

White Paper

Enabling Autonomous Supply Chain Planning and Optimization in the Food and Beverage Industry

Part Two: Reducing Your Time to Market by a Factor of 10

Executive Summary

As a food manufacturer, you face a big list of tough supply chain challenges including long raw material lead times, volatile commodity price fluctuations, safety and quality issues, demand uncertainty and seasonality, high promotional activity, product perishability, frequent new product introductions [NPIs], exacting distribution requirements, complex manufacturing constraints, strict legal and regulatory requirements, and increasing customer expectations.


Whew! The list is long but there is good news. A convergence of people, process, data, and technology capabilities, including those listed below, makes the timing ripe to take your food and beverage supply chain to the next level.

- Automation through artificial intelligence and machine learning capabilities
- More mature and user friendly supply chain planning and optimization solutions
- Proven supply chain optimization algorithms
- Access to richer internal and external structured and unstructured data
- Technology savvy workforce—Millennials/Generation Z

Part One of this white paper presents the capabilities required to build a strong digital supply chain planning foundation, and Part Two covers the next steps food and beverage companies should take to reap the greatest harvest from supply chain investments.

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A photograph of two food safety inspectors in a kitchen. They are wearing white lab coats, hairnets, and face masks. One inspector is wearing gloves and is using a knife to cut into a piece of food. The other inspector is looking on. The background is a kitchen with various equipment and ingredients.

**Reducing inventory by 20%
or more** while maintaining or
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Reducing Your Time to Market by a Factor of 10

Rich data + embedded advanced analytics + powerful optimization algorithms + a heavy dose of artificial intelligence and machine learning = a great recipe for food and beverage success.

Without a doubt, the supply chain organizations in food and beverage companies face mounting pressure to reduce costs, add more value and do more with fewer resources. Once your supply chain planning foundation is established, these six areas are the logical places to focus if you want to develop more mature supply chain practices and add more value to your organization:

- 1 Supply Optimization
- 2 Multi-Echelon Inventory Optimization
- 3 Manufacturing Optimization
- 4 Advanced Sales & Operations Planning
- 5 Digital Transformation
- 6 Artificial Intelligence and Machine Learning

Let's investigate each of these more advanced supply chain practices.

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Supply Optimization

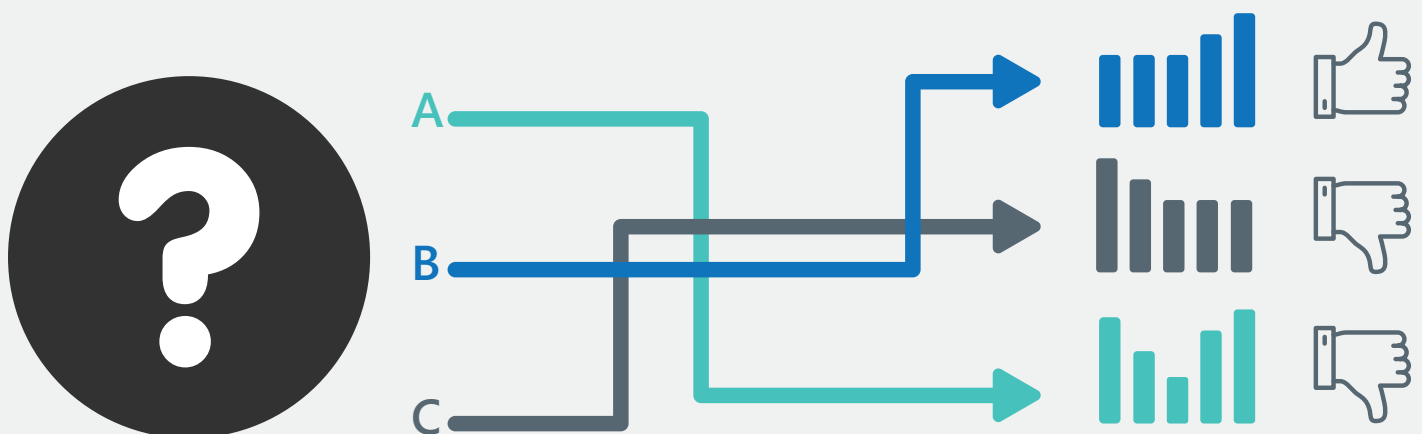
The ultimate goal of supply optimization is to minimize total supply costs while meeting demand requirements. The only way to accomplish this is through solving for the optimal plan while simultaneously considering all constraints, costs and capacities and business goals across the supply chain network. Supply optimization enables you to profitably satisfy market demand through dynamically sourcing materials, optimizing production and manufacturing plans, reducing distribution costs and slashing lead times.

