply chain with the required intelligence.

Assortment Planning to drive the Supply Chain

Before we talk about various aspects of the supply chain, let us understand the importance of assortment planning first. The growth of consumerism is also driving the growth of brands and range across categories of consumer goods and durables. Brands are researching the needs and spending powers of every demographic group and creating a range of products to suit their needs and wallet power of these varied consumer groups. Which means most items available in the market are meant for a targeted consumer groups' need. Before we talk about the stocking levels and inventory standards for these businesses, it is important to plan what is the suitable range for the target customer base of the business. This process is called Assortment Planning.

Days of Holding (DoH)

For an efficient supply chain, this is one of the most critical KPIs to manage. Days of Holding (DoH) is the number of days the item has been in your supply chain starting from the day it lands in your warehouse from the supplier to the day it either gets sold to a customer or gets consumed in a manufacturing process. Depending on the nature of business and category of the product DoH standards can be different and these need to be benchmarked for the overall inventory budgeting. For example, any fruit and vegetable category in a retail format should work within DoH of 5 days whereas staples can be working on 25 days cycle. Anything less than that can lead to shortages on the shelves and more than that can also cause wastages, especially on perishable items. Though in a category like Fresh, different items can have different DoH from the point of freshness and perishability the budgeting point of view we can work on a category level. However, since all items in a category aren't supplied by the same vendor or on the same day, it becomes important to monitor the DoH performance of each item in your inventory across the supply chain. DoH can also be hugely impacted by the delay in supplies by the vendors hence DoH budgets for each category become a benchmark to manage the delivery time from your suppliers. Ideally, the delivery period of a supplier shall never be more than the DoH budgets of that item/category. This is also an important aspect of vendor selection criteria to ensure that your business can run on the most optimum DoH levels across the supply chain.

Fill Rate

Generally, fill rate is referred to as "order fill rate" or "basket fill rate", however, there is another type called "case fill rate" as well. Let's assume you are an online retailer and you have received 20 orders of a particular SKU but your stock in the warehouse is only 18 then your "order fill rate" is 90%. Now, in the same situation if out of 18 orders one of those has ordered 2 qty then you can only serve 17 orders. In this case, your "case fill rate" is 85%. Whatever you retail or distribute, one of the most important KPIs to monitor in your supply chain will remain to be demand satisfaction rate, another term used for "fill rate".

A higher fill rate is always good for the business and most well-run businesses operate on a fill rate between 85-95%, depending on the category of their business. If your fill rate is around 95% or more then there is a possibility that your business is already operating on extra inventory which may lead to loss of inventory through wastages and lost inventory. Some of the other factors of inconsistent inventory can be not taking into account holidays, festivals, weather, and other local influences on sales and supplies. Also, sometimes a new inventory item may become suddenly become very popular leading to a sudden boost in sales not supported by sufficient inventory. Optimum consistency of your fill rate determines how well you are using your business data to manage your inventory. Businesses are now moving towards the use of Advanced Demand Forecasting and Inventory Optimization tools.

Inventory Turns

Inventory is like cash and in any business, it is important to ensure that your investments are deployed productively. Inventory turns in any business, especially retail and distribution reflect the efficiency and speed at which you are making use of your cash investments. Inventory turns are typically measured on a quarterly or annual basis. At the broader level, you can count your inventory turns by simply dividing your annual or quarterly sales numbers with the average inventory in hand. Although to ensure the right balance it is important to measure this at the item level across the business. Sometimes to ensure faster turns you may run with low inventory levels but then your business runs the risk of losing sales due to the non-availability of stocks required for sales. Similarly, overstocking of any item can lead to loading your overall inventory with slow-moving items blocking cash for more than planned.

Managing inventory turns is directly linked to managing your business cash flow. One of the common practices to manage it effectively is to follow the “open to buy” model in your inventory planning. This allows you to plan the turns you want for each item, category, or classification. There is no need to set standard turns for all items across your business. Some will turn slow and some will turn faster and with this model you can easily manage those differences to get the optimum balance across the business. However, it is always advisable to ensure that you turn your inventory at item level faster than the vendor payment cycle. This will help you to run your business with the lowest inventory investments.

- Inventory turnover happens when a business sells through its inventory and needs to order more.
- Inventory turnover is often measured as a ratio that expresses how many times in a given period that a business sells through its inventory.
- Businesses should seek to strike a healthy inventory turnover rate that keeps items on the shelf without burning too much cash on inventory storage costs.

Remember, we earlier mentioned that to run a successful business it is important to ensure that you should be able to deliver your customers what they want when they want it and if you can accomplish this by having the lowest cash deployed in your supply chain. To achieve this there are many other interconnected and overlapping aspects that have to go right—from planning to forecasting to order placement to warehousing execution.

Historic Data V/S Recent Data

Organizations are using historical data to generate business insights using advanced statistical and Machine Learning techniques. One of the primary questions that are asked in this regard is the volume of historical data required to generate useful and accurate business insights. Unfortunately, there is no golden formula to decide the optimum number of data points. The decision to use quantum of historical data is dependent on multiple factors like data availability, time and investment required to fetch additional data, the product characteristics, noise in the data, specific algorithms (deep learning techniques require larger data), etc. As an example, electronics products like mobile phones have a very fast obsolescence rate, and therefore purchase behavior of the user of the mobile phone in the past may vary significantly from the mobile phone users in recent times. Therefore, it is more pertinent to use recent data than using old data. The opposite is true in the case of a commodity product like steel or cement. Long past data (usually 3 to 5 years) is used to analyze the impact of seasonality, and much more data (10-15 years) is used to capture the impact of economic cycles.

