MAKING THE CASE FOR

AI AND MACHINE LEARNING IN SUPPLY CHAIN PLANNING

How companies can ensure peak supply chain performance
with an autonomous engine that continuously senses, analyzes,
and updates demand planning parameters in real-time.

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Harnessing the fast-moving supply chain

On its own, supply chain planning (SCP) provides the critical set of business processes that companies rely on for optimizing the delivery of goods, services, and information to their customers. Focused on balancing supply with demand, SCP manages real-time demand commitments, "what-if" scenario analysis, inventory optimization, and sales and operations planning (S&OP), among other functions, according to Gartner.

Valuable in its own right, SCP's value proposition gains even more momentum when advanced technologies like artificial intelligence (AI) and machine learning (ML) are layered into it. As the development of computer systems that perform tasks that historically required human intelligence, and the ability to automatically learn and improve from experience (and without being explicitly programmed), respectively, these two technological innovations are taking SCP to new levels in the modern-day supply chain.

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"Supply chains are moving faster and faster," says Hank Canitz, Logility's director of product marketing, "and most are not only global in nature, but also 24/7/365." On any given day, the same supply chains may face multiple disruptions (i.e., a truck accident that delays deliveries, a supplier that files for bankruptcy, a geopolitical event like Brexit, etc.)—a reality that always-on supply chains must be able to quickly identify, address, and respond to.

Hitting all of those goals isn't easy in today's fast-paced business environment, where creating a positive customer experience means being able to deliver shipments faster than ever before (in exchange for low or no delivery charges). "In general, everything is speeding up. For example, Amazon is beginning to offer 2-hour drone delivery in certain areas," says Canitz. "The supply chain has to be the enabler of that speed, and one way to make that happen is by using AI and ML to automate and shorten the times to complete planning processes."

Using AI and ML, for example, companies can start to make faster decisions and execute more quickly with less need for human interaction. The idea is catching on and vendors are responding accordingly. According to Gartner, 95% of SCP vendors will be incorporating

ML into their solutions by 2020. By 2023, AI techniques will be an embedded or augmented component across 25% of all installed supply chain technology solutions.

Deloitte has also been watching the convergence of AI and ML with SCP, noting that these "smart" technologies are helping firms make smarter planning decisions. In return for

now, and that will continue to happen in the near future."

Technologies like AI and ML also help companies find those needles in the haystacks that tend to keep them from realizing their full potential. Put simply, humans are limited in terms of just how much time and how many resources they can allocate to extracting valuable nuggets out of the mounds of

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their technology investments, Deloitte says companies are effectively reducing costs; removing reliance on "tribal knowledge"; gaining deeper and broader insights into their supply chains; improving decision-making processes; and increasing supply chain agility.

When AI and ML are infused in SCP, companies can also reduce the incidence of human error, better anticipate future opportunities, and identify challenges that are coming down the pike. "It's all about addressing the 'need for speed,'" says Canitz, "and the time-to-market compression that's happening

data (both structure and unstructured) being put in front of them on a daily basis.

Machines, on the other hand, can work 24/7/365 to ferret out those nuggets, analyze them, and then use them to spin up what-if scenarios and simulations. Humans, machines, or both in concert can then use that intelligence to develop the most appropriate responses, actions, and decisions.
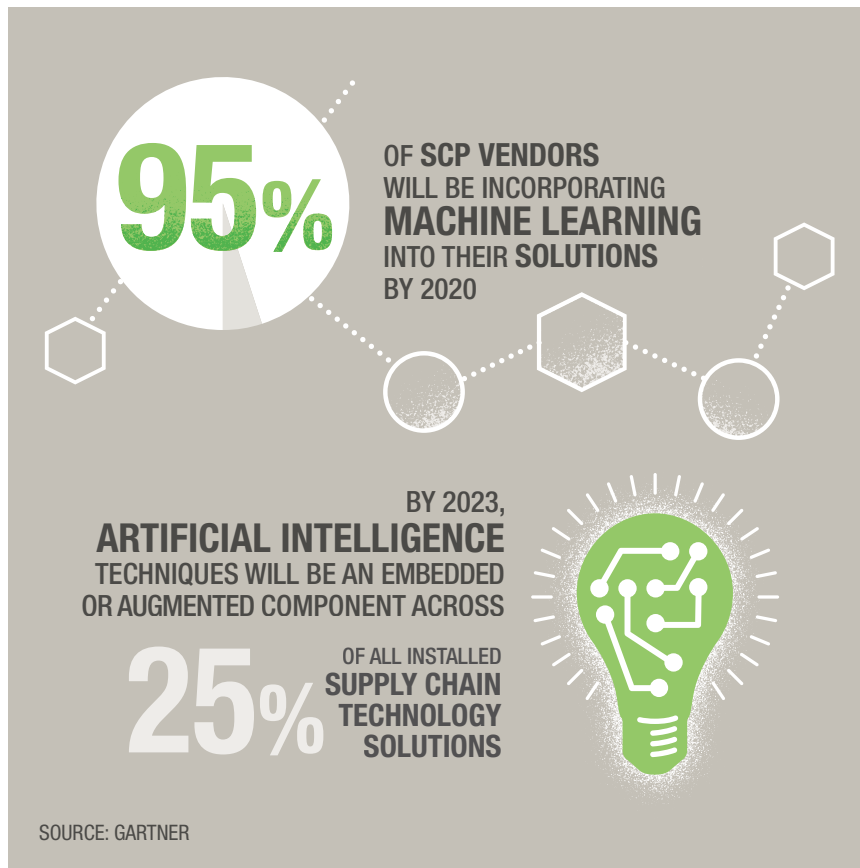
"With the overall volume of data doubling about every 18 months, there's a wealth of information available for companies that want to improve their supply chain planning," says Canitz.

