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# INVEST IN COLLABORATIVE PLANNING TO MITIGATE VARIABILITY

Unleash the Power of Modeling and Predictive Analytics to Drive Business Results

February 2023



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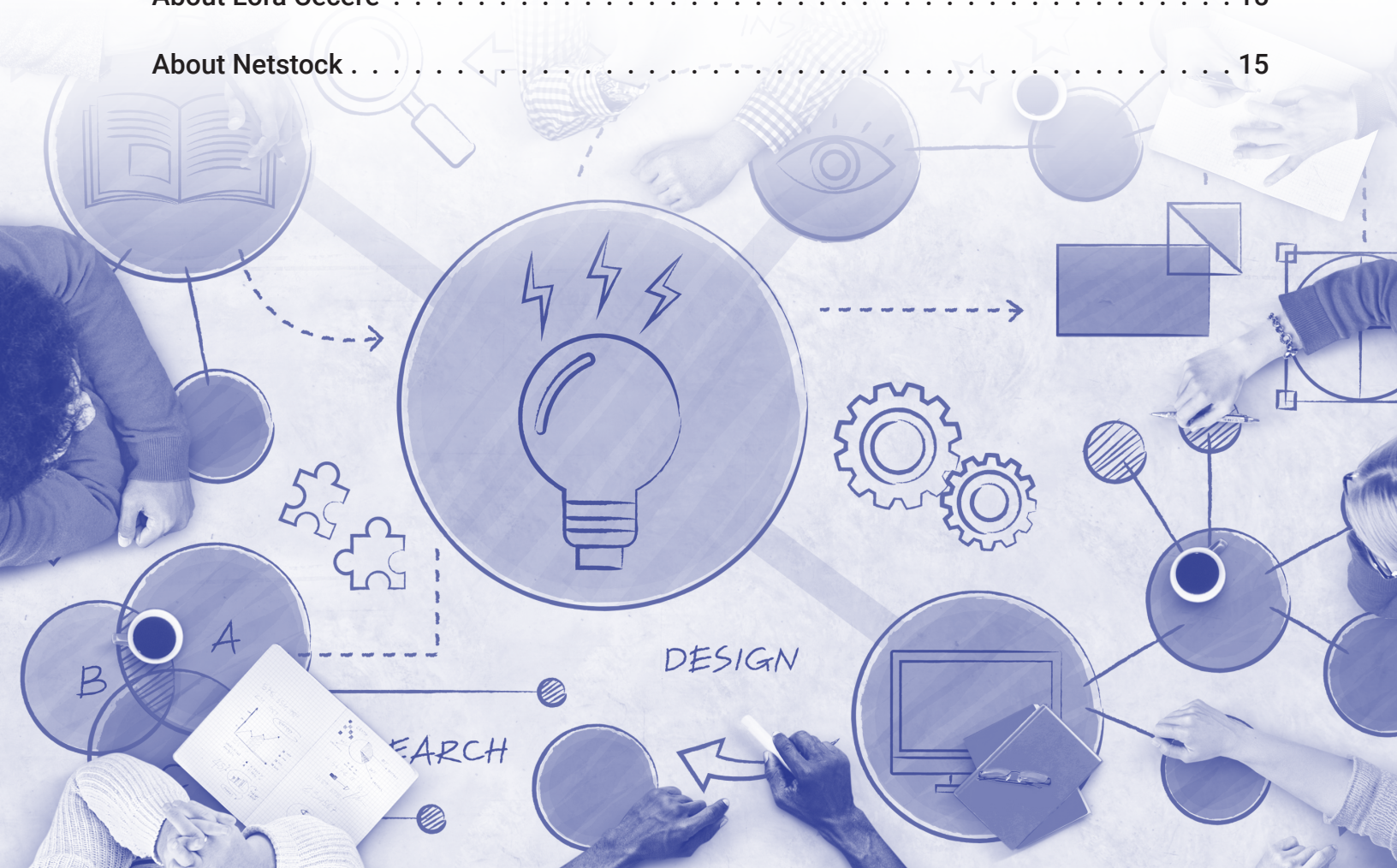
### **Disclosure**

The supporting independent research for the report was sourced from the files of Supply Chain Insights.



