Global supply chains have become so complex, both in generating and in receiving so much data, that humans simply can't keep up. Forward-thinking companies are turning to AI to solve this challenge.

The Utility of AI in Supply Chain Planning

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Questions posed by: SAP

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Q. What role do you see for AI in supply chain and in supply chain planning specifically? What are some AI use cases you are seeing?

A. AI is poised to dramatically impact the supply chain, and supply chain planning specifically, over the next few years. A recent IDC's *Supply Chain Survey* identified advanced analytics/AI as the most important technology over the next three years. The reality is that global supply chains have become so complex and are both generating and receiving bewildering amounts of data that the human brain can no longer keep up. The requirements for speed and elimination of latency (think waste) necessitate decision automation, data aggregation, and insight now – not tomorrow, not next week – but *now*. People remain critical to the operation of the supply chain, but they need the tools to meet ever-increasing expectations.

Although AI is not new to supply chains, the amount of progress and innovation over the past few years has been enormous in terms of what is now practical and available. Many of the most interesting use cases revolve around demand planning and driving to a better forecast, which makes sense given the highly data-centric nature of demand forecasting. There are other areas of opportunity as well. One company that IDC has spoken with uses AI to help with master data accuracy and alignment. Efforts to do this in the past invariably flagged once the initial urgency had passed. With AI, they tell us, "We are always paying attention." We have also seen AI used in the alignment between supply and demand. Delivering against service-level obligations requires both understanding and synchronizing when data is dynamic, as in key influencing factors like lead times and often when it is fleeting. At the same time, the ability to plan well means nothing if you cannot deliver. Leading-edge companies are using AI to ensure that all data sets that may impact fulfillment are considered and integrated into decisions and expectations.

It is also important to recognize the differences between embedded AI and layered AI. While both may have their place, supply chain data often stays out on the edge and embedded AI is best suited, indeed located, to perform better. AI must be able to see the data and analyze it and then disseminate actions back to the key supply chain operating systems. Otherwise, AI is simply an exercise in academia.

Q. Despite investing in technology, many companies are stuck in a "paper-based thinking" paradigm. How can AI help break this paradigm and drive greater value?

A. This idea of paper-based thinking is interesting. In the early days of supply chain digital transformation, many companies digitized information, often dispensing with the need for a piece of paper. However, they did not change the way they used the information. Things may have been faster, but fundamentally, organizations were still behaving as if constrained by that piece of paper. Invoices, for example, are mostly digitized, yet the process of matching to purchase orders (POs) or understanding deductions remains manual. Or POs are generated electronically within the business but then shared manually either by being emailed to suppliers or printed out. Is it any wonder, then, that some percentage of digital transformation efforts were not successful — or not as successful as companies had expected? In IDC's view, moving away from paper-based thinking is essential if transformation is to happen.

Think about the massive number of documents involved with the fulfillment process or in navigating the morass of global trade. Automating the document is just the first step. The real value lies in automating the approval processes or implementing the right exception process so that everything else just flows.

In IDC's *Supply Chain Survey*, when respondents were asked about the most problematic gap of their supply chain, the most common response was a lack of agility to see necessary changes in time to react effectively. The reality is that most disruptions cannot be foreseen nor predicted, so the best supply chains will be those that can react more quickly to those events. Companies stuck in a paper-based thinking paradigm are unlikely to have a nimble supply chain. Moving to the cloud, aligning the supply chain with ERP, adopting AI-enabled business processes, integrating embedded AI at the edge, and fully leveraging the power of data are the actions that will confer nimbleness.

Q. What impact is AI and modern generative AI having on supply chain labor and supply chain planners?

A. Although the most acute labor shortages have tempered in 2023, companies still report challenges finding qualified people to work in the supply chain. Based on IDC's recent *Supply Chain Survey,* supply chain planners and modelers remain the scarcest talent. To address this need, the most forward-thinking companies are looking at a blended approach that includes augmenting experienced existing employees with less experienced new hires and decision automation technology. Interestingly, one company told us it is using AI to help train new, often inexperienced hires, something IDC refers to as accelerating time to expertise. Hiring less experienced planners and getting them up to speed faster, is only one dimension; using AI as a tool for task replacement/planner augmentation is the other. In both cases, the planner remains a highly skilled role, and people are critical. Technology is not taking their job, rather it is expanding their action radius.