Food and beverage companies often run on razor-thin margins. Optimizing end-to-end supply chain operations should be a top objective of a food and beverage supply chain leader.

A supply optimization solution should provide powerful yet flexible and easy-to-use capabilities; have the ability to automatically evaluate and compare multiple supply alternatives through simulations; and be able to perform multiple business scenario analysis. The system should incorporate both volumetric and financial information to evaluate supply, production, transportation and storage alternatives in the context of financial impacts.

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Automating multiple scenario analysis



Multi-Echelon Inventory Optimization [MEIO]

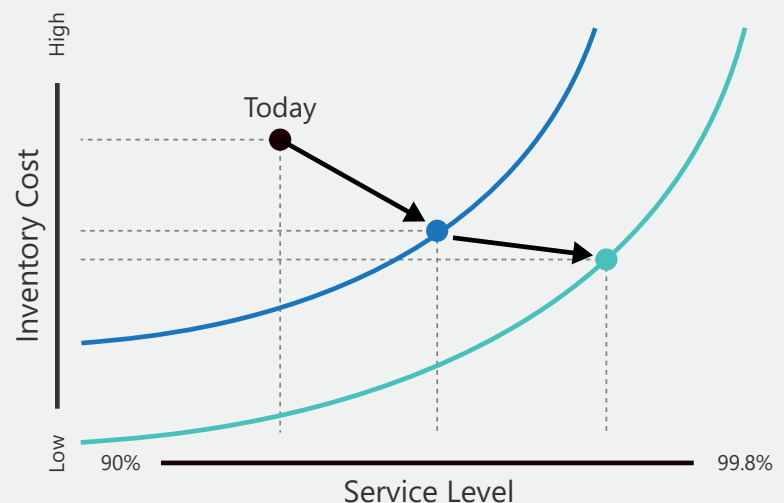
Many inventory optimization efforts limit your benefits to finished good inventory positions at a specific inventory stocking location independent of other finished goods stocking locations or raw and work in process inventory. Location-by-location and type-by-type inventory optimization produces sub-optimal results and may increase your working capital requirements.

A superior method to optimize inventory is to take a holistic approach considering all levels and locations of inventory within an enterprise simultaneously. This holistic approach is called Multi-Echelon Inventory Optimization [MEIO]. Properly executed, MEIO provides deeper insight into the inventory challenges of an end-to-end supply chain, including manufacturing, distribution centers, suppliers and in-transit product. With an MEIO both demand and supply reliability help determine the optimal locations to hold inventory in the optimal quantity and stage to minimize overall inventory investments while meeting customer service requirements.

Companies that have implemented an MEIO strategy have reduced total company inventory by 20% or more while maintaining or increasing customer service. Food and beverage supply chains tend to be inventory rich with average days of inventory still hovering in the high 30 range. Reducing inventory by 20% or more while maintaining or improving customer fill rates should be highly attractive for any food and beverage company, and storage alternatives in the context of financial impacts.

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**Efficient frontier—
MEIO considers demand variability and supply reliability to determine inventory investments required to achieve service goals**



Manufacturing Optimization

As food and beverage manufacturers become more demand-driven, often there is a shift toward more frequent changes in production runs. These market requirements must be balanced with appropriate production efficiency goals. For many, changeovers are among the most difficult constraints to optimize, and this places even greater pressure on manufacturing teams to become more agile and quickly respond to market needs.

You can minimize changes due to activities such as allergen/species cleans and packaging configuration by optimizing the sequence of products through the manufacturing line. If changeovers vary considerably, you may need to optimize the sequence of the products in a given production timeframe.

Efficient capacity utilization depends on an advanced manufacturing planning system's ability to easily model changeovers and prescribe the optimal production sequence that will deliver the required output while minimizing changeover downtime.

