Maverick* Research: ‘Demand-Driven’ Is Deadly to Your Supply Chain

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Initiatives: Supply Chain Planning

The way in which more than 99% of end users and vendors interpret “demand-driven” supply chains is dangerous, if not outright deadly, to a modern supply chain. The results of its application are rigid and fragile supply chains that are unfit for today's VUCA world.

Overview

Specific Maverick Caution:

This Maverick* research contradicts prevailing wisdom, namely that the demand-driven principle (as interpreted by the vast majority of users and vendors) is the optimal way to drive supply chains. Its use results in rigid and fragile supply chain plans that are unexecutable under uncertainty, leading to significant performance impairment. With recent disruptions, organizations are starting to demand resilience in their supply chains to be able to cope. However, this unchallenged demand-driven principle prevents them from clearly seeing what they must do in order to achieve this.

Maverick Findings:

■ Despite several decades of evolution, most of the world's supply chains are still demand-driven in a way that was first introduced in the 1960s. For most companies, this underlying principle has never been challenged and continues to be predominantly unchallenged today.

■ For the vast majority of supply chain practitioners, being demand-driven means driving the supply chain using a demand forecast. As a result, all upstream plans and decisions are based on this demand forecast.

■ This myopic focus on the forecast and its accuracy results in upstream supply chain plans that are rigid and fragile — that is, hard to change and easy to break. This accuracy thinking that is inherent in demand-driven supply chains is a key obstacle to the evolution of resilient (flexible and adaptable) supply chains that are much more suited for today's volatility, uncertainty, complexity and ambiguity (VUCA) world.

Maverick Recommendations:
Supply chain planning leaders should:

- Stop interpreting demand-driven as forecast-driven by changing the focus of your planning onto uncertainty rather than exclusively on the accuracy of your plans.
- Enable your supply chain to take full advantage of your uncertainty mitigation tactics by not constantly propagating your demand signal through the supply chain.
- Assess your supply chain decisions using uncertainty metrics rather than accuracy metrics, by deploying key performance indicators (KPIs) that describe the supply chain's capability to tolerate uncertainty and the “probability of execution” of the resultant supply chain plans.

**Strategic Planning Assumption**

By 2026, 90% of supply chains will still be demand-driven (aka forecast-accuracy-driven), significantly impairing their overall performance.

**Maverick Research**

*This is “Maverick” research, designed to spark new, unconventional insights. Maverick research is unconstrained by our typical broad consensus-formation process to deliver breakthrough, innovative and disruptive ideas from our research incubator. We are publishing a collection of several Maverick research lines this year, all designed for maximum value and impact. We’ll explore each of these lines of research to help you be ahead of the mainstream and take advantage of trends and insights that could impact your IT strategy and your organization (see Note 1).*

**Analysis**

**The Problem? It All Started With MRP**

Since the invention of material requirements planning (MRP) in the early 1960s, the fundamental approach to planning a supply chain has not fundamentally changed. It all started with the assumption that a supply chain can be planned using a forecast of future demand as the input to the rest of the planning, such as inventory and production — in other words, being forecast-driven. The thinking was, if you know what the demand for your products is going to be, then you can calculate how much you need to have in inventory, to produce in manufacturing and to buy from suppliers to satisfy future sales. This approach involves taking the product demand forecast and calculating from this, back upstream in the supply chain, the inventory, replenishment, production and procurement plans. This is done for all time horizons — short term, midterm and long term. Although this is seen as a best practice, is it? MRP was invented at a time when supply chains were nowhere near as complex, global, interconnected and uncertain as they are today.

Supply chain organizations need to break free from this old paradigm. This research aims to debunk this popular interpretation of the demand-driven approach by highlighting its pitfalls and negative
consequences to help drive the necessary changes required for the modern supply chain to become more resilient to uncertainty.

The Result of MRP? A Single-Minded Obsession With Forecast Accuracy

The legacy of MRP is an obsession with the accuracy of the demand forecast. As this forecast is used to drive the supply chain, it follows the logic that the better the demand forecast is (that is, the more accurate it is), the better the upstream supply chain plans will be because they will also be accurate. This form of demand-driven theory says that the result will be higher performance for the supply chain (and the business) as the right products will be in the right place, at the right time, to maximize customer service and profitability, and to minimize costs.

