

CONSUMER PACKAGED GOODS

The Autonomous Journey Transforming demand planning in CPG and retail supply chains

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Supply chain disruption reveals a broken planning process

ATTENTION CUSTOMERS;

cace water . Gallon milk

. Bread

Due to high demand these items will be limited to two per customer.

. Paper towels

. Disinfecting wipes

ANN YOU

. Bath tissue

. Hand sanitizers

For consumer packaged goods (CPG) and retail businesses, 2020 brought a rude awakening. The global pandemic wreaked havoc on the industry in terms of both unexpected demand and supply chain disruption—and shortages still pose a serious challenge.

The now-classic example is the story of how, early in the pandemic, many CPG and retail companies were caught flat-footed by the unprecedented demand for toilet paper, hand sanitizer, personal protective equipment (PPE), and more. This was the result of consumer panic creating overwhelming demand that CPG and retail companies couldn't see coming using demand planning based on historical sales data, combined with severe supply chain disruption.

While the unavoidable pandemic-related supply chain crisis resulted from extraordinary conditions, it revealed the weaknesses of traditional demand planning systems even in "ordinary" circumstances and demonstrated the need for evolution in demand planning processes.

The fundamental flaws of the legacy systems include:

- The waterfall approach of batch planning makes it impossible to react quickly enough to keep up with the time-sensitive demands of always-on B2B and D2C ecommerce channels.
- Manual processes are so time consuming and unsustainable that successfully completing monthly sales and operations planning (S&OP) cycles is an overwhelming task.
- Current demand planning is largely based on a single source of data—sales history—and bias towards human intervention and tribal knowledge, leaving out a large range of factors that actually influence demand.



Autonomous evolution is imperative

It's clear that CPG and retail companies need to take a new approach, and not just in reaction to the perfect storm of the pandemic. Integrating autonomous processes into demand planning will be crucial for retail and CPG companies to successfully move into a fast-approaching future.

Autonomous demand planning systems are self-driven, employing machine learning (ML) and other advanced technologies to automatically make decisions while continuously learning and improving. The end goal is a self-adjusting process that combines with other parts of the chain, such as supply planning, to deliver products to customers smoothly and efficiently with minimal human intervention.

The demand decisions that CPG and retail companies make are relatively simple, focusing on how to get the right product to the right place at the right time. But the factors that feed into demand variation are extremely complex. Autonomous systems use technology to consider a multitude of inputs that are impossible for people to take into account in an agile way. Autonomous planning feeds better decisions and execution throughout the supply chain.



Technology offers new opportunities

While traditional systems have been rendered ineffective by new realities, the available technology has evolved. Cloud computing, artificial intelligence (AI), and ML have become more mainstream than they were even a year or two ago, presenting a huge opportunity.

CPG and retail companies have typically used on-premises systems, which don't support the larger datasets required for more effective demand planning. Now, however, many more companies are moving to the cloud. Cloud technologies make it easier and more cost effective for organizations to quickly develop and deploy new capabilities. Al and ML are the backbone of autonomous planning, and their growing availability brings transformation within reach for many more organizations than before.

Amazon.com has long been a leader in using ML for sophisticated demand planning. Starting in 2007, Amazon began applying ML to understand price variability, regional vs. national demand, and slow-moving, new, and highly seasonal products. Amazon continued investing in ML, using deep learning models starting in 2015. By 2019, Amazon saw a 15x improvement in accuracy using deep learning.

Autonomous solutions for demand planning challenges

Autonomous capabilities can evolve demand planning in several areas, including statistical forecasting, demand sensing, and demand shaping. Information and insights can then generate automated execution, where the system turns plans and data into decisions and action.

Improved forecasting

Conventional demand forecasting is a slow, manual process, whether it involves individual planners using rudimentary solutions such as spreadsheets or SAP-driven forecasts that are batched throughout the day. Planners are effectively already out of time when they begin the process; it's impossible to catch up with actual demand in a world of constantly changing variables.

Traditionally, CPG and retail companies create demand forecasts using historical data and relying on statistical forecasting, which always has a significant degree of error. The median forecast error across industries ranges from 24 to 37 percent, according to the Gartner Hierarchy of Metrics <u>benchmarking research</u>. And new products lack the historical data to effectively forecast, even with current statistical models.

