



A Big Rethink:

Reimagining and Reshaping Supply Chain Planning



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Ongoing disruption is forcing a rethink of conventional supply chain planning, from extrapolated supply and demand forecasting to probabilistic planning, to simulations based on real-time visibility from more current, granular market and contextual data. AI and machine learning are critical to the shift. So is trust.

No question about it: Supply chains have had a tough three years.

Pandemic, weather and port congestion fed wild swings in supply and demand, workforce dislocation and input shortages. Residual effects continue, compounded by geopolitical tensions, inflation and recession fears, rising costs from omnichannel, along with shifting direct-to-consumer (DTC) demand. Try planning for future growth and resilience amidst that level of chaos.

Digital freight optimization platforms have provided relief to supply chain executioners during the series of rolling crises, helping overburdened warehouse and transportation networks cope with DTC market pressures for ever more speed, reliability and service choice. Now, companies are looking for visibility and resiliency to connect across strategic, tactical and operational time horizons as well as span functional processes and geographies. As they move forward, many find themselves outgrowing their underlying legacy enterprise resource planning (ERP) software.

ERP's Nice, Long Run

ERP began in the early 1900s as a paper-based production scheduling system, later modified by Black & Decker in 1964 as a material requirements planning (MRP) solu-

tion requiring mainframe computers. A modular version of that system developed over the 1980s, integrating end-to-end production functions from purchasing to contract management under a single database, becoming ERP. Nearly every supply chain software advance since then, from warehouse and transportation management systems to robotic process automation, is an add-on.

The problem is ERP's original DNA: an "inside-out" focus on tracking and managing internal production and order management processes within an organization, typically a manufacturer. It was, of necessity, insular, execution-centric, paid more attention to upstream supply than downstream demand, and measured performance by completion of transactional steps in a production operation or order fulfillment.

Modern, resilient supply chains need a more decentralized, collaborative, "outside-in" planning model that can interpret and manage far higher volumes of end-to-end internal and external data in a continuous flow. It includes notifications of production downtime or material shortages across supplier tiers or congestion logistics vendors face downstream, as well as demand signals from channel data, and third-party contextual data that tracks everything from

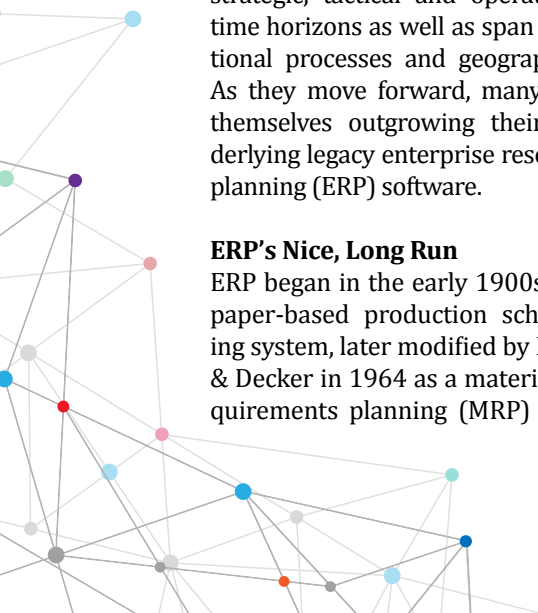
traffic and weather conditions to interest and exchange rates and regulatory updates.


Meanwhile, in the Real World

Most data generated by a supply chain today comes from external sources — suppliers, transportation and logistics vendors, customers and third-party market data providers. Relatively little of it is retrieved and used in a timely way. For example, most shipment data collected by sensors isn't retrieved until the sensor is returned to its owner; third-party point-of-sale data reports arrive on desks days after data is collected.

"It was simpler in the old days when you had a store, kept stock in back, and had a warehouse and predictable sales year-round," explains Matt Hoffman, vice president industry and product solutions with US-based supply chain planning software solutions provider John Galt Solutions. "Now demand is coming through more quickly, from many places, and that information doesn't always make it back to the person doing demand planning."

The same situation applies for upstream supplier data about production downtime and materials shortages, as these might affect delivery ETAs: It rarely happened or rarely mattered, so latency in reporting wasn't unusual.