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# Executive Summary

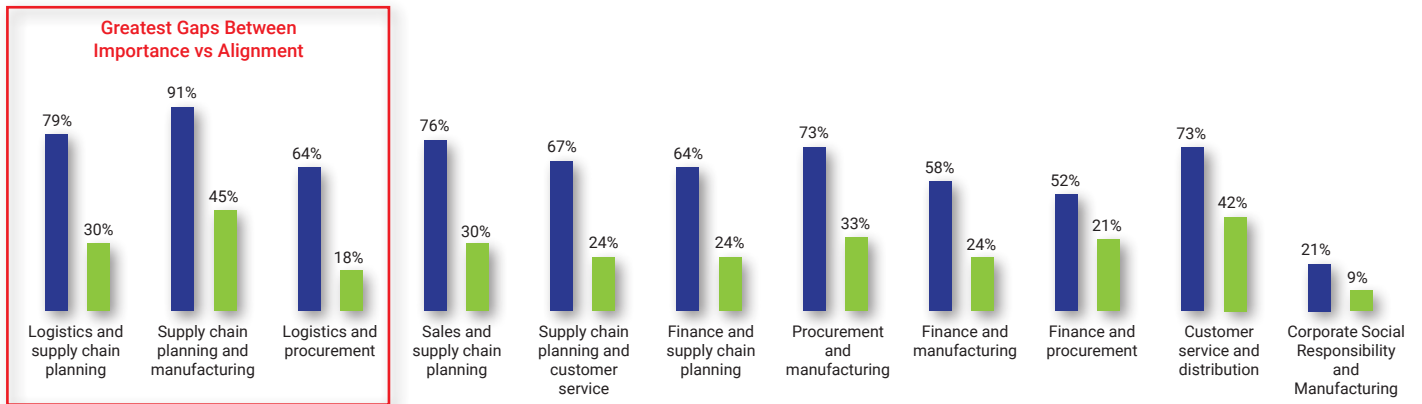
While many believe collaboration between functional teams to develop a shared plan should be easy, it is not. Within organizations, teams have different roles, incentives, and views on supply chain excellence. As a result, as shown in **Figure 1**, organizations need to be aligned. When planning is defined based on legacy thinking, supply chain planning is not a team activity reducing effectiveness.

The larger the organization, the bigger the issue. Over the past decade, the gaps increased three-fold between manufacturing

and finance and manufacturing and procurement. As a result, doing more of the same is not the answer.

Planning can improve organizational alignment. Here we share insights on building a collaborative planning process to enhance balance sheet performance and drive resiliency in the face of unprecedented variability. Unleashing this opportunity requires rethinking the planning process to use predictive analytics, flexible modeling (pivot forecasting), and a digital twin. We define these concepts in this report. 🌟

**Figure 1. Current Organizational Alignment**



Source: Supply Chain Insights LLC, Analytics Digital Transformation Study

Q9. In your opinion, how important is it for each of the following pairs of teams to be aligned within your supply chain?

Q10. How aligned do you believe that these same pairs of teams actually are with your company?





# Building a Collaborative Planning Environment

Visualizing supply chain issues through collaborative planning helps organizations improve alignment and drive reliability in business results.

**How to take this step?** This transition requires a mind shift.

Teams must shift from viewing planning as tight integration into back-office systems to building a cross-functional exercise to understand planning possibilities. Today, only 32% of organizations have what-if capabilities, and less than 5% have digital twin capabilities to enable collaborative and predictive modeling across roles and organizations.

**Why is collaborative planning important?**

Just like pilots practice in simulators for an emergency to act quickly to prevent an accident—even though the actual event may be very different than the one practiced in the simulator—collaborative planning helps teams to work better together. Using what-if optimization and modeling, cross-functional teams can better understand the constraints, limitations, and opportunities in the supply chain with a cross-functional view. Investing in predictive analytics helps teams to see the possibilities. The great General Dwight Eisenhower expressed this sentiment in the quote below:

*“In preparing for battle, I have always found that plans are useless, but planning is indispensable.” Dwight Eisenhower*

The supply chain is a complex, non-linear system undergoing constant change based on market dynamics. Managing the complexity and making the right trade-offs at the speed of business is an ongoing challenge. This capability is impossible through spreadsheet modeling or conventional Enterprise Resource Planning (ERP) systems.