This thought process is still at the heart of supply chain management (SCM) today, and it remains unchallenged in most supply chains. However, its impact on these supply chains is deadly — especially so, in today’s uncertain and volatile world. It is deadly because it perpetuates a fixation with synchronizing the whole supply chain to the demand forecast. This, in turn, perpetuates a fixation with trying to get this demand forecast accurate because the rest of the supply chain depends on it. This results in rigid and fragile supply chain plans that take little to no account of uncertainty, resulting in plans that are unexecutable and hence fail to deliver expected performance. Companies need to remove this demand-driven straitjacket so that they can assimilate different ways to design, optimize and plan their supply chains to become “uncertainty-driven” to better survive and prosper in highly volatile global markets.

Forecast Accuracy — Why Is It Still Seen as a Top Obstacle to Achieving Supply Chain Goals?

Every year, for the last 10-plus years, Gartner has been surveying supply chain professionals annually as part of its Supply Chain Technology User Wants and Needs Survey. ¹ A question that is always asked relates to what professionals feel are the top obstacles that are preventing their supply chain from achieving its goals and objectives. Table 1 shows how the obstacle of “forecast accuracy” ranks among the dozen or so other obstacles that supply chain professionals identify as preventing their supply chain from achieving its goals and objectives. For the last decade, forecast accuracy has been at, or very near the top, of the key obstacles affecting supply chain performance in the minds of supply chain professionals. In 2019, it was knocked off the top spot by cost optimization and lack of talent — neither of which altered the perceived wisdom of demand-driven. In 2020, it dropped a further place as “lack of visibility” came in at No. 3 as a direct result of the COVID-19 pandemic and the impact it was having on global supply chains. Allied with this need for improved supply chain visibility, an overriding drive to improve the accuracy of the demand forecast still remains. So again, the perceived wisdom of demand-driven is not being challenged as a fundamental principle of SCM.
### Table 1: Rank of Forecast Accuracy in Top Internal Obstacles to Achieving Supply Chain Goals

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Source: Gartner (April 2021)

Unfortunately, the unintended consequence of this demand-driven mindset has been the resulting myopic focus on trying to perfect the forecast (unsuccessfully as it turns out, as all forecasts are inaccurate) so that the decisions based off of this “perfect” forecast are also perfect. Especially over the last 20 years, as companies strived to integrate end-to-end planning, all under the demand-driven guise, this inaccurate demand forecast is connected to the rest of the supply chain for all subsequent decisions about inventory, production, sourcing and capacity. But these subsequent decisions assume that the forecast is “accurate,” resulting in a predominantly deterministic mindset. The trap is then set for assuming that the supply plans created will be “perfect” and can be executed in the real world.

The supply chain assumes that, once executed, these perfect plans will result in “perfect” supply chain performance (such as, the achievement of the target business goals in terms of profitability, costs and customer service). This is absolutely not the case. As every supply chain professional knows all too well there is no such thing as an accurate demand forecast — these forecasts are always wrong. They also know that the plans created using this forecast are also almost always wrong. These plans rarely deliver...
the expected results, as witnessed by the amount of replanning, firefighting and expediting that is undertaken as execution deviates from the plan.

After decades of chasing the panacea of becoming demand-driven, today’s supply chains are woefully ill-prepared for the rising tide of uncertainty and supply chain disruptions.

The Unintended Consequences of Being Demand-Driven

All supply chain professionals are taught the principles of demand-driven, through experience and/or education. It becomes a learned behavior similar to muscle memory or a subconscious reaction. This is how it remained unchallenged for so long.

Unfortunately, there's more bad news as further, highly relevant, but negative consequences arise from this demand-driven, "accurate" forecast mindset, such as:

- The resulting upstream supply plans are created under a deterministic regime — no need to take serious account of demand variability (or any other form of variability for that matter) because the forecast is going to be “accurate.” Some people might argue that demand variability is taken into account, to some degree, with safety stocks. However, these safety stocks (and the other types of buffers used, such as safety time and spare capacity) are never actually used to their full potential or at all in many cases because of the reasons mentioned in the next bullet point. Instead, the supply plans are just recast each time the actual demand is not in line with the demand forecast — which is most of the time for most supply chains today.