“We’ve never had the levels of disruption that we have in the supply chain today,” argues Lora Cecere, founder of industry analysis and consulting firm Supply Chain Insights. “We have high-level variability in both the channel and the supply base. We have unique constraints in the supply base. We’ve never before had logistics or supply outages be constraints.”

Conventional planning models, meanwhile, are no longer up to the job: Orders lag data in the market by six to eight months and are no longer a good proxy for demand, Cecere says. There’s no common end-to-end supply chain management data model: The ERP model is functional while transportation, manufacturing and order management models are all different, limiting their effectiveness and adding latency to decision-making by relying on enterprise data rather than market data. ERPs were built on the functional siloes of order-to-cash and procure-to-pay processes while ERP planning solutions fail to orchestrate demand from market and consumer signals through distribution, purchasing and manufacturing.

Beyond the software, there’s process latency, with an average company taking three months to make decisions off data received. Transportation decision-making remains relentlessly price-driven, oblivious to strategic objectives and planning insights. Longer, more complex supply chains, meanwhile, constrain forecasting ability, and process optimization and collaboration benefits are limited without better integration of more current, granular market data.

“People are struggling with this high level of disruption,” Cecere

says. “They’ve got the wrong inventory and they can’t manage reliability of the first mile, and because of that they can’t manage reliability of order delivery.” To properly capture, interpret and act in near-real time on demand and supply

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signals the markets are sending, she insists, will require a redefinition of planning.

Visibility Is Just the Start

“Historically, the approach companies have taken is to focus on

forecast accuracy and a single-point forecast. However, this approach doesn’t enable supply chains to account for uncertainty, which is critical, especially in a highly unpredictable world,” says John Galt Solutions product strategy leader Alex Pradhan. “Today you need to think differently about how you plan for demand, what metrics to focus on. As the technology has advanced, we now have better tools and it’s becoming a conversation about process and technology to help companies make faster and better decisions.” Artificial intelligence and machine learning are central to that conversation.


Traditional inside-out supply chain planning typically involved applying current market, industry, and other trends to internal historic data, to forecast demand and set achievable pricing and other targets. With the level of supply-demand volatility since COVID-19, setting stationary targets is no longer possible. So now what?

An outside-in planning approach aims to first build a more robust, granular and dynamic model of the end-to-end working supply chain, drawing on the massive volume of data generated across functions and product lines within an organization with standardized reporting from supply and channel partners, and with third-party data filling contextual gaps. AI and machine learning are key enablers to support a wide range of areas from short-term visibility, process optimization and collaboration, to longer-term strategic and resilience planning.

A Shift in Thinking

The realities of today’s complex and unpredictable market require companies to redesign their supply





chain process to be outside-in and leverage different strategies and approaches to be more resilient. One of these approaches, referred to as probabilistic planning, de-emphasizes the focus on forecast accuracy in favor of accounting for the true impact of variability and how to better express a full range of opportunities and risks. Probabilistic planning is challenging the norm, and innovative companies are breaking tradition to set themselves apart. These companies are developing strategies that deliver greater understanding of how uncertainty might impact the supply chain and how best to build the right level of resiliency to establish a strong competitive differentiation in often crowded markets.

To manage through today's complexity and help mitigate uncertainty, what-if scenarios — leveraging a probabilistic planning approach, identify the likely outcome of a decision based on a vast array of more granular data from both internal and external sources. Now, an organization can conduct a top-down assessment of its supply chain, game out these various "what-if" risk scenarios, bring in selected supply and channel partners to participate, evaluate financial impact, and assign risk probability scores and priorities to each scenario. AI and machine learning monitor and analyze performance, making recommendations for adjustments as needed, again based on defined business rules and strategic goals.