Collaborative planning requires rethinking work within the supply chain organization. The trade-offs between organizational functions are only apparent with deeper visualization and modeling. The goal is to avoid attempting to get precise on

imprecise data. Instead, the focus is to align on options and agree on trade-offs based on what-if analysis and collaborative modeling. Only 5% of manufacturing organizations can analyze the trade-offs of shifts in product mix, consumption, seasonality, or demand-shaping effectiveness in demand planning. Mature manufacturers deploy digital twin environments to help accelerate this transition.

**Definition of Demand Shaping:**

Market potential is the impact of marketing and sales programs to improve baseline demand. Demand-shaping programs include advertising, new product launch, changes in channel relationships, price changes, promotions, or partnerships. In effective demand-shaping programs, the market potential of a product increases in the channel. When demand-shaping does not increase market potential,

shipments shift from period to period, increasing costs, but not elevating baseline demand. In collaborative planning, teams can visualize these impacts and trade-offs.

In collaborative planning, the goal is to drive organizational learning to understand the trade-offs and assumptions in building the plan. In the process, cross-functional teams better understand opportunities, risks, constraints, and the need for buffers. The tight coupling of ERP to planning as a control system reduces organizational learning and exposes the organization to unmitigated risk while reducing resiliency. ❁

## COLLABORATIVE PLANNING:

A process for teams to analyze the impact of plans together in an in-memory model operating in parallel to the operating system or system of record. Effective collaborative planning requires visualization, what-if analysis, and role-based views.

## DIGITAL TWIN:

An in-memory model to enable collaborative planning between functional teams. The in-memory model operates in parallel to the IT operating environment enabling what-if analysis without the risk of impacting the operating systems.



# What Is Supply Chain Excellence?

Supply chain excellence is easier to say than define, but a clear vision is mandatory to align teams. Functional metrics focused on cost put teams at odds, making it more challenging to accomplish organizational goals.

Through collaborative planning, teams can see that an efficient supply chain—focused on the lowest cost—is not the most effective to deliver customer service reliability. There are three primary supply chain types: **efficient**, **responsive**, and **agile**. Each requires a different planning strategy. Identifying the supply chain type is the starting point for implementing collaborative planning. ❁

## DEFINITIONS

**Supply Chain Efficiency:** The lowest cost of operations with maximum output. This supply chain is usually a high-volume supply chain with slight variation.

**Responsive Supply Chain:** This type of supply chain requires the shortest cycle time and quickest response to changing market requirements.

**Agile Supply Chain:** The supply chain design drives cost, quality, and customer service predictability in the face of extreme demand and supply variability.





# The Role of the Forecast

In order to successfully implement collaborative planning programs that drive supply chain excellence, companies must be clear on the role of the forecast and the inventory plan. Let's start by defining the forecast. A forecast is a time-phased view, or projection, of future demand. Along the journey, there are many options in the design of a forecasting process.

A forecast is not just a forecast. A company's sales, marketing, and finance teams each have a forecast, but they are different by definition. The forecasts vary by planning horizon, granularity, and unit of measure. Each has a different goal in mind. As a result, there is no value in the tight integration of dissimilar forecasts.

In implementing collaborative planning, start by gaining consensus on the role of forecasting and how to use data best. Backcast<sup>1</sup> to build a model, then use the pivot forecasting approach to implement flexible modeling across hierarchies, horizons, and units of measure. This process discussion starts with a consensus on time horizons for decisions, appropriate data granularity, and a clear definition of supply chain excellence.

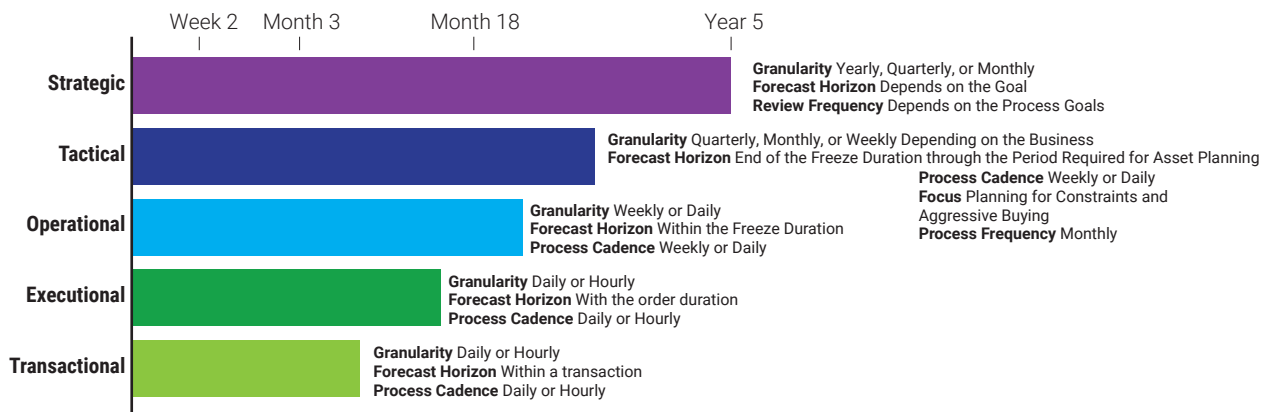
Companies average four-to-five supply chains, each having

