

Operations Practice

Launching the journey to autonomous supply chain planning

For many companies, the COVID-19 pandemic has provided the impetus—and a uniquely apt moment—for transitioning toward autonomous planning.

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Over the past few months, people everywhere have been worrying about the supply chain. Items have been out of stock at stores for weeks; shortages in crucial categories such as packaged food, cleaning supplies, and, more critically, medical safety equipment have been all over the news. At the same time, with stores closed and most people staying home, demand for other types of products has fallen precipitously. How will companies handle continued uncertainty and fluctuations in consumer demand as cities, states, and countries start to reopen?

The COVID-19 crisis poses many new challenges to supply chain planning. In forecasting, for instance, the pandemic has rendered traditional techniques ineffective, since those techniques rely heavily on a company's historical sales data rather than on forward-looking external data. Some manufacturers, therefore, couldn't react fast enough when consumers shifted most of their spending away from brick-and-mortar stores toward e-commerce; others couldn't ramp up production to meet soaring demand from pantry-loading consumers. Yet some companies will be (and, indeed, have been) consistently able to meet demand in the near term—thanks in large part to their advanced supply chain capabilities.

For many companies, the COVID-19 crisis has provided not just the “burning platform” for transforming supply chain planning but also a set of circumstances conducive to such a transformation. For one, because of mandatory closures of factories and stores in various regions, manufacturers are dealing with fewer suppliers and customers in fewer geographic markets. Also, some manufacturers are temporarily reducing the number of SKUs they make, devoting their factories and warehouses to only the highest-demand products—thus allowing for greater visibility into the supply chain and targeted interventions. Furthermore, the crisis has forced marketing and sales teams and supply chain planners to collaborate more closely with each other, creating opportunities for end-to-end redesign of planning processes.

In the early days of the crisis, many companies rushed to assemble a supply chain control tower—a cross-functional team reviewing real-time data to make decisions quickly. Done right, the control-tower approach can be an effective one, whether in a crisis or not. It's also a potentially big step toward what we believe should be an aspiration for every consumer company: autonomous planning. The vision for autonomous planning is one in which big data and advanced analytics are used in every step of the supply chain planning process, enabling faster and better decision making with minimal manual intervention.

In this article, we describe the elements of a successful control tower to help companies make data-driven decisions during the COVID-19 crisis and in the immediate aftermath. We also discuss how companies can use a control tower as a springboard toward autonomous planning. The goal, ultimately, is for companies to be better prepared to provide the products that consumers want and need, at the best cost and in the most environmentally sustainable way—even in times of crisis.

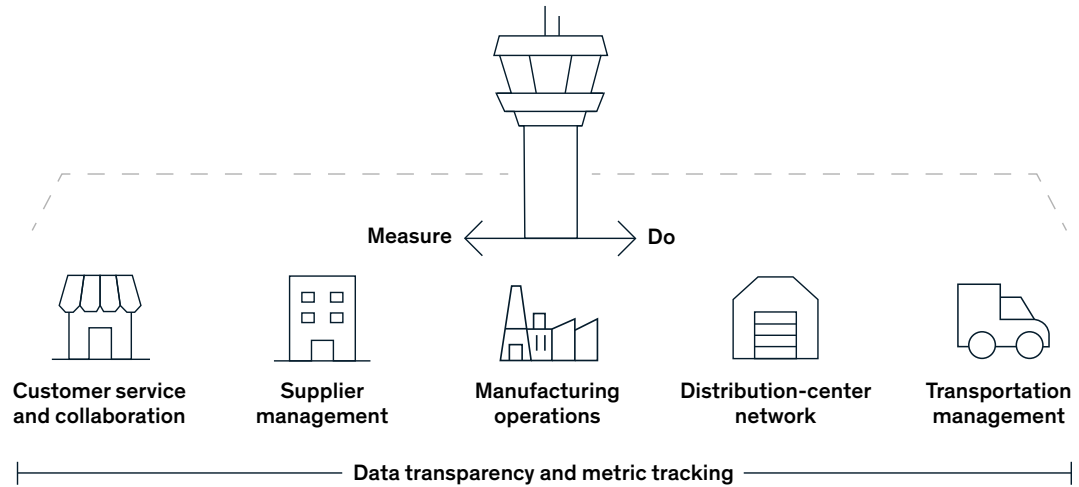
Do now: Strengthen the control tower

Some companies mistakenly believe that an effective control tower is simply a team doing round-the-clock work in a war-room setting during a crisis. In the best-run companies, however, a control tower is part of the normal way of doing business, not an ad hoc initiative hastily dusted off in crisis periods and then dismantled afterward. Successful control towers have the following elements in common:

- ***The authority to make critical decisions.*** The control tower can't fulfill its purpose if it's made up of junior planners and midlevel personnel tasked with generating reports for their higher-ups. Rather, the individual leading the control tower must be an executive who has the trust and respect of the CEO and COO; the rest of the team members should be high-performing supply chain planners, plus managers from customer

Exhibit 1

A control tower is cross-functional, has access to real-time data and metrics, and is empowered to make critical decisions fast.



service, supplier management, manufacturing operations, warehousing, and transportation (Exhibit 1). This cross-functional team must be empowered to make important business decisions quickly, with reasonable limits.

- **Data-enabled decision-making processes.** Gathering accurate data from internal and external sources—and integrating all the data into a “single source of truth”—is important but not sufficient. The data must then be delivered to decision makers in digestible, user-friendly formats. Control-tower team members won’t be able to make decisions in a timely manner if they first have to wade through and pressure-test hundreds of spreadsheets and documents that yield limited insights for their work. That said, a company shouldn’t wait to establish a control tower until it has the perfect data or the perfect tool. It can start with the available data sets and build on them over time.
- **Scenario-planning capabilities.** The most effective control towers are equipped with the

tools, talent, and processes to conduct scenario planning regularly and rapidly. In minutes or hours instead of days or weeks, they can develop a range of scenarios, model the implications and trade-offs (financial and otherwise) in each of the scenarios, and generate recommendations for action. Discussions and debates about the right path forward are data driven, instead of being dominated by the loudest and most insistent voices.

A control tower’s impact will be felt in every part of the supply chain. At a consumer-health company, for example, the control tower mobilized fast in the early days of the COVID-19 pandemic to distribute personal protective equipment to factory workers, track the evolving situation at its facilities around the world, reduce its SKU portfolio by 50 to 70 percent (depending on the brand), and develop an allocation process that it swiftly communicated to retailers. Even with unprecedented spikes in demand for its products, the company has been able to maintain a higher case-fill rate than its competitors.

Shape the next normal: Move toward autonomous planning






A control tower's accelerated planning cadence and rapid decision making can serve as the foundation for building more sophisticated autonomous-planning capabilities. Practically, autonomous planning enables ongoing, machine-supported decision making in every part of the planning value chain, with planners intervening only to manage exceptions (Exhibit 2). In other words, the machines do what they do best—crunching data and applying advanced analytics—thus freeing up planners' time for higher-value activities.

A case example: Autonomous planning in packaged food

About a year before the COVID-19 outbreak, a multinational packaged-food manufacturer sought to improve its supply chain planning processes. The company had historically adhered to a monthly planning cadence, but by the end of each month, supply conditions and demand profiles had changed, rendering monthly optimization a useless exercise. In addition, the company was routinely taking longer than three days to respond to demand-change requests, partly because of highly manual processes and a complex data ecosystem that made it difficult for planners to access and review data inputs. The company wanted to be able to react faster to changes in either supply or demand—and to do so in the most profitable way.

Exhibit 2

Autonomous planning differs from traditional supply chain planning in several ways.