Using autonomous processes, forecasts can be created for a multitude of products, incorporating a multitude of factors, in near real time. For example, Amazon.com uses ML to create daily forecasts for over half a billion products at a postcode level around the globe. "Pick a ZIP code, and Amazon can pretty much tell you what people wear, buy, and do in that ZIP code," former Amazon general manager Neil Ackerman <u>has said</u>.

Sophisticated ML and deep learning models can incorporate detailed internal and external data, such as point of sale information, publicly available competitive intelligence and pricing, weather conditions, social media, marketing campaigns, and much more. This, in turn, leads to better decisions that can be made in seconds instead of days or weeks—and can quickly evolve according to the latest data.

Investing in technology

Amazon and other leading companies have spent years investing in sophisticated forecasting technology. For example, <u>Amazon Forecast</u>, based on the same technology used by Amazon.com, relies on ML to automatically discover how historical data and other variables affect each other, such as product features (description, dimensions, color, packaging, volume, and more) and store locations, resulting in forecasts that are up to 50 percent more accurate.

Higher accuracy can unlock tremendous value. When forecasts are more accurate, organizations know what to expect and can work with variables such as better time-phased demand, safety stock, inventory targets, product mix, and allocation to reduce excess and obsolescence and improve on-time in-full (OTIF) metrics, increase sales and margins, reduce inventory, and use working capital more efficiently.

With the help of Amazon Forecast, More Retail Ltd. (MRL), India's fourthlargest grocery retailer, <u>increased its demand forecasting accuracy</u> from 24 to 76 percent. This helped the company waste 30 percent less fresh produce, increase its in-stock rate from 80 to 90 percent, and raise its gross profit by 25 percent.

ML can also increase the effectiveness of forecasts with advanced capabilities such as probability distribution. For example, a traditional forecast might simply predict demand at 50 units for each of the next four weeks, while an ML-driven forecast can more accurately state a 90 percent chance that demand will be at 50 items per week, or higher.

Benefitting from automation

A more accurate forecast also significantly improves customer and product segmentation and inventory strategies. This enables organizations to automate SKU rationalization efforts to both reduce supply chain complexity and optimize revenue and margins.

In the SKU rationalization process, products are monitored and prioritized by characteristics such as performance, strategic fit to larger goals, and more. Lower-performing SKUs can be culled to raise product margins and grow profits. Reducing the number of SKUs can also simplify demand forecasting overall. ML algorithms can analyze more data sources and provide deeper insights than human analysts, enabling SKU performance analysis and optimization at a much more granular level. While traditional retail and CPG companies may perform a profit and loss (P&L) review of products twice a year or so, using ML models allows a company to gather more data on products and discontinue them as needed, based on constantly updated information. This enables companies to determine more quickly whether products should be eliminated, allowing businesses to realize savings sooner.

Demand sensing

Companies can also use autonomous capabilities to integrate demand sensing into their demand planning process. Demand sensing captures short-term, highly changeable external and internal demand signals—such as weather conditions, social media, online customer searches, store, and sales data—even how much time people spend in a certain aisle in a store.

Demand sensing generates timely, actionable insights. As an example, a CPG company that sells ice cream products may already know that demand for its products rises during summer heat waves. Using demand sensing, however, one such company identified that if winter temperatures warm by two degrees Celsius, people buy 30 percent more ice cream than they did the day before. This is data that affects and improves forecasts and supply on a very short timeline.

CPG companies have traditionally tracked a few of these short-term demand signals, but now there are far more variables to consider, especially related to online communications and data. The pandemic shortages demonstrated that current systems don't allow companies to pick up on trends quickly enough. If companies had been better able to incorporate short-term demand signals such as social media content, they could have been better prepared for the avalanche of demand by tapping into the information that was influencing that demand—such as online rumors about paper factories shutting down. Of course, modern supply planning and execution systems need to be able to react to changes in demand effectively to take full advantage of sophisticated planning.

Demand shaping

Companies can also bring autonomous processes into demand shaping as part of demand planning. This means integrating data on how the company itself is creating demand with campaigns, promotions, and more. In an autonomous system, technology can help planners understand the effectiveness of their marketing activities and create even better promotions based on what the system has learned, resulting in better service to customers and increased sales.