a different objective function (efficient, responsive, or agile) with differing lead times. While many of the critical decisions of the operations groups are outside of product lead times (tactical planning horizon), the primary focus of a financial team is usually quarter-to-quarter within the lead periods (operational horizon) focused on budget compliance. In parallel, the processes of order-to-cash and procure-to-pay are within the order lead times (the executional time horizon), and the accounting group within finance usually operates within the transactional time horizon. Collaborative planning using digital twin techniques must reflect the multiple versions of lead time while enabling role-based views to drive the right insights for the decisions made within and out of lead time. Visualization of these choices reduces organizational friction.

Traditional models are rigid. What if the taxonomies and demand planning hierarchies were more flexible? In pivot forecasting, the hierarchies are just that, enabling more straightforward analysis. An example is "*What-if analysis*" to understand the impact of ship-to and ship-from data.

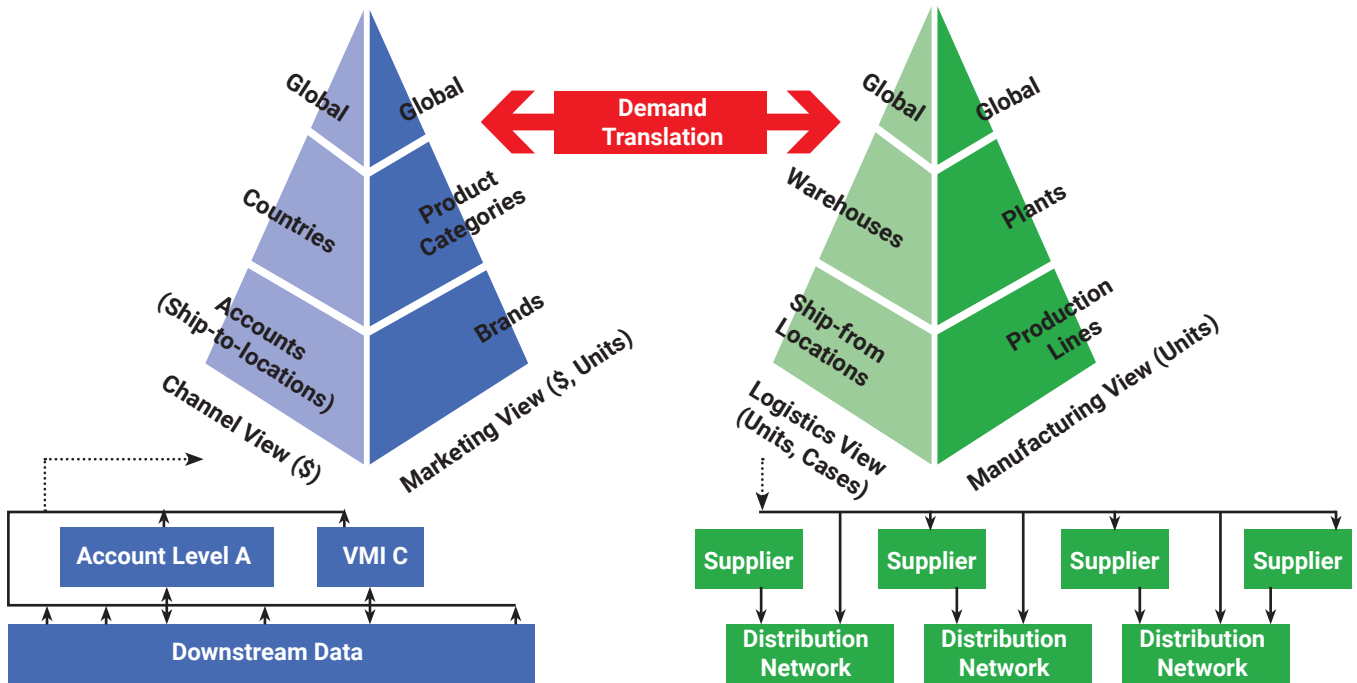
A **pivot** is a central point of turning data for closer examination in an alternate view. An example is the comparison of these channel and supply views. In traditional implementations, these

