RETAIL SUPPLY CHAIN

Satisfying customers with A.I. to optimize retail inventory

Dear frustrated retailer:

Are you responsible for the success of your company's retail business from sales, margin, and inventory levels to overall customer satisfaction? If so, what happens when a valuable customer tries to make a purchase from one of your stores or online but is disappointed when there is no inventory? Odds are great you won't get them back. Out of stocks are a huge problem for your financial bottom line.

What happens when you have excess inventory in the wrong products, wrong locations, or at the wrong time, leading to disappointed customers? You might not be back. Slow moving, stagnant inventory stranded in various locations throughout your supply chain is a tremendous problem for your financial bottom line—and your career.

Your greatest challenge is balancing the need to satisfy customers with your business' profitability and growth. Customer loyalty is finicky. They demand inventory when they want it, where they want, and have a myriad of options on their smartphone to change brands, retailers, locations, and delivery method. In this new age of retail, you can't afford to lose a customer to your competition. At the same time, you can't load up every location/channel with an infinite amount of inventory in hopes of satisfying every customer's purchase.

That's not your only challenge. You must also match the objectives and factors across billions of combinations of category/SKU, location/channel, and days/weeks. Your business objectives could be maximizing profit, revenue, and market share, while minimizing costs associated like manufacturing, shipping, customs/freight forwarders, receiving, put-away, picking shipping, receiving, and stocking shelves along various transportation modes and much more.

Most retailers rely on outdated replenishment systems, fed by traditional time-series forecasting methods, that require a lot of manual tasks. You may have to work through all the objectives and factors outlined above in your head or in a spreadsheet before you can turn to your replenishment system to update parameters.

After you've been taught how the countless options of replenishment methods and associated parameters affect the business, you're now ready to manage them to achieve your goals. Honestly, there's too much to learn so you either embark on a set-it-and-forget-it strategy or use only one or two methods and constantly tweak, hoping through brute force, you can achieve the inventory plans.

When you've decided to tweak and maintain replenishment parameters, high on your list of system features would be mass maintenance capabilities. Before even engaging in mass maintenance, every week you pull up various reports and sort by several factors to find problems or opportunities for better inventory positions.

With the reports, you manually note the sought-after inventory and the best combinations of parameters you think will work to attain the desired levels. If you're allocating a fashion collection, through mass maintenance, you choose the styles, and locations, then set the demand methods, the desired weeks of supply, along with other parameters and constraints.

If you're replenishing a hardline or grocery item, you may select a group of SKUs and locations then make a change to the inventory policy, replenishment method, min presentations stock, safety stock factors, and more. Even though you're working at an aggregate level and across averages, mass maintenance is much needed time-saver.

Now consider a different world, one where there are no policies or methods to learn. One where you don't have to choose whether you are going to allocate the merchandise or replenish it. A world where science can make optimal decisions at the most granular level for days or weeks into the future. An innovative universe where you and your staff make decisions automatically, and in the most optimal way, by only dealing with exceptions. One where both allocation and replenishment, pushing and pulling, are synonymous and your system just solves the inventory problem.

In this new world, exceptions are raised to you along with the root cause and subsequent actions to take. Your new, exciting world allows you to engage in more value-added work like looking for opportunities to expand assortment, chase fashion trends and more importantly, ensure customer satisfaction.

Artificial Intelligence is at the forefront your new world. Leveraging A.I. should be your highest priority in order to solve your toughest retail inventory challenges. Not only prioritizing machine learning for demand forecasting, but your vision should be fixed on leveraging A.I. for optimizing retail inventory across replenishment and allocation.

A.I. models like mixed-integer linear programming (MILP) and stochastic modeling are generating profitable results for retailers today. Driven by a machine learning demand signal, the power of A.I. lies in the unlimited number of inputs evaluated during the optimization modelling. Differing by products/locations, you may have primary business objectives such as maximizing profit, maximizing revenue, maximizing unit sales, while considering secondary factors such as minimizing lost sales, wastage, inventory capital, fill rates, transportation costs, DC and store labor costs, and many more variants.

An A.I. model approach automatically considers optimization objectives, various supply chain network costing factors, numerous supply chain constraints, and the penalties of excess inventory and wastage, while simultaneously considering the impact of each calculated output at every location (store, warehouse, DC, manufacturing location, digital channel) for all future days and continuously adjusts. Akin to price optimization models that try every price in increments of one cent to determine the optimal price, an A.I. inventory optimization model approach simultaneously evaluates every increment in inventory to ensure that every style/color or item for every location (stores, DCs, warehouses, and channels) for every day to produce the optimal inventory need for the entire supply chain.

With A.I., you no longer have to manually select inventory policies or replenishment methods or have your legacy system attempt to align or optimize the stores and warehouses separately, or even to finalize store replenishment plans so they can feed the warehouse replenishment plans. Those methodologies are all outdated approaches to inventory management leading to suppressed results.

By feeding hundreds of terabytes of data, A.I. models will optimize all your purchase orders, transfers, and allocations across the entire supply chain based on your optimization objective, leading to increases in both customer satisfaction and profitability.

It's time to leave your legacy by modernizing your outdated legacy systems with new innovations and A.I. Bottom line, A.I. delivers happy customers as well as long successful careers in retail inventory management.

Potential benefit ranges you may see:

- Up to 10x ROI
- Increases in sales ~5%
- Margin improvements ~5% bps
- Inventory reductions between 3% to 20%
- Productivity improvements of 3% to 5%

Learn more ›

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INF-1658652-en-US-0417-1

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