- The assumed accurate forecast is always propagated back up the supply chain to recalculate the supply plans to keep them in line with the assumed accurate forecast — this occurs every time the supply chain plan is recalculated. As the forecast is never accurate and actual demand always deviates from it, the supply plans are changed every time the forecast is recast, prorated and/or consumed. Hence, the supply plans are always changed to try to accommodate the inaccurate demand forecast. Even with time fences being used, the demand-driven logic tries to adjust the plans inside the time fences, resulting in large quantities of exception alerts.

Today, this aspiration of trying to achieve demand perfection is still very much alive and well, and is typically referred to as being demand-driven (driving your supply chain from an accurate demand prediction so that your supply decisions are aligned with your future customer requirements). Becoming more demand-driven is also often at the heart of customer centricity or strategic supply chain transformations, even in this age of the digital supply chain. With the rise of digital supply chain initiatives, the underlying demand-driven interpretation is still not being challenged.

Demand-driven has been at the heart of supply chain research and a perceived best practice for the last 20 years or so. Over this time period, experts have preached about improving demand forecast accuracy through the application of people, processes and technologies. For many years, a best practice top-level KPI to assess supply chain performance has been forecast accuracy. Gartner reflects how leading
companies approach this in many research notes. (See Align Supply Chain Performance to Customer Outcomes Using This Framework, Extend Your Supply Chain Service Metrics to Cover the Full Customer Experience and The Hierarchy of Supply Chain Metrics: Diagnosing Your Supply Chain Health.)

Perceived wisdom and best practice is that key metrics, and relationships between metrics, are used to run a supply chain. This best practice recommends that organizations (see The Hierarchy of Supply Chain Metrics: Diagnosing Your Supply Chain Health):

- Use a hierarchy of supply chain metrics to help focus on the metrics that matter and look at the interdependencies among the metrics to manage end-to-end supply chain trade-offs.
- Embed the use of these metrics in the right supply chain processes (for example, sales and operations planning [S&OP]) in which end-to-end trade-off decisions are made.
- Determine the right corrective actions using people, process and technology enablers, as well as deeper functional metric hierarchies.

At the highest level of the hierarchy, the following three key metrics are recommended for overall supply chain health:

- Demand Forecast Accuracy (DFA)
- Perfect Order Fulfillment
- SCM Total Cost

Forecast accuracy is seen as a top-tier metric for driving the supply chain across the profession. The heart and soul of demand-driven is to focus on the demand forecast and improve its accuracy, and then connect that to all the other supply chain metrics.

**Demand-Driven Supply Chains Create Unexecutable Plans**

With the advent of emerging technologies, such as artificial intelligence (AI) and machine learning (ML), one might have expected things to change. After all, applying ML to internal and external data is a great way to convert unknown uncertainty into known variability, and provide a way for that increased understanding of uncertainty and variability to help the supply chain become more agile and responsive. However, this is not the case. Despite the raft of ML-driven supply chain technologies hitting the market in recent years, more than 99% of end users and vendors are still focused on using more data to try to improve the forecast accuracy. These new digital technologies are still, almost exclusively, being used to try to improve the accuracy of the demand forecast so that the resulting supply-side plans can be accurate as well. Even the advent of new cloud-based supply chain planning solutions promulgates the old demand-driven philosophy by tightly connecting the demand forecast to the supply-side plans (that are still deterministic). The old paradigm is still alive and well, even with new technology.
The problem, as every supply chain planning professional will attest to, is that these forecast-driven plans are just not accurate. They are not even reasonably accurate. A recent survey by a vendor of a leading demand-sensing application shows that even with well-tuned ML algorithms and multiple datasets, average weekly item-location-level forecast accuracy levels of 69% are achievable. For traditional statistical-based forecasting, average accuracy drops to 52%. Because the forecasts are not accurate (and the subsequent supply plans assume they are) the resulting demand and supply plans are not actually executable in the real world. Because the plans assume high predictability and the real world is not predictable, the supply chain execution functions (such as customer service, logistics and manufacturing) cannot follow these plans. The level of variability and uncertainty is now such that the execution functions stand little to no chance of executing these plans. Consequently, execution has to deviate from the original “perfect” plan as customer orders arrive out of line with the demand forecast and supplies arrive out of line with the supply plans. These necessary deviations from the plan, if they are addressed, are handled by exception and firefighting. Additionally, as the supply chain is no longer following the original plan, the attainment of the corporate KPIs (such as customer service, inventory turns and profitability), inherently built into the original plan, will not be achieved. So, despite the fact that the supply chain is demand-driven, with upstream plans derived from downstream demand forecasts (at various levels of aggregation) in an integrated end-to-end plan, the supply chain will still underperform and value will still be lost. Many years ago, when supply chains were much more in a “steady state” than they are now, a reliance on an accurate forecast would, perhaps, cause less problems. However, that is definitely not the case in today’s environment.