"When we talk about moving beyond accuracy measurements, one of the key things we look at is how much risk does this forecast account for," Hoffman explains, versus chasing a single set of

forecasting numbers which can often be wrong by the time they're calculated. "The goal of a probabilistic plan is not to eliminate risk but to acknowledge and account

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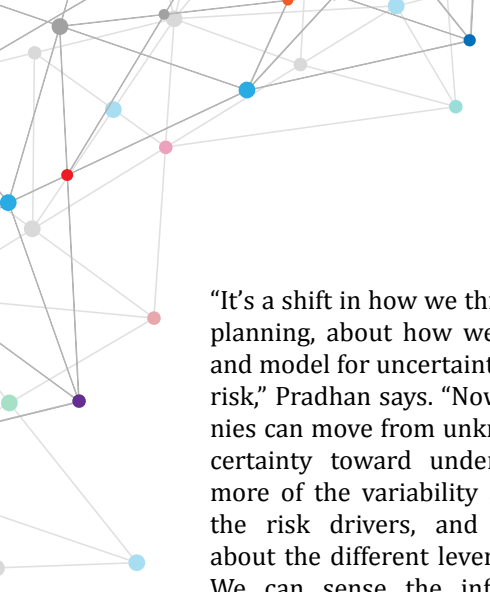
for those risks in putting together an end-to-end plan and approach."

To gain a comprehensive, end-to-end view and model the stochastic nature of the real-world supply chain to mitigate against

uncertainty, companies need to build their digital supply chain twin, a real-time, dynamic replica of the end-to-end supply chain that can sense risk early and correct for it. Companies must analyze and model hundreds of response options in real-time to find the optimal one. A state-of-the-art supply chain planning platform is key to create the digital twin and develop the simulations of how resilient the supply chain will be to variation and uncertainty. For example, the ability to understand the causal relationships among variables helps deliver insights into what drives the business.

"As you run through those processes you can see where you have risk," Hoffman says. "You can know that if lead time increases it may not matter, but if it goes up and I also see these other two factors, that's when I will see an impact." At the same time, machine learning has "learned" to analyze those causal factors and assess the likely demand, supply, and financial impacts. "Now, with a playbook available based on the various scenarios, you can quickly pivot to manage that risk."

On the planning side, the system assigns risk scores to items, customers, suppliers, and materials against traditional key performance indicators and various financial, operational and resilience criteria. It continuously incorporates and assesses new data points for their interrelated risks — and for potential risk bias as many overlapping variables are taken into account. The result is dynamic visibility into the current supply chain, alongside dynamic risk assessment extrapolating future risk through simulations of probable scenarios.



“It’s a shift in how we think about planning, about how we account and model for uncertainty and for risk,” Pradhan says. “Now companies can move from unknown uncertainty toward understanding more of the variability and even the risk drivers, and knowing about the different levers to pull. We can sense the information coming in from a demand perspective — macroeconomic, pricing, weather — or from a supply side to sense rising costs, longer lead times, and disruptions.”

The Path Forward

Key to any digitalization effort is connecting all data, decisions, and operations and enabling the community of internal and external users and partners to make better and faster supply chain decisions. Pradhan says, “We see companies accelerating their global supply chain transformation initiatives, bringing in a wide range of data signals and sources to deliver greater visibility and gain a better pulse on their operations to help automate their processes. They’re poised to use next-generation technology and implement these newer supply chain approaches to help them unlock the right supply chain strategy for their organization.”

“While these new approaches can seem daunting, there’s a path for getting there, a path to ensure that companies realize the full potential and business value to support their digitalization efforts,” Pradhan explains. “For example, as companies evolve their digital supply chain twin strategy there are technology elements to it; there’s the data and people needed to support it. It’s about leveling up companies quickly, and then as they’re ready and their processes mature, you

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Hoffman adds that analytics transparency is imperative to adoption and buy-in. “Rather than just giving, for example, a forecast and saying “The model or the platform said

this, clients are shown the result, here’s what it is, here’s what caused the demand drivers for those risks, here’s the relative importance of those drivers. That makes it easier for users, regardless of their role, to understand, gain knowledge and trust the system and work with it; otherwise, the system will sit there and people will just override or work outside it.”

While the world has fundamentally changed, we still rely on traditional supply chain management approaches and concepts that have proven to be inadequate to handle growing uncertainty and complexity, eroding service, performance and customer satisfaction with each new shock to the system. A window of opportunity has opened to rethink current processes and adopt a new way forward. It’s just a matter of taking that first step to reimagine and reshape how the supply chain can be the catalyst to transform your business.