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"**H**owever, it's getting to the point where humans can't conceivably sort through all of that information. They need help."

For many companies, that "help" will come in the form of AI- and ML-enabled supply chain planning. In this Making the Case, we explore the opportunities that these advanced technologies present and show how organizations can ensure peak supply chain performance with an autonomous engine that continuously senses, analyzes, and updates planning parameters in real-time.

95% OF **SCP VENDORS** WILL BE INCORPORATING **MACHINE LEARNING** INTO THEIR **SOLUTIONS** BY 2020

BY 2023, **ARTIFICIAL INTELLIGENCE** TECHNIQUES WILL BE AN EMBEDDED OR AUGMENTED COMPONENT ACROSS **25%** OF ALL INSTALLED **SUPPLY CHAIN TECHNOLOGY SOLUTIONS**

SOURCE: GARTNER

Using AI and ML to solve supply chain planning problems

T he modern supply chain organization grapples with growing complexities, high levels of uncertainty, and the potential for disruption on a daily basis. Being able to quickly turn tremendous volumes of data into action-able, useable insights is an ongoing concern in a world that by 2025 will be creating 463 exabytes of data daily (for context, that's roughly 213 million DVDs).

While data may be the new "oil," it's also creating major challenges for companies that want to stay ahead of the rapidly changing business landscape. For help, many of them are turning to innovative digital supply chain platforms that are powered by AI and ML. Combined with SCP, these advanced technologies help firms uncover hidden opportunities, identify potential risks, and accelerate decision making—from product concept to customer availability, and all points in between.

Artificial intelligence vs. machine learning

A branch of computer science that involves the simulation of intelligent behaviors in computers, AI basically does what it says it does: it makes computers more intelligent. Also referred to as cognitive or "thinking" technology, it's a category that also includes ML and natural language processing (NLP). AI's true aim is to simulate the way human intelligence solves complex problems.

In most cases, those complex problems contain much uncertainty and ambiguity, both of which AI attempts to simulate and solve. Machine learning allows computers to ferret out the nuggets of information that the human brain can't effectively process. Using algorithms, ML gets "smarter" every time it takes in more data. "It basically trains itself," says Canitz, "to the point where it can automatically make predictions and decisions."

Karin Bursa, Logility's executive vice president, says to get the most value out of AI and ML, supply chain organizations have to think beyond the "people, process, technology" matrix and also include data in that conversation. The problem is that no human mind can conceivably receive, process, and make sense of 213 million DVDs worth of information on a daily basis.

That's where AI and ML come into the picture. "What used to take 5-10 days for one person to sift through, analyze and provide a recommendation," says Bursa, "now takes an AI-enabled SCP platform just a few minutes (or less) to harness."

With these technologies in their corner, companies can also break out of "historic" mode and start making better decisions on a con-

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tinuous basis. Where a VP of supply chain once waited until the end of the quarter to get performance statistics for the prior three months, for example, that person now has the most recent data at his or her fingertips. This not only enables better inventory management, demand planning, and forecasting, but it also creates higher customer satisfaction levels and ultimately boosts the organization's bottom line.