Every manufacturing plant has its own distinct characteristics and operating requirements, so your manufacturing optimization solution must quickly model the characteristics of the plant and not the other way around. Efficient capacity utilization depends on an advanced manufacturing optimization solution's ability to represent changeovers easily and to prescribe the optimal production sequence that delivers the required output with minimal changeover downtime. It must optimize sequence-dependent changeovers with scheduling granularity of hours and minutes, not daily buckets.

Advanced Sales & Operations Planning

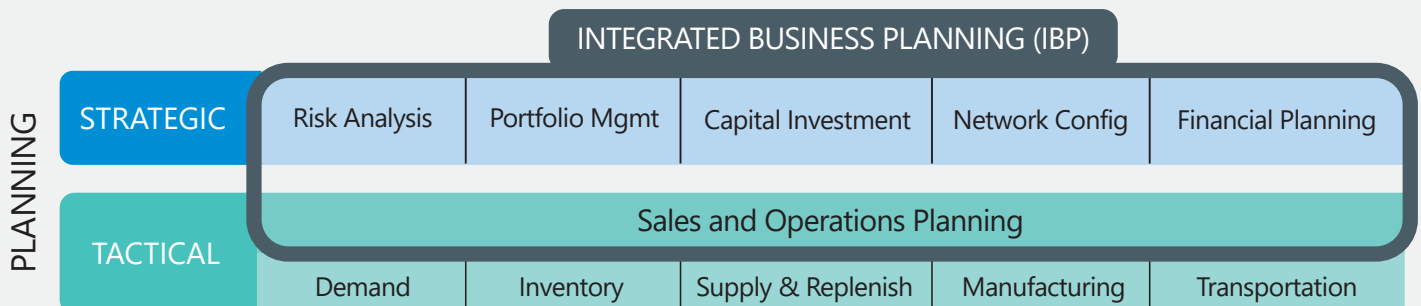
Today most food and beverage companies conduct a tactical sales and operations planning [S&OP] process to synchronize supply with demand. Many also have strategic planning processes for financial planning and long-term investment decisions. However, few food and beverage companies have integrated their tactical and strategic planning processes.

Advanced Sales & Operations Planning, often referred to as Integrated Business Planning [IBP], gives you the opportunity to unite strategic and tactical planning to represent both volumetric and financial information into one flexible planning and decision support system. IBP combines data from sales, marketing, production, procurement, transportation and finance to create a powerful plan for all stakeholders. By removing organizational and technology barriers and aligning and synchronizing plans, an Advanced S&OP platform ensures your business plans are rooted in feasible supply chain network capabilities, with resources and investments deployed where they are most effective in achieving business goals.

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Because Advanced S&OP, or IBP, involves multiple collaborative, cross-functional processes, it requires a technology solution specifically designed to efficiently evaluate multiple business scenarios and time horizons within one holistic platform. A superior S&OP platform must provide collaborative workflow, advanced analytics, and artificial intelligence to streamline and automate a closed loop plan development. Also crucial is the flexibility to view data in varying time horizons from weekly to monthly, quarterly or yearly. The ability to drill down enables new insights and greater confidence. Finally, an Advanced S&OP or IBP solution must work in various volumetric measures and in multiple currencies.

