

How AI and Advanced Analytics Are Reshaping Supply Chain Planning



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Supply chains have never operated in a forgiving environment, but pandemic-era disruptions, geopolitical instability and rapidly shifting consumer demand have all exposed just how fragile legacy planning systems can be. Today, organizations that once relied on spreadsheets and gut instinct are finding that legacy tools simply can't keep up with the speed and complexity of modern supply chains.

Artificial intelligence and advanced analytics are emerging as the industry's answer to that problem, as practical instruments for smarter, faster and more resilient decision-making.

1 GenAI for Root Cause Analysis

Supply chains by their nature are complex, interconnected systems where the source of a disruption is rarely obvious at first glance. And while identifying root causes has traditionally demanded significant time and analytical effort from experienced planners, generative AI is beginning to change that calculus.

"Not only are you able to identify different connections and different possible impacts relative to the root cause," says Justin Siefert, chief marketing officer with John Galt Solutions. "You're able to use that technology to guide users through whatever that problem might be."

What might take a team of analysts days to unravel can be surfaced and contextualized far more efficiently through GenAI, freeing up planners to focus on response efforts rather than diagnosing the core issue.

2 Ensemble Forecasting in Demand Planning

Anyone who's ever watched a weather forecast knows that predicting tomorrow's conditions is far simpler than predicting conditions six months out. The same logic applies to demand planning, which is where ensemble forecasting comes in.

Essentially, ensemble forecasting is where multiple forecast models are run simultaneously, before they're blended into a single, more accurate prediction. By wrapping in a variety of models that account for a range of possibilities, you can benefit from all the various strengths of a range of models and minimize each of their flaws.

"Ensembling allows you to take advantage of different model strengths, and blend them together for a data-driven, 'best of all worlds' approach to forecasting," says Siefert. "It's really useful in the demand planning space, because there's so much volatility and uncertainty in future periods as we're trying to predict demand."

The result, Siefert says, is a forecast that tends to be more accurate in these further out periods compared to using one singular model.

3 Causal Modeling and Cluster Analytics

When planning a new product launch or forecasting demand for an existing line, many organizations default to surface-level comparisons, where they group items together by obvious shared attributes like color, size or category. But beneath those visible characteristics lie patterns that traditional methods routinely miss.

With causal modeling and cluster analytics, companies can expose any number of hidden relationships, transforming how planners think about product groupings and demand drivers. In practice, causal modeling identifies the underlying factors that actually drive demand for a product, while cluster analytics groups items together based on those shared behavioral patterns, rather than surface-level attributes like size or color.

"There are a lot of under-the-hood, unseen patterns and relationships that can be identified through causal modeling and clustering," says Siefert. "It sheds light on these connections and also allows you to think about planning for a given cluster rather than defaulting to the individual item level."

By assessing how a cluster of products behaves collectively, planners can step back from the labor-intensive process of reviewing items one at a time, and develop a clearer, more strategic view of the entire picture.

4 **Balancing Supply, Demand and Inventory Management**

As supply chain networks have grown in complexity, spanning multiple manufacturing sites, distribution centers and geographies, the limitations of node-by-node inventory optimization have become increasingly apparent. Multi-echelon inventory optimization, or MEIO, offers a different approach, by managing inventory levels across every tier of the supply chain — from raw materials to the end customer — as one connected system, rather than a series of isolated nodes.

“MEIO allows you to look at that holistic, end-to-end picture, and balance supply and demand, as opposed to looking at just one specific node and trying to optimize for that node” Siefert explains.

The practical value lies in visibility. Seeing how a decision at one node ripples through the entire network allows planners to make smarter trade-offs and avoid the kind of siloed optimization that can inadvertently create problems elsewhere in a supply chain.

5 **Capacity Optimization Through Advanced Analytics**

A demand signal is only useful if an organization has the capacity to act on it, and connecting the dots between what customers want and what operations can actually deliver has historically been

one of supply chain management’s most persistent disconnects.

With capacity optimization, a business can ensure that the right resources, space, equipment, labor and materials are available at the right time to meet demand. And by incorporating advanced algorithms supported by AI into the optimization process, planners can stress-test demand scenarios against real operational constraints before those constraints become real world problems.

“It gives the downstream teams a voice to go back upstream and say, ‘Hey, we see this signal, and based on our analysis, these are the three issues that we might run into if this demand materializes,’” Siefert says.

A Look at John Galt Solutions

At the center of John Galt Solutions’ current development efforts is what the company calls its composite AI framework, providing a unified architecture designed to bring together a full range of AI tools and techniques,

and make them accessible and interpretable for anyone.

For Siefert, technical capability is also only half the equation. The other half is ensuring that users actually

understand and trust what the AI is doing and how it came to its recommendations, representing a philosophy the company has branded around the concept of explainable, or “glass box,” AI.

Resource link: <https://johngalt.com/ai>