Despite several decades of demand-driven philosophy, and the wide array of new technologies and new analytics, many supply chains suffer from lower-than-expected customer service and higher-than-expected costs (for example, expediting costs, overtime, loss of productivity, obsolete inventory and excessive inventory levels). Consider how many companies struggle to mature their S&OP process because they have to spend so much time trying to figure out why they missed last month’s plan and their KPIs.

**Being Demand-Driven Is a Roadblock to Supply Chain Resiliency**

Unfortunately, this focus on being demand-driven (overwhelmingly interpreted as being forecast-driven) drives particularly unhelpful behaviors and outcomes, such as:

- The interpretation of demand-driven as the need to constantly connect the forecast to the rest of the supply chain plans so that the plan becomes demand-driven.

- The resulting mindset that supply chain planning is all about accuracy — get the plan accurate and everything else will fall into place. Again, this is impossible because the forecast is always wrong and, as such, all subsequent plans are wrong as they are based on this forecast in a demand-driven world.

- This drives the assumed beneficial tactic of supply chain synchronization — if the forecast changes, then immediately change all the plans calculated from that forecast. As the forecast is always wrong, this inaccuracy gets constantly reflected back up the supply chain, resulting in excessive nervousness and constant change.
This drives an overemphasis on trying to perfect the forecast so that everything upstream falls into place. This is impossible; even with AI and/or ML, the forecast is always wrong.

Becoming demand-driven drives companies (and technology providers) to reiterate the need for forecast accuracy (and planning accuracy in general), even when applying new technologies such as AI and ML.

As a result of this “accurate forecast” fixation, the resulting upstream plans are overwhelmingly deterministic in nature. They take little to no account of uncertainty because they “don't need to.” Never, in the S&OP process for example, does anyone present a plan to the executives that includes a measure of how likely it is that the supply chain will be able to execute this particular plan. Given that the plan being proposed, if enacted, should deliver the relevant corporate goals as agreed in S&OP, then it is highly likely, as the plan is unexecutable, that these goals will be missed.

Again, due to the fixation on accurate plans, no consideration is typically taken of the fact that the real-world supply chain is stochastic in nature and that supply chain planning needs to be uncertainty-driven (or “chaos-tolerant”) rather than demand-driven (aka forecast-driven or accuracy-driven). It is therefore hard (if not impossible) for companies to see the need to apply any form of probabilistic planning. Probabilistic planning (where the probability for different outcomes is calculated), would allow companies to set up their plans to be resilient to uncertainty so that the plans are more likely to be achievable and, thereby, deliver on the goals (see Hype Cycle for Supply Chain Planning Technologies, 2020). For a comparison of traditional demand-driven planning to resilient (which incorporates probabilistic planning), see Innovation Insight for Resilient Planning.

In the way that demand-driven is perceived and implemented, it assumes that, through process and technology maturity, a company can achieve high forecast accuracy and that the subsequent supply plans can be executed. It assumes that this is the path to higher supply chain performance and business value. However, the results are very different. With no true consideration of the uncertainty of the real world being taken into account, then the resultant plans are rigid and fragile. With the underlying paradigm of accuracy, with little to no account taken of variability, the supply chain plans are rigid. They are unable to flex to accommodate the uncertainty because they assume that the real world is deterministic in nature and can be accurately predicted. This results in the plans being easily broken (fragile) and needing to be created again, and again and again. In the creation of a new set of plans, execution gets another, different set of instructions to try to follow. This descends into a vicious circle of replanning and nervousness, with consequential business value loss for the company.

The above behaviors are why being demand-driven is deadly to the supply chain. It is deadly because it is based on a fallacy that effectively gets propagated throughout the supply chain (and the wider enterprise), and undermines corporate performance and stability. At the beginning of SCM, it didn’t matter as much. Back then, the supply chain could operate in more of a steady state. The world was less volatile, and supply chains were less complex and more local. Now with highly uncertain operating environments, and complex and global setups, supply chains are anything but steady state. They need to be managed in a way that recognizes and mitigates uncertainty — and this is not demand-driven.
Supply chains need to be resilient, but being demand-driven obscures what’s needed to make this happen.