For example, an autonomous system can tell a planner that promoting product A at price point X in region R, targeting a specific demographic, will result in a specific percentage uplift—a capability that Amazon regularly uses in planning promotions.

At Amazon, the automated forecast solution can consider a variety of inputs—such as price, region, product type, and metadata—to predict a promotion's impact. The planning team can then adjust the levers to directly impact promotion forecasts and performance.

Automated execution

Planning is a complex and hugely important process, but the real value of autonomous planning lies in decision-making and execution. Demand planning processes feed into the rest of the supply chain, including supply, inventory, order and product allocation, fulfillment, replenishment, manufacturing, and more. In an autonomous system, these functions are also automated in a natural extension of the planning process to continually meet service expectations. An autonomous system can factor in several demand variables for a particular product, including price, demographics, geography, and promotions, decide on the best forecast, and automatically translate that forecast into action, such as inventory level requirements.

However, this requires other connected systems to all be automated, not just demand planning. To truly achieve hands-off-the-wheel execution, companies also need to identify areas for automation within supply, inventory, supplier, product allocation, and more. Better planning is a key starting point that sets execution up for success.

Taking hands off the wheel

Autonomous planning is a long-term vision that takes years to fully achieve. While the goal is to take "hands off the wheel" and let the system make decisions, initially, people need to provide inputs. The more inputs they provide, the more the system learns, and the more accurate it becomes.

People are still central to autonomous supply chains, but their roles evolve. An autonomous system eliminates repetitive steps that add little value and lets technology do the heavy lifting. This frees people to perform more value-add work. In an autonomous system, for example, instead of feeding inputs, planners can become interpreters of outcomes and work with stakeholders to drive improvements.

For that reason, organizations working on implementing autonomous systems also need to consider culture. This means preparing people to understand the goals and process of the autonomous journey and their places within it.

Starting your autonomous journey

Every organization is unique in terms of culture, goals, current processes, and technology. Working with a partner that can provide autonomous planning expertise is invaluable in helping an organization take the right steps on the journey and scale in a controlled and effective way.

There are some fundamental steps that organizations can take, with the help of experts or on their own, to further their progress toward autonomous demand planning.

Identify desired business outcomes

To start, an organization should decide what it ultimately wants to achieve with autonomous planning. This begins by assessing your current planning system to identify its accuracy and effectiveness, determining a baseline, and understanding the improvements needed and how they will impact your business. The end goal should quantifiably improve business objectives, such as decreasing costs or increasing revenue.

Validate and import data sets

Here, you need to determine which data is needed to achieve your goals. This means identifying factors that affect sales, beginning with key historical data points and going on from there to other factors in priority and sophistication. ML tools can help identify which factors are more or less important to demand planning.

Then you must gather the data and prepare to import it into your models. Data is commonly stored in several different places and formats; historic data might be stored in an ERP system, for example, while price and promotion data might be stored across multiple spreadsheets.

Test and train your forecasting model

In this step, the goal is to increase the model's accuracy, always tying it to the desired business outcome. Determining your most important SKUs—which can be done with the help of ML—is an important step to take before you start working with your model. For example, if 80 percent of revenue is driven by 20 percent of your SKUs, you would want to see how your forecasting model performs against those SKUs. Creating an ML forecast with a subset of SKUs gives you a forecast that you can automate as you transition from your traditional forecast.

Deploy and generate automated forecasts

Advanced systems have the capability to use APIs to automate and integrate with ERPs or other in-house systems. These can augment or replace existing forecast outputs that feed into processes other than demand planning, such as inventory planning, transportation planning, or capacity management. Organizations may start automation adoption by using ML in parallel with legacy systems with the capability to override them, ultimately getting to the point where ML systems run on their own.

The time is now

Within CPG and retail supply chain demand management, the urgent need for change has been matched by new technological capabilities. This makes it an opportune time for organizations to delve into the autonomous journey in demand planning.

Organizations taking the journey continuously implement capabilities that get them closer to full planning potential—a moving target of ever-faster decisions based on a constantly growing set of better inputs. Ultimately, this leads toward a truly demanddriven CPG world in which organizations accurately and seamlessly anticipate and meet customer demand—and create vast new business opportunities. Take the next step.

Contact us to learn more about improving your organization's demand planning.

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