**Figure 2. Definitions of Time Horizons**



<sup>1</sup> Backcasting is a technique of building the predictive model using two-to-three years of data to build an effective model. Through a series of optimizations, historical data is used to tune the model to improve a predictive model's Forecast Value Added (FVA) results.

**Figure 3.** Example of The Need for Flexible Hierarchies in Forecasting



data views are constrained due to the limitations of conventional software. As a result, companies must choose between a demand (channel view) or supply-centric (distribution/manufacturing locations) visualization. As a result, it is impossible to drive a simple analysis like the impact of product market drivers on the mix or the variety of products sold. Pivot forecasting enables the demand translation from one view to the next. This type of forecasting allows flexibility for visibility in role-based views.

**Why is this important?** Traditional deployments focus on mining data from historical order patterns. But what if the historic order pattern is not a good proxy for current demand? For example, a weather pattern of rain dramatically influences the sales of many products. The length of a drought or the number of sunny days significantly impacts regional demand. Demand deviates from

history when the weather patterns shift, as is happening more often with climate change. Companies focusing on historical demand patterns with rigid demand hierarchies cannot easily

translate market drivers, like weather, to supply. The goal of collaborative planning is to enable this translation at the speed of business.

The use of market drivers along with flexible IT architectures is essential to compete. When organizations align on scenarios and possibilities, the organizations are aligned, enabling a quicker and better response. The focus should be the continual evolution of Forecast Value Added (FVA) Analysis and unexplained variability. ❁

**FVA** is a metric for evaluating the performance of each step and each participant in the forecasting process to determine which one adds value and which does not. The comparison is to the naïve forecast. The objective of FVA analysis is to determine which touchpoints (activities) help and which do not so that one can eliminate those that don't help.



# What Is the Role of Inventory?



After defining the role of the forecast, the next step is to determine the role of inventory. To minimize the impact of demand and supply variability, the supply chain requires buffers or shock absorbers. There are three buffers in supply chain design: **inventory**, **converting capacity**, and **order cycle time**. In most companies, over the past decade, asset utilization increased, decreasing capacity, and order cycle times shortened, putting more pressure on the design of inventory strategies.

Inventory is the most critical buffer to improve reliability, but it is also the most significant source of waste. As a result, inventory analysis is vital. Getting clear on the role of inventory is essential to drive improvement in inventory levels and order reliability.

Supply chain processes are now 30 years old. While there is a

generalized belief that implementing planning technology and process maturity improves inventory turns, this is not true for nine out of ten companies. Organizations invest in project after project, yet inventory levels remain the same or grow. Let's examine the issues and the role of collaborative planning.

As shown in **Figure 4**, due to an increase in supply chain complexity and the lack of alignment of teams, the number of days of inventory averages thirty-three days more than at the start of the 2007 recession.

For most, this data is a surprise. Many ask, "Why?" In the past two decades, there have been five main drivers. The rise of the global multinational significantly impacted inventory requirements. The changes may seem small, but they add up:

**DEFINITION**

**The Line of Sight** is the line from an observer's eye to a distant point.

Webster's Dictionary

**Figure 4.** Shifts in Days of Inventory Over the Past Two Decades

Industry Segment	Years					Difference	
	2004-2006	2007-2008	2009-2013	2014-2019	2020	2020 vs 2004-2006	
Beverage	108	115	133	184	156	48	↑
Pharmaceuticals	151	164	173	202	192	41	
Medical Device	107	123	142	152	148	41	
Semiconductor	60	69	79	92	99	39	
Beauty	117	127	132	141	151	34	
Aerospace & Defense	94	89	99	107	122	28	
Automotive Parts	47	52	61	67	76	29	
Household Products	56	53	57	74	77	21	
Chemical	63	62	67	81	83	20	
Food	50	51	59	60	61	11	
Automotive	45	51	53	55	50	5	
Apparel Retail	74	77	77	81	75	1	
Broadline Retail	71	76	74	79	59	-12	

