

The power of modern supply chain modeling

The larger and more complex a supply chain becomes, the greater it's potential to under-perform.

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Supply chains typically grow in increments to meet the needs of a growing business—whether it is delivering the next product line, expanding into a new territory or entering a new market segment. As a result, a company's global footprint is in large part shaped by many small decisions rather than the pursuit of one overarching ideal.

In addition, the demands on supply chains are dynamic and uncertain. Relentless changes in customer requirements and supplier capabilities,

unanticipated competitive pressures, ever-shifting business and seasonal cycles and global marketplace fluctuations such as currency exchange rates can rapidly erode supply chain performance if companies cannot anticipate and adapt.

Adaptation becomes even more challenging when the supply chain grows to the point that no one has a clear end-to-end view of operations. It may even become impossible to identify many of the most significant sources of under-performance, let alone address them. The result? Large supply chains often bleed millions of dollars of operating profit and tie up millions more in assets. However, supply chain modeling can help stanch this flow of losses.

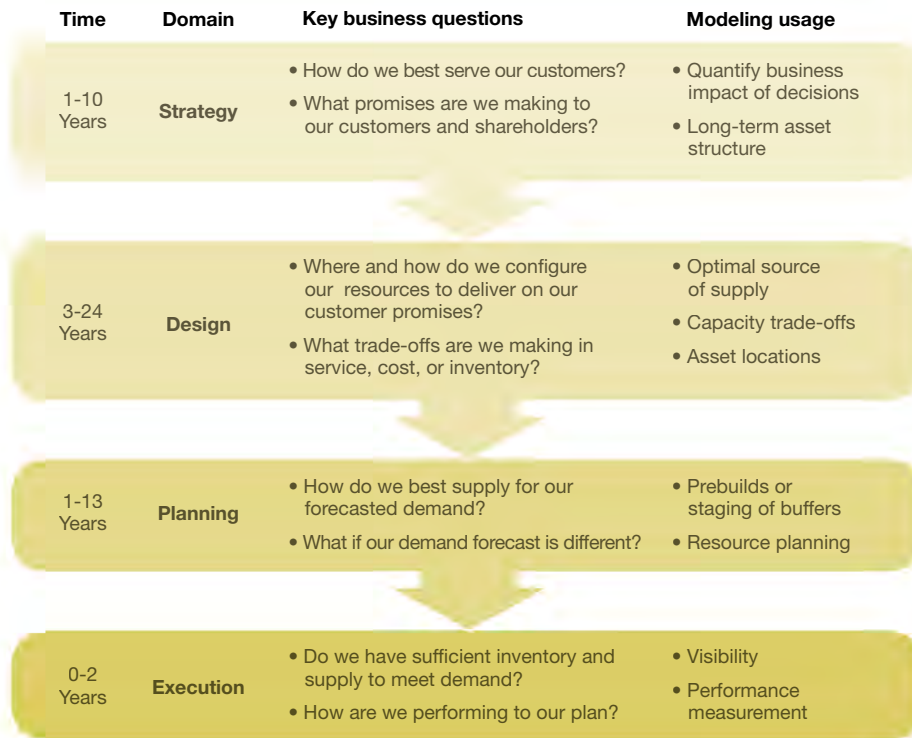
Modern supply chain modeling

The past decade has brought great leaps forward in data analytics, visualization and computing power, making modern supply chain modeling more powerful than many companies realize. In fact, it is possible to gain an end-to-end view of even the largest, most complex global supply chains. In addition, modeling can provide an extraordinary level of detail—for example, to the level of individual customers, network nodes, product configurations and even piece parts.

Sophisticated modeling integrates diverse inventory and network analyses that were traditionally conducted separately into a single enterprise-wide view of the supply chain—cutting horizontally across business units and functions and vertically from the deepest details to the highest level. Executives and managers who previously made crucial decisions based on fragmented data can now have a complete view of the supply chain as well as detailed views into the myriad forms of cause and effect.