Automating multiple scenario analysis



Digital Transformation

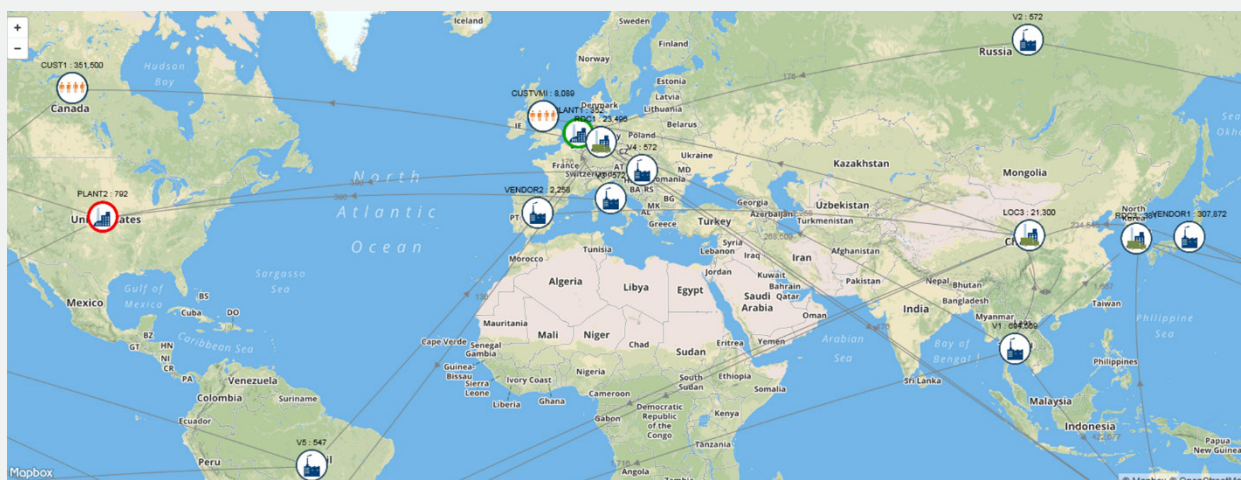
Digitalization is the use of technology to change your business model to generate new revenue, increase efficiencies and offer greater business confidence. Digitalization takes advantage of your investments in foundational and advanced supply chain planning and optimization capabilities to help you make better decisions faster.

The digital supply chain is the next step in the evolution of modern supply chain management. Digital models reflect the physical network allowing you to leverage Artificial Intelligence, Machine Learning, Collaboration and business scenario analysis to boost customer service, accelerate your time to market and replace inventory with information.

Through digital supply chain capabilities your business can help increase revenue, lower costs, reduce risk and boost service as you make better decisions, faster. A digital supply chain enables process augmentation and automation freeing up resources to focus on other value added activities. A digital supply chain also improves your ability to seamlessly collaborate with customers and partners. Digitizing your supply chain allows you to build a “Digital Twin” or an electronic representation of your supply chain increasing visibility and enabling the foundation for advanced analytics including simulations and multiple “what-if” scenarios.

Your Supply Chain Digital Twin can help propel your business to continuous planning with visual cues regarding opportunities or risks with an easy and intuitive workflow to act on that information. Once properly aligned, the digital model will provide event-driven scenarios derived by the system and presented to the analysts in a way that allows them to quickly make value-based decisions that align to your corporate strategy or culture. For example, if demand exceeds supply, how do you want to respond to this opportunity? Do you have priority customers that must be served? Are there more profitable segments that you will serve first or will all channels be trimmed equally? Your analysts are presented with sufficient information to make that call and take action to respond appropriately.

Supply chain digital twin



Artificial Intelligence and Machine Learning

Today you operate in a world of ever increasing complexity. Your business must thrive in a 24x7x365 connected world where the amount of data is doubling every 18 months. Some of that data is structured [like sales or product information] and some of it is unstructured [like customer sentiment]. Furthermore, the pressure of the informed customer and omni-channel challenges accelerate and add complexity to your supply chain. There's a wealth of knowledge that can be extracted from social media that provides insight from customer sentiment and significant business value, if you can respond quickly.

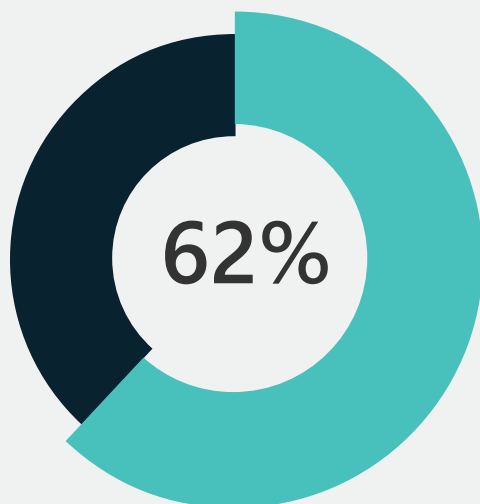
At the same time, there is a shortage of skilled supply chain talent. The planners of today think differently, want to engage differently, and expect a new role and new experiences in your organization within a few years. The speed at which supply chains operate is getting faster every day. The number of new product introductions is accelerating. Time to market compression is increasing. Quite frankly the complexity and speed of the supply chain is outpacing the ability of humans to manage it.