1. **Item Complexity.** Item and process complexity increase cycle and safety stock inventory requirements. As the supply chain's long tail proliferates, more products are at lower volume levels with higher variability. Few companies manage item complexity well.
2. **Growth In-Transit Inventories.** Slow steaming and larger ocean vessels require building inventory levels to cover goods in transit. In addition, slower rates of intermodal shipments increase the levels of inventory.
3. **Outsourced Manufacturing.** Global manufacturers outsource 25-50% of goods sold. The use of outsourced manufacturing increases cycle time and in-transit inventories.
4. **Increase in the Number of Nodes.** The greater the number of nodes in the supply chain, the more inventory is required. As companies outsourced production, inventory levels grew.
5. **Variability.** The higher the demand and supply volatility, the more required inventory.

$$\text{Cash-to-Cash} = \text{Days of Receivable} + \text{Days of Inventory} - \text{Days of Payables}$$

Cash-to-cash is a compound metric composed of receivables, inventory, and payables. As inventories grew, improvements in cash-to-cash over the decade were driven by lengthening payables. First, it was 60 days, then 90 days, and for many now, the discussion is 120 days. The lengthening of payables is like a harmful drug. It pushes waste and cost to the suppliers and gives the organizations a short-term *benefit*. The teams feel good because cash-to-cash metrics improve. The problem is that companies do not realize that they have reduced capabilities with suppliers and have not improved in inventory. The elongation of payables is especially problematic in times of supply constraints, like now. As a result, there needs to be a heightened focus on inventory to decrease waste and redesign

inventory as a buffer. The greater the variability, the more critical it is for teams to align on an inventory strategy to improve reliability.

Problems also arise when financial teams *game* the system to improve cash-to-cash for quarterly reporting. The most dangerous practice is to do a *haircut*, or an *even cut*, across inventory irrespective of demand and supply variability and constraints. This type of activity destroys reliability.

The answer is visualization in collaborative planning and the aligned understanding of inventory as a buffer with continual organizational alignment on inventory levels.

You might ask, how can companies improve cash-to-cash results yet have higher inventory levels? Many companies covered up the lack of progress in inventory by reporting cash-to-cash improvements.

**Figure 5. Form and Function of Inventory**

Form	Function
Supplier-owned inventory: raw materials	In-transit Inventories: Inventory that is on trucks, barges, and containers. The longer the trade-lanes and the slower the mode, the larger the requirements for in-transit inventory.
Company-owned inventory: raw materials	Cycle Stock: In the planning of production, finished good production is cycled to ensure that the production lines are fully utilized. The average rotation between products on the production lines in consumer packaged goods is three weeks.
Work in process inventory	Safety Stock: Inventory requirements to buffer demand and supply volatility.
Finished goods at the company warehouse	Seasonal Inventories: Inventories required to support season builds.
Finished goods in the channel	Promoted Items: Inventories to support the promotional lift to support a promotion.



In this process, companies need to define the form and function of inventory. The higher the variability, the greater the need to hold inventory as a semi-finished good or raw material using late-stage postponement. In addition, high variability items require pooling. With increased variability, the need for collaborative planning increases. In **Figure 5**, we define the Form and Function of Inventory.

Today, only 12% of companies actively model inventory form and function. Instead, most companies manage inventories by focusing only on establishing safety stock models in Distribution Requirements Planning (DRP).

Supply chain planning uses better math and modeling to improve outcomes, requiring organizational alignment and definition clarity. Over the last decade, companies made functional silos more efficient and the supply chain less effective. There are three root causes:



**Tight Integration to ERP.** Tight integration to ERP without the ability to use market data or participate in a collaborative review within the organization produces an inflexible plan.

**A Mistaken Focus on Trying to Make Imprecise Data Precise.** By definition, planning attempts to help organizations visualize uncertainty and variability to understand the impacts and trade-offs. Companies that view planning as finite numbers without understanding the

demand and supply error reduce resiliency and customer order reliability.