It is imperative to develop a mental map to realize the usefulness of historical data on a specific industry or business domain. In addition, unprecedented situations also demand special attention for judicious use of historical data. As an example, the COVID19 pandemic has resulted in significant demand volatility across all sectors. These unobserved demand patterns are difficult to predict using the long historical data, most of which is irrelevant to the present situation. Models are required to be flexible enough to use an optimal number of relevant historical data to predict future demand more accurately. Moreover, the capability to integrate and analyze external data that reflect the day-to-day dynamics of the pandemic like lockdown status in a specific city, store operating hours, etc. would make the forecast more accurate. The current volatile situation is likely to persist with different severity for a long time and therefore require recalibration of the existing forecasting techniques with newer exogenous variables and different modeling approaches.

Impact of External Factors

To enhance data models, businesses are now exploring using both internal and external real-time data. Historically, most models only used internal data sources, but now, more and more businesses are realizing that the only way to get higher accuracy in demand prediction is to understand the impact of external factors on their business. Let us look at some examples:

Customer Footfall

It is known that the revenue of any business is always linked to no of customers serviced and especially in retail business it is several customers visiting your store or e-commerce site. However, real-time footfall patterns are determined by many factors such as profile and demography of the catchment of the retail store, weather conditions, special events around the catchment, presence of competitive brands around, and finally factors like the local impact of the pandemic on business hours, lockdown, etc. Not considering these factors may lead to missing out on additional revenue opportunities.

Launches

The introduction of new products is part of the growth strategy of every brand and every time a new product is launched it may have some impact on the sales of similar products in your range. However, in a typical retail store, even a competitor launching a new product may impact your sales throughput. Promotions

Brands continue to drive promotional campaigns from time to time, not just to enhance the customer reach but sometimes to clear out the inventory as well. This may create lumpy demand, not for the promoting brand but can also impact the sales numbers of similar or competitive items in the market as well as store shelves.



Nihilent Perspective – RESENSE™

To determine accurate customer-centric localized assortments we use AI/ML-driven algorithms to analyze product attributes, customer buying patterns, sales channel preferences including omnichannel interactions, socio-demographic profile of catchment area, etc. The key driver for success here is to optimize the depth and breadth of merchandising to minimize stock-out and to maximize profitability by reducing markdown sales. The starting point to effective assortment management is to have the right sales forecast at a granular level, which can be a combination of brand, size, color, cut, store, channel, etc.

Advanced ML algorithms can improve this forecast accuracy significantly if used judiciously with the right data (combinations of enterprise data and external data like promotions, holidays, events, weather, etc.) and pre and post-processing techniques. Another important aspect to gain nimbleness across the entire supply chain network is to anticipate supply-side variability well in advance. Holding optimum inventory at each hierarchy (store, regional distribution centers, central distribution center, etc.) helps the retailers to overcome the unanticipated demand and supply variances. Determining the optimum inventory at each stock-keeping point requires multiple simulations at each store level with varying demand patterns.

We believe that weather plays a major role in the daily variation of sales for all channels though more for the brick-and-mortar stores. It is well understood that inclement weather can affect footfalls in the stores or the other way round for online stores. It is important to determine the exact impact of rainfall, temperature, and even wind speed on sales of different product categories across different locations.

The impact varies depending on the day of the week, a specific time of the day, etc. It gets more complicated when the impact of rain on sales is not only limited to the day of the event but continues to the subsequent days. The key challenge is that the relationship between weather (rainfall, temperature, wind speed, etc.) and sales is mostly non-linear, which cannot be identified using a simple regression method. More advanced Deep learning-based algorithms can be used to find out these non-linear patterns to improve day-level sales forecast accuracy.

Conclusion

It is in this backdrop Nihilent developed RESENSE™ leveraging years of industry expertise and its deep retail industry domain knowledge. RESENSE™, a Cloud-hosted Software as a Service (SaaS) platform works on deep learning principles of determining demand forecasts at SKU and store level to manage DoH, Fill Rates and inventory cycles across the categories and businesses. It also helps on price optimization recommendations and models to support supply chain efficiencies. It uses multiple forecasting algorithms, including univariate and multivariate time series forecasting models, Machine Learning (ML). Banking on an AI-driven approach, the solution is extremely relevant for the retail and consumer brands to optimize their supply chain through balanced inventory load across the enterprise.

To know more about RESENSE™ write to resense@nihilent.com

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About the Author



Ajay brings more than 3 decades of successful association with the global retail and e-commerce industry as an entrepreneur, advisor as well as practitioner. He has pioneered product development for the global retail industry since 1996 with success. His industry insights help him engage with retail brands to help them mitigate their business challenges.

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About Nihilent

Nihilent is a global consulting and services company that uses a human-centered approach for problem-solving and change management. Nihilent's comprehensive range of expertise in customer research, process, and technology enables newer heights of business performance.