Generative AI is still very much in its early days, typically used for initial pilots and process mapping. Using this technology to automate document creation and edits is one promising area. Generative AI can learn standard contractual language, which enables it to create and edit routine documents per both structured and unstructured data (e.g., an ETA showing a late delivery could trigger a mode change on a PO or an email aligning with contractual terms could feed a contract update).

Digital assistants to help planners to quickly scan available data sources, find results/issues faster, and suggest courses of action are also a use case that could leverage generative AI. Supply chains are looking for better, more modern tools to better track, assess, and operationalize carbon and sustainability data. Scopes 1–3 regulatory requirements will also put a sizable burden onto companies that cannot easily access and assess this data and embed it into the planning process.

Q. How well have efforts to use AI across the supply chain been working?

A. We have seen many cases in which supply chains have used embedded AI within their supply chain planning and fulfillment tools to drive improved outcomes. Food and agriculture companies, for example, have used AI tools to better align supply and demand while working toward critical sustainability goals. IDC has also seen companies use AI to significantly reduce the time it takes to complete a new planning cycle.

However, supply chains have just scraped the surface of what is possible with this technology, particularly in the case of emerging generative AI. Supply chains are unlikely to become less complex anytime soon, and the breadth and depth of available data will continue to grow. Better tools are critical for improving supply chain processes — consider sourcing and sourcing planning. Although discussions of nearshoring have picked up as the global COVID-19 pandemic wanes, the reality is that a global supply chain is here to stay. Most companies are at least exploring multishoring and diversification of supply, which means more complexity and more data. It is unrealistic to think that supply chains will be able to do this without employing modern AI tools.

AI also offers the opportunity to seamlessly connect supply chain planning to both manufacturing and logistics. More progressive manufacturers are integrating operational and planning systems with generative AI to better ingest data, identify issues, and provide real-time context both to factory floor operators and to the production plan. In logistics, some companies are using AI to better plan dock door schedules or to dynamically deploy warehouse workers/pickers for optimal labor usage.

Q. What is the future for AI in supply chain planning? How does it help companies to solve their business problems or seize on new opportunities?

A. IT applications, whether AI enabled or not, must be used to solve business problems and/or take advantage of new business opportunities. AI may be today's bright shiny object, but to materially drive productivity, it must find compelling uses and help companies to extend human work and better manage data. Early returns suggest it can do both successfully. IDC expects that AI usage will expand in the supply chain as organizations become comfortable with what AI can do and what it cannot. Early use cases around efficiency and speed suggest that AI aligns well with the most important goals of supply chains and operations. Indeed, in IDC's most recent *Supply Chain Survey,* manufacturers said that they often lack the digital tools necessary to fully leverage new opportunities. This may be a function of demand planning and better forecasting, or it may be about dynamically diversifying supply networks or supply points. Either way, AI is making a difference.

For example, AI-enabled demand sensing is being used to drive sustainability efforts while reducing overall waste. In this case, AI allowed a dairy collective to better sense and react to demand changes to improve customer service performance, reduce inventory levels, and manual time spent forecasting. In this case, manual, repetitive planning tasks were replaced with an automated demand–sensing solution for around 70% of forecast products, freeing up planners' time to focus on higher-value tasks. They were also able to improve forecast accuracy for more than half of the forecast products without any incremental manual effort in one common application, thereby improving customer service and delivery.

A second example, often encountered, is better integration of disparate systems. This could be multiple ERP systems and one supply chain planning tool in which different labels from the ERP system can be mapped to one specific master data attribute in the planning environment, or it could be multiple ERP systems having to talk to multiple planning systems. Either way, AI plays a crucial role in making sure the right data is analyzed and pointed to the right sister system.

The future for AI in supply chain planning is bright. In IDC's 2023 *Supply Chain Survey,* when asked about the biggest benefits companies were getting from AI, the number 1 answer was helping drive better supply chain planning. The reality is that there is too much data coming too quickly for human planners to handle. Technology does not replace planners; it makes them more effective.

About the Analyst

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As Group Vice President, Simon Ellis currently leads the U.S. Manufacturing Insights, U.S. Energy Insights, and Global Supply Chain Strategies practices at IDC, specializing in advising clients on manufacturing/energy strategies, supply chain digital transformation, sustainability, cloud migration, network, and ecosystem design. Mr. Ellis works with end-user companies, supply chain organizations, and technology providers to develop best practices and strategies leveraging IDC quantitative and qualitative data sets. Within the supply chain practices, Mr. Ellis contributes extensively to the supply chain planning and multi-enterprise networks strategies practice while overseeing the supply chain execution practices.

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