Let the computers do the heavy lifting
By letting the computers do the heavy lifting, organizations can allocate valuable labor to more important, core business tasks. Supply chain planners, for example, can be transformed into "analysts," that interact with AI and ML to solve some of their companies' most difficult planning issues.

"Computing power has grown to the point that supply chain

leaders can do all of this right from their desktops," says Hank Canitz, Logility's director of product marketing. "That opens up all kinds of new opportunities to use advanced technology like AI and ML in supply chain planning."

By taking a very structured approach to analyzing enormous data sets, AI and ML can make quick work of projects that could take humans days, weeks, or even months to complete. Going a step further, these technologies also remove any human biases. For example, employees may tackle supply chain planning problems based on a certain set of expected results, inflate those results, or even weigh things out differently than the next person would. Machine learning, on the other hand, removes that bias by learning, grading itself, and getting smarter over time.

To best leverage these capabilities as part of their SCP approaches, more companies are turning to solutions like Logility Voyager Pulse Wise™, an autonomous engine that continuously senses, analyzes,

and updates statistical forecasting algorithm parameters in real-time to maximize forecast accuracy and help ensure the supply chain operates at peak performance.

Using AI, the platform analyzes future demand signals and actual performance to proactively react to changes that may impact forecast accuracy—a process that can increase forecast accuracy by 20%-50%, on average.

What recession?
Canitz says Logility Pulse Wise is a good fit for companies that want to move up the SCP maturity curve, and want to maintain their competitive positions in any market conditions. Should an economic recession rear its ugly head in 2020, for example, he says the companies that have layered AI and ML into their SCP functions will be best positioned to come through unscathed or stronger than their competitors.

"When you can predict when the recession is going to hit and how it will impact your business, you can then proactively react to these issues," says Canitz. "Having AI, ML,

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AI and ML in supply chain planning

When companies incorporate artificial intelligence and machine learning into their supply chain planning activities, everyone wins.

FOR THE SENIOR VP OF SUPPLY CHAIN:

Layering advanced technologies like AI and ML into supply chain planning puts more driving power into the hands of the VP of supply chain or CSCO who is tasked with running an extremely efficient, effective, customer-centric supply chain. Inventory management plays a key role in making this happen, and when AI and ML are used for this aspect of planning, the outcomes are generally far better than they would be using manual, legacy, or fragmented approaches.

"From AI and ML, seniors VPs of supply chain get better performance for every dollar that's invested in inventory," says Karin Bursa, Logility's executive vice president. "They also get a solution that can more accurately predict future demand, improve service levels, and enhance the customer experience." The latter is particularly important in a world where the "perfect order" has become the Holy Grail for all product-centric companies.

When you can deliver the right order to the right place at the right time—and in its entirety—you score big points with your customers. Bursa says VPs can also count on reduced risk within their supply chains. That's because AI and ML can detect in advance when a potential shortage, disruption, or other problem is brewing. Armed with this intelligence, senior VPs of supply chain can quickly evaluate alternative scenarios and act with a higher confidence level.

"You'll be able to mitigate that risk significantly quicker than your competitor does," says Bursa, "or fast enough that customers never even knew there was a problem meeting their schedules. After all, isn't it better to prevent a late order than to report one?"

FOR THE CFO: Focused on growing top-line revenues and boosting bottom-line profitability for their organizations, CFOs understand the burden of high inventory carrying costs. They're also painfully aware of the amount of working capital that's tied up in inventory on any given day. And while the inventory itself is less of a concern for the CFO, exactly how much that inventory costs over time is a real concern.

When AI, ML, and SCP converge on a single platform, CFOs can rest easier knowing that the right amount of inventory is in the right place and at the right time—no more, no less. "Based on their in-stock positions, companies can take and fill more orders," says Hank Canitz, Logility's director of product marketing, "which translates into more robust revenue streams at a lower investment."

When this occurs, the CFO literally looks like a genius within his or her organization. Finally, the finance department also benefits when companies can minimize inventory write-downs, product obsolescence, and overstocks, all of which can take a toll on the company's bottom line. "Because the SCP platform is in sync with actual demand," says Canitz, "financially- and volumetrically-modeling supply chain activity becomes much easier."

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FOR THE CIO: Right now, every CIO in the marketplace is looking for an area that he or she can point to and say, "this is where we've been successful with ML and AI." Seeking wins from these innovative, advanced technologies, these C-level executives want real proof of how their organizations are applying these new technologies to digitally-improve their overall businesses.