					
Features of autonomous planning	Efficient	Powered by advanced analytics	Fast	Hardwired into business	Self-transforming
From	Many manual steps and interventions	ERP ¹ and standard software functionality; software potential largely unrealized	Monthly, weekly, and daily cadence (eg, for S&OP planning, S&OP execution, IBP ²); lots of data review and discussion of resolutions	Owned by supply chain/operations; not integrated with company-wide functions	One-and-done projects replacing one black box with another
To	Automation of inputs to demand and supply planning; streamlined order management; exceptions elevated	Advanced analytics with artificial intelligence and machine learning in forecasting; multiechelon, continuous supply-planning optimization	S&OP cadence replaced by short, tactical, cross-functional touchpoints relying on real-time information	KPIs ³ fully aligned across functions; planning fully integrated with all business processes	New talent (eg, data scientists) embedded in teams to pilot new use cases continually

¹Enterprise resource planning.

²S&OP = sales and operations; IBP = integrated business planning.

³Key performance indicators.

A control tower's accelerated planning cadence and rapid decision making can serve as the foundation for building more sophisticated autonomous-planning capabilities.

Company leaders assembled an agile, cross-functional team to lead the supply chain organization toward autonomous planning. In just four months (versus the typical timeline of six to eight months), the team developed a minimum viable product (MVP) that included a tool to integrate and cleanse data from more than 100 data tables. The effort was a success: the company speeded up its tactical-planning cadence from monthly to weekly and achieved a 24- to 48-hour response time to demand-change requests.

When COVID-19 hit, the autonomous-planning system detected unusual patterns in point-of-sale data and other demand signals (such as retail traffic, mobility data, and social-media “buzz” analytics) in certain markets. Using automated forecasting models powered by machine learning, the system could rapidly evaluate millions of data points to uncover the drivers of shifts in demand. The system then sent automatically triggered alerts to the company’s planners. It also generated a set of scenarios, as well as recommendations for maximizing both revenue and profit in each scenario. For example, in a scenario in which one of the company’s manufacturing plants runs out of certain materials or ingredients, should it shut down that production line entirely? Or should it manufacture a different product on that line instead—and, if so, which product? Planners then collaborated with the marketing and sales teams to agree on the best path forward.

As a result, when demand for the manufacturer’s products more than tripled in several categories and regions, it could react speedily. It was able

to optimize inventory levels by two to three days across categories, even at the peak of the crisis. The company is now even more committed to building its autonomous-planning capabilities further.

Getting started on autonomous planning

The packaged-food manufacturer in our case example is using a phased process to move toward autonomous planning. The following principles are helping ensure the transformation effort’s success:

- **Focus on use cases that drive the most value.** Instead of taking the traditional, protracted “waterfall” approach and launching every single module of the new tool—thereby overwhelming the supply chain function with too many new goals and targets—the company first zeroed in on specific pain points and desired outcomes, translating them into use cases and embedding machine learning into those use cases. For example, it identified supply issues (measured in service levels) as the biggest problem to solve, given the potential market opportunity. It piloted the MVP in a handful of manufacturing plants, using it to optimize production plans. Planners found that the new system enabled them to create better plans—and to do it five times faster than they did before.
- **Challenge the operating model.** The company didn’t just launch a tool and declare victory. Instead, it jettisoned its traditional planning cycles, redesigned its planning processes, and built employee capabilities (for example, in data engineering and advanced analytics) through intensive training. It reconfigured

planners' workspaces to facilitate closer collaboration, immediately transitioning to remote collaboration when planners started working from home. Agile methodologies, such as sprints and kanban boards, have become the norm in day-to-day operations for the 20-plus planners that form the core of the company's new autonomous-planning capabilities.

- **Use data as the backbone.** The company spent many hours unifying the data into a cloud-based ecosystem that can be frequently and automatically refreshed and that can potentially draw from dozens of data sources. Various stakeholders across functions collaboratively made decisions about the technology stack, focusing on the areas of highest importance. With a solid data infrastructure as the backbone of supply chain planning, the company can

seamlessly advance from the initial steps of autonomous supply planning to other areas, such as inventory optimization, material-requirements planning, and, eventually, production scheduling.

The COVID-19 pandemic has severely tested supply chains around the world, exposing weaknesses in companies' planning processes and operating models. Manufacturers must take the lessons of this crisis to heart and act quickly to address them. By embedding a control-tower approach into standard ways of working, then using it to jump-start a decisive transition to autonomous planning, companies can strengthen their businesses to thrive in the recovery and beyond.

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