“CEOs expect supply chain leaders to prepare for digital business and want to know how they intend to develop capabilities and use advanced technologies like artificial intelligence to create a flexible, agile and responsive digital supply chain.”

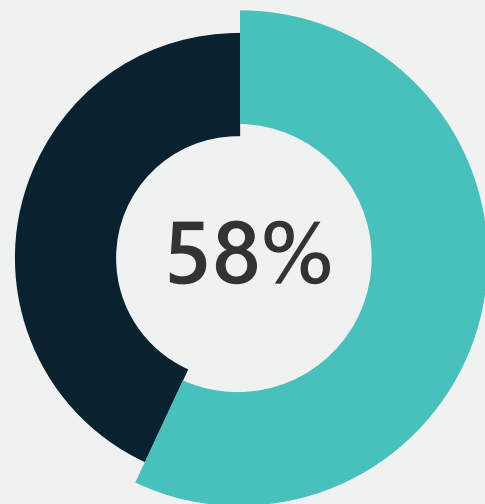
— **Gartner**

Supply Chain Insights 2018- 2019

CEO expectations [Source: Gartner, Supply Chain Insights, 2018-2019]



expect digital business will drive more than half of their organization's revenue within two years



of those in supply-chain-intensive industries identify growth as their CEO's top priority

Artificial intelligence and machine learning capabilities automate routine tasks and augment analysis and problem solving, effectively making your supply chain talent smarter and more productive. A digital supply chain lays the foundation for great gains. However, to accelerate your speed and increase agility requires the adoption of artificial intelligence [AI] capabilities and machine learning [ML] to automate critical areas of your digital supply chain. In fact, capabilities like machine learning and natural language processing can help automatically:

- Select the optimal forecast algorithm and the optimal forecast parameter settings to increase forecast accuracy by up to 50%.
- Optimize supply chain operations to lower operational costs by as much as 30% and speed up the Product Concept to Customer Delivery process by as much as 10X.
- Determine the variability of demand to model and predict the resiliency of an n-tier supply chain to help reduce risk and improve customer service levels.
- Calculate and apply the correct demand distribution model for each SKU/Location to optimize inventory across the extended supply chain helping to reduce total inventory by up to 50%.
- Validate, correct or flag data that is imported from internal and external sources helping to ensure plans and actions are based on clean and accurate data.
- Analyze “Big Data” to recognize complex patterns and to separate actionable demand signals. Specifically, machine learning and natural language algorithms can determine the “Sentiment” of social media messages to predict the impact on demand.


AI capabilities and Machine Learning can help automatically optimize supply chain operations to lower operational costs by as much as 30% and speed up the Product Concept to Customer Delivery process by as much as 10x.

Automate and Optimize to Accelerate Your Business

Attaining superior supply chain planning and optimization capabilities has become a necessity for survival for food and beverage companies in today's highly competitive global environment. Food and beverage companies need to build a strong foundation of supply chain capabilities today to be in a position to take advantage of more mature capabilities.

Industry-leading technology enables a strong supply chain planning foundation including; market-driven demand planning, advanced inventory control, time-phased replenishment plans, demand centric manufacturing plans, sales and operations planning and supply chain master data management. These planning capabilities lay the foundation on which to build advanced supply chain planning and optimization capabilities, including: supply optimization; multi-echelon inventory optimization [MEIO]; manufacturing optimization; advanced sales and operations planning; digital transformation; and artificial intelligence and machine learning.

Excelling at supply chain planning and optimization creates a recipe for efficient and profitable operations and provides a competitive advantage for any food or beverage company. It's time to thrive in the digital age or get left behind.


Download
Part One





About Logility

Accelerating the sustainable digital supply chain, Logility helps companies seize new opportunities, sense and respond to changing market dynamics and more profitably manage their complex global businesses. The Logility® Digital Supply Chain Platform leverages an innovative blend of artificial intelligence [AI] and advanced analytics to automate planning, accelerate cycle times, increase precision, improve operating performance, break down business silos and deliver greater visibility. Logility is a wholly owned subsidiary of American Software, Inc. [NASDAQ: AMSWA].

To learn how Logility can help you make smarter decisions faster, visit www.logility.com.

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