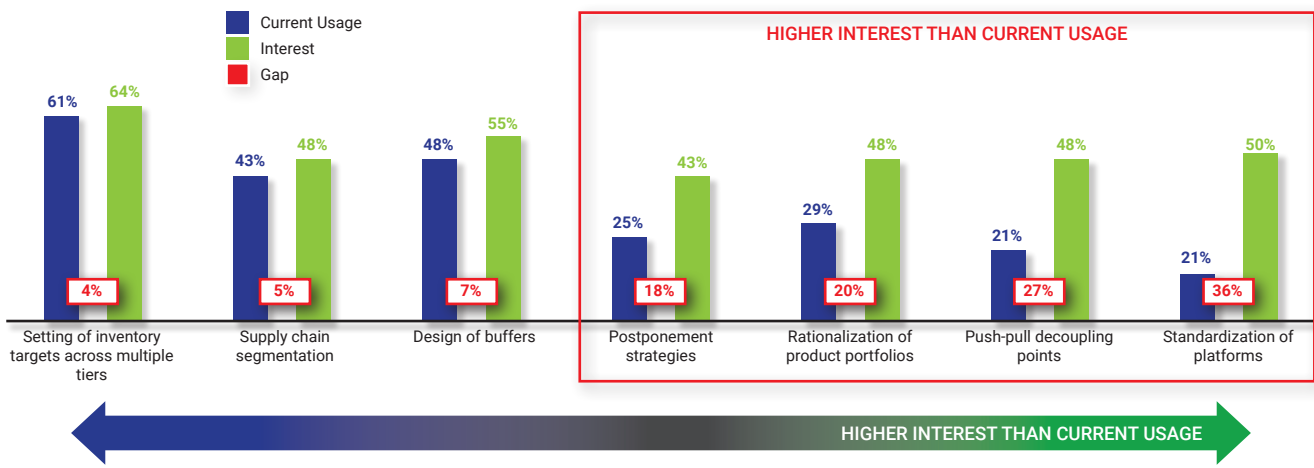
**Lack of Review and Collaboration.** Companies that are the most successful in driving balance sheet results focus on understanding what-if analysis through collaborative planning. Unfortunately, the planning technologies from ERP vendors do not enable collaborative planning.

To drive improvements, recognize that inventory is the most important buffer in the supply chain and resist the temptation for knee-jerk reactions to meet quarterly earnings targets. To drive progress, close the gaps in **Figure 6** by reducing complexity by rationalizing product portfolios and standardizing product platforms. Use the collaborative planning platform to help organizations understand the impact of complexity reduction on inventory.

Continually assess where and how to store inventory and develop collaborative planning capabilities to design buffers. For example, as variability increases, companies need to shift from holding finished goods to storing raw materials and semi-finished goods. As variability decreases, the organization needs to change from storing raw and semi-finished goods to finished goods. The use of collaborative planning to make this type of inventory decision is ideal as a step in a robust Sales and Operations Planning (S&OP) or Integrated Business Planning (IBP) process. ❁

**Figure 6. Gaps in Inventory Strategies**

**Executing Inventory Optimization Tactics: Current Usage of Technology vs. Interest in Purchasing\***



Source: **Supply Chain Insights LLC, Inventory Optimization Study (Jan-Mar 2018)**  
 Base: Total - manufacturers, retailers, distributors, third-party logistics providers (n=89)  
 Q20. Which of these tactics are executed using your company's inventory optimization technologies? Please select all that apply.  
 Q40. How interested do you believe your company is in purchasing software to improve the execution of the following inventory optimization tactics? SCALE: 1=Not at all Interested, 5=Very interested, 0=Don't know; \*Showing those rating 4-5 on 5-point scale

# Getting Started

To build the capability for collaborative planning, take the following steps:

## Invest in Building a Collaborative Planning

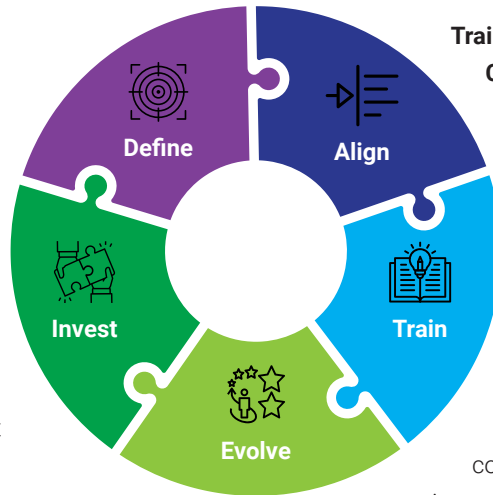
**Technology Environment.** Build a planning environment to enable the sharing of plans between teams. Buy based on the capability to drive “what-if analysis.” In the selection process, build sample “what-if” scenarios in the testing phase to ensure system capabilities.