FIGURE 1

Supply chain modeling application



Source: A.T. Kearney

Perhaps most important, supply chain modeling is now highly robust and dynamic, allowing companies to anticipate and rapidly adapt to a range of internal and external variables—such as changing customer requirements, business and seasonal cycles and marketplace shifts—and to test the agility and responsiveness of network designs before building or expanding their supply chains. Modeling is now a powerful tool for analyzing, evaluating, optimizing and simulating every aspect of the supply chain from honing daily operations through defining an ideal long-term footprint.

Applications and time horizons

Two of the main areas of supply chain modeling are network optimization and inventory optimization. Network optimization encompasses the manufacturing and distribution footprint, product flows and supplier selection. It can also identify improvements to enhance operating profits, cash flow, reliability and customer satisfaction.

State-of-the-art multilevel inventory optimization determines the optimal positioning of inventory within the supply chain network to meet customer delivery requirements reliably and efficiently while operating in an uncertain environment.

Advanced supply chain modeling is an effective way to simultaneously optimize inventory and networks over near-, mid- and long-term horizons.

In the near term, modeling can hone operations planning and execution in several ways. For example, it can:

- pinpoint waste and drive out supply chain costs;
- speed up supply chain operations;
- ensure that capacity levels are optimal for demand; and
- manage the global manufacturing and supply base dynamically to anticipate and adapt to continually shifting demands and conditions.

Modeling is also a powerful tool for supply chain strategy and design, allowing companies to accurately forecast their requirements under

various scenarios, build in flexibility to deal with the unexpected and accurately pre-test the performance of different footprints under various circumstances over longer periods of time (see Figure 1).

Common supply chain strategy and design outputs will:

- quantify and prioritize improvement opportunities;
- test the capability of demand ramp-up or ramp-down;
- evaluate scenarios to guide market growth opportunities;
- test how inventory will match demand;
- forecast product and transportation costs;
- determine the best locales to make and inventory products;
- identify the suppliers that can add the most value;

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- determine the ideal supply chain flow; and
- quantify the impact of delayed differentiation and product rationalization.

Gauging the business impact

An adaptive, optimized supply chain has substantial benefits: nimble and rapid response that delights customers, clear performance advantages over the competition, minimal waste or excess infrastructure and very competitive costs.

Because the supply chain is a significant factor for outcomes that are relevant to executives, performance should be quantified and monitored using tools such as balanced scorecards and analytics dashboards. Used correctly, these tools can aggregate real-time data on key performance indicators and make complex data more useful.

Crafting the model

Creating a model that delivers the rich variety of value described above is not easy. It demands sophisticated analytics and the technical expertise to design models that combine diverse data and algorithms, foundational expertise in optimizing supply chain performance, executive-level business acumen and the ability to collaborate with leaders and contributors across the supply chain. Sophisticated modeling is more than worth the

effort as it reveals not only how much more a supply chain might deliver, but also exactly what must be done to realize that potential.

Two tasks are important in the early stages of building a supply chain model:

Define the business need and model architecture. Define the business questions and structure needed to support modeling and ensure that the level aligns with the current view of customer segmentation while also being logical for the business. Consider top-level products, options, customer markets and regions and network nodes, such as facilities and suppliers. This architecture definition is essential for data collection.

Collect and validate information for modeling. Gather and validate modeling data such as order-to-delivery requirements by customer segment, historical and forecast demand statistics, quality metrics, target and demonstrated service levels and lead times and variability.

As soon as the model is designed, built, informed with data and run, it delivers valuable detailed pictures of the supply chain's actual performance, current optimized performance (the highest level the supply chain can deliver as it is now configured) and future optimized performance (what it could deliver with specific, identified improvements). Combined with modern visualization tools, these outcomes can provide powerful insights. All of these models are dynamic, accounting for an array of external and internal variables that impact performance.

Supercharging the supply chain

The insights provided by a powerful supply chain model can lead to unprecedented opportunities to rapidly and efficiently optimize performance—if the model is married to its execution. A winning strategy encompasses an array of elements, including securing inputs and requirements, structuring and leading action teams and assigning clear responsibilities. It is also vital to ensure that the right tools are available and to make trade-offs about improvement priorities. Measurement, visualization and reporting are essential, as is documenting value for senior leadership.

Guided by sophisticated modeling and flawless execution, supply chain improvement can supercharge service, costs and asset performance. Better performance in these areas is critical for all companies. ∞∞

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