By monitoring forecast accuracy in real-time and autonomously adjusting forecast parameters, Logility Pulse Wise is answering that call and helping CIOs justify investments in both AI and ML. It continuously monitors supply chain performance as well as internal and external data sources to sense, analyze, and adjust to market conditions. This, in turn, helps companies stay ahead of potential disruptions, respond to spontaneous demand, and take advantage of new opportunities.

In some cases, that might mean reducing "buffer" inventory (and the cost associated with it) in return for having more reliable data and actionable insights, the latter of which are generated via AI and ML. "Supply chain is a great place for CIOs to prove out AI and ML," says Bursa, "and use both to support digital initiatives."

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If artificial intelligence is the engine, data is the fuel

Supply chains are moving faster, skilled labor more difficult to find and retain, and customers harder to please. Add in trade wars, economic uncertainty, and the risk of supply disruption to the equation, and you wind up with a perfect storm of supply chain challenges that—when combined with other hurdles—require the right mix of software and advanced technology to solve.

By adding AI and ML to supply chain planning (SCP), companies like Logility are breaking through barriers that have held their predecessors back. Armed with enormous computing power, a proliferating data environment, and some of the most advanced technologies ever developed, organizations can effectively harness even their most onerous supply chain challenges and turn them into competitive advantages.

"With all of the buzz around automation, AI, and ML," says Hank Canitz, Logility's director of product marketing, "CEOs, COOs, and other executives are all looking to the supply chain be both implementers and facilitators of the digital supply chain. Supply chain practitioners are under significant pressure to find ways to incorporate AI, ML, and advanced analytics to drive down costs and improve customer service."

Easier and cost effective

Thanks to rapid advancements in technology, supply chain leaders can blend AI, ML, and other technologies into their planning platforms—something that wasn't even possible just five or 10 years ago. "Today's computer power makes it feasible," says Canitz, "and solutions like Logility make it both easier and cost effective."

The good news is that, unlike early AI and ML efforts, their latest iterations don't require much in the way of building or customizations. Where in the past a company had to build its own platform from the ground up, figure out what data did or didn't work, and then apply that knowledge across various departments, Logility embeds purpose-built capabilities right into its solution.

"We know that these capabilities provide value and solve problems, so you're not out there on the wild frontier, developing it on your own," says Canitz. "Instead, you're leveraging a team of experts that's already built and fine-tuned a solution that's built to enable advanced supply chain planning and optimization capabilities."

Working side-by-side

If AI is the engine that the mathematical process relies on for its algorithms, then data is literally the fuel that feeds that process. This is an important point because it means that the technology augments human experts, and that it doesn't replace them. Instead, it gives planners and other supply chain professionals a firm basis upon which to work, ask new questions, and serve up new insights about their businesses.

"This is a very exciting time and an opportunity for companies to respond faster in the marketplace," says Canitz. "It's also an opportunity for them to learn new things about their businesses, customers, and suppliers, and to align their businesses for success in any market conditions."

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Give CSCOs a boardroom seat and watch the magic happen

The presence of the chief supply chain officer (CSCO) in the senior ranks has risen commensurately with the growth in advanced, connected technologies. According to Deloitte, just 8% of Fortune 500 companies had a single executive in charge of the entirety of the supply chain in 2004—a number that had risen to 68% by 2016.

This "rise" in CSCO numbers and the role's profile is completely warranted in a business world that's placing more and more value on its supply chain operations every year. But there's still more work to do in this area. Calling the CSCO the ostensible leader of supply chain strategy and day-to-day operations, Deloitte says these professionals play a relatively small role in shaping digital transformation investment decisions.

Karin Bursa, Logility's executive vice president, concurs, and says that supply chain has historically been looked upon as a cost center or, an opportunity to reduce costs. That's changing. "Strategically, many companies now see supply chain as an opportunity to spur growth in a cost-effective manner," says Bursa. "It's a different twist."

To maximize this opportunity, more companies are pulling out a chair for supply chain in the executive boardroom, where more of them are filling C-level roles. When the CSCO or senior VP of supply chain has a place at that table, for example, he or she can interact with the CEO, COO, and CFO about the best approach for entering a new marketplace or accelerating a new product introduction.

"The supply chain leader has a voice, data, and point of view that can help ensure that these and other strategic moves happen in a very effective manner," says Bursa. "It's one of the few disciplines where if you improve your supply chain planning or execution, you not only improve your top line growth, but also your bottom line profitability. That's pretty powerful stuff."

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