## Define the Role of Forecasting and

**Inventory.** Don't assume that this is clear to employees. Actively measure Forecast Value Added (FVA) and Bias, and ensure that the process delivers a better result than the Naive forecast (prior shipments).

**Align on the Definition of Supply Chain Excellence.** Help the organization move past functional metrics like manufacturing cost or procurement variance to focus on total cost and market

potential based on commodity indexes. A focus through a functional metric lens will throw the supply chain out of balance and diminish balance sheet results.



## Train Employees to Develop and Share

**Collaborative Plans.** The key to success is the redefinition of work to ensure that planners have enough time to work together and that the technologies are available and easy to use to drive planning analysis during a reasonable timeframe. Test the scalability and usability of the systems selected.

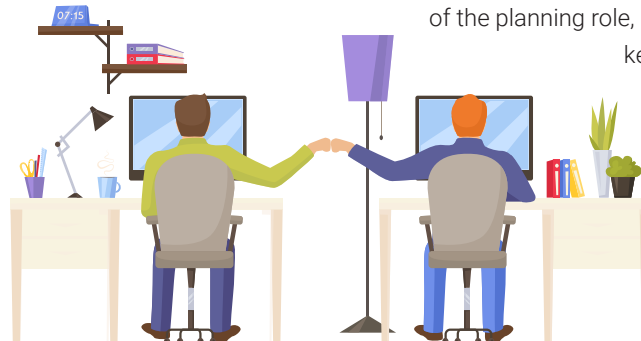
## Evolve. Drive After-Action Review

**Processes.** As a cross-functional team, consistently evaluate progress and discuss the impact of planning on monthly results. ✨

# Summary

Simulation and what-if collaboration technologies like pivot forecasting and digital twin visualization enable teams to model and test buffers to improve organizational alignment. Collaborative technology platforms allow teams to visualize the impact of complexity while aligning future outcomes lead times. When leaders manage inventory as a “cost bucket”-- artificially manipulated to meet public reporting goals-- organizations get in trouble in meeting customer service goals reducing reliability, and decreasing resiliency.

Collaborative planning requires redesigning work to build plans based on predictive modeling to understand better the possibilities, constraints, and opportunities to make a feasible and adaptive plan. Implementing the technology is more straightforward than managing the change and the redefinition of the planning role, but the results are worth the effort. The key to the transition is the realization that planning is not about tight integration of time-phased numbers but understanding the options to adjust and adapt to market shifts and define a feasible plan. ✨







# About Supply Chain Insights

Founded in February 2012 by Lora Cecere, Supply Chain Insights LLC's goal is to deliver independent, actionable, and objective advice for supply chain leaders. With ongoing research using the 330,000 followers on LinkedIn, the goal is to publish actionable insights to help leaders understand supply chain trends, evolving technologies, and which metrics matter.



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## About Lora Cecere



Lora Cecere (Twitter ID @lcecere) is the Founder of Supply Chain Insights LLC and the author of the popular enterprise software blog Supply Chain Shaman. She is the author of twelve books. Lora also writes as a LinkedIn Influencer and a contributor to Forbes.

With over eighteen years as a research analyst (AMR Research, Altimeter Group, and Gartner Group) and now as the Founder of Supply Chain Insights, Lora understands supply chain management. She has worked with over 600 companies on their supply chain strategy and is a frequent speaker on the evolution of supply chain processes and technologies.

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## About Netstock

Netstock is a leading supply chain planning software company trusted by more than 2,200 customers globally to optimize their planning. The Netstock cloud-based solution synchronizes demand and supply insights with Enterprise Resource Planning (ERP) platforms, providing superior supply chain visibility with enhanced analytics. Enabling organizations to unlock operating cash, respond rapidly to change, make faster supply chain planning decisions and offer exceptional customer service, businesses can recognize a Return on Investment (ROI) from day one of implementation.