**Actions Required to Drive Supply Chain Resiliency**

A key symptom of not having a resilient supply chain is having to repeatedly adjust the plans and decisions as the originals were not able to cope with real-world execution. Unfortunately, most companies, still working with a demand-driven mindset, approach this problem by:

- Doubling down on their forecast accuracy efforts with demand-sensing and other ML initiatives.
- Starting to run a few scenarios to try to compensate for demand uncertainty — often called range forecasting (such as, best case, likely case and worst case).
- Cycling through their S&OP processes weekly, rather than monthly, to try to pick up on demand uncertainty quicker.
- Deploying a sales and operations execution (S&OE) process that tries to force-fit execution to the S&OP plan.
- Trying to apply concepts, such as continuous planning, where upstream plans are changed every time downstream demand changes, via the constant propagation of the demand signal through the supply chain.
- Developing control towers that visualize and monitor supply chain execution to try to pick up when the original plans are wrong when they should be addressing the planning issues.

However, these initiatives are still seeded by the demand-driven paradigm, which at its heart has the tenent of forecast accuracy and forecast propagation feeding the desire for accurate plans. Supply chains need to find an approach that focuses on resilience rather than accuracy. They need to:

- Stop being demand-driven and switch to being uncertainty-driven. This will help to prioritize the need to fully recognize and quantify supply chain uncertainty and variability, and think about how to use this knowledge to improve planning and decision making.
- Recognize the diminishing returns of chasing forecast accuracy. It is only relevant in the very short-term horizon, when the rubber hits the road. In all other layers of planning, accuracy is an illusion.
- Move from deterministic planning to probabilistic planning to cope with the lack of planning accuracy. Probabilistic planning supports the notion of ranges through probability distributions so that plans can be tested for their robustness to uncertainty.
- Stop constantly propagating upstream through the supply chain. This propagation is an artifact of demand-driven. This propagation prevents most of the uncertainty mitigation tactics from being used effectively to buffer uncertainty by constantly recasting the plan, rather than absorbing variability within the plan.
Without these changes, supply chains will be stuck in the demand-driven world with often deadly consequences, unprepared to face the VUCA world we now live in.

**Evidence**

1. **2020 Gartner Supply Chain Technology User Wants and Needs Survey, 2020.** Results presented are based on this survey that was conducted from 2 November through 17 December to explore the roles that digital and technology play in supply chain, how supply chain organizations leverage digital and technology for competitive advantage, how supply chain organizations are organizing to support their digital initiatives, and their changing views on how best to exploit emerging technology in their SCM organizations.

A sample of 520 supply chain professionals, with their primary workplace located in North America (including the U.S., Canada and Mexico), Western Europe (including the U.K., Germany and France) and APAC (including Australia, New Zealand, China, Singapore and India), completed a web-based survey.

Qualifying organizations operate in the manufacturing, retail, wholesale trade, transportation and logistics, healthcare providers, and natural resources industries, and report enterprise-wide annual revenue for fiscal year 2019 of at least US$100 million or equivalent.

Qualified participants have a role tied to a supply chain function and are in manager or above roles. Supply chain professionals are involved in their company’s investment decisions regarding SCM processes, strategies and supporting technology in a decision-making capacity, as advisor to the decision makers or member of the decision-making group.

The survey was developed collaboratively by a team of Gartner analysts and was reviewed, tested and administered by Gartner’s Research Data and Analytics (RDA) team.

2. **The 2019 E2open Forecasting and Inventory Benchmark Study, E2open.**

**Note 1 Roots of the Word “Maverick”**
Derived from the name of Texas rancher Samuel Maverick and his steadfast refusal to brand his cattle, "maverick" connotes someone who willfully takes an independent — and frequently disruptive or unorthodox — stand against prevailing modes of thought and action.

**Recommended by the Author**

*Mastering Uncertainty: The Rise of Resilient Supply Chain Planning*

*Innovation Insight for Resilient Planning*

*Innovation Insight for Digital Supply Chain Twin*

*Hype Cycle for Supply Chain Planning Technologies, 2020*

*Align Supply Chain Performance to Customer Outcomes Using This Framework*

*Extend Your Supply Chain Service Metrics to Cover the Full Customer Experience*

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