Supply Chain Management Series

Part Two: The Emergence of AI as an Essential Supply Chain Tool (April 2024)

As we learn from the business world, we want to share that information with our community of educators and business professionals. Several recent focus panels on the topic of supply chain management (SCM) have highlighted a growing trend within supply chains: the increasing necessity of artificial intelligence (AI) in supply chain processes.

This Action Brief explores how AI is being used across all facets of supply chain management, including manufacturing, distribution and warehousing, and reverse logistics.

The Growing Need for AI

In March of 2024, the one-thousand-foot-long container ship *Dali* collided with the Francis Scott Key Bridge while exiting the Port of Baltimore. The bridge subsequently collapsed, halting virtually all movement throughout the Patapsco River. The disastrous event impacted tens of thousands of supply chain jobs and resulted in untold billions in costs associated with damages, insurance claims, and lost business.

This is just one of many setbacks that modern supply chains face. Geopolitics, natural disasters, labor shortages, and more have stressed supply chains in an era where e-commerce already heightens consumer expectations of product delivery. To survive in this demanding, fast-paced global business environment, organizations must stay on the cutting edge of supply chain technology. And today, the technology driving supply chain management—along with many other careers—is AI.

While automation has been an essential concept in supply chain management for decades, the emergence of artificial intelligence promises to exponentially increase supply chains' automated process capabilities.

The true utility of AI lies in its variability. The supply chain is a vastly complicated network, with a variety of activities coalescing to accomplish a singular goal: meet customer demand. AI has potential applications in virtually all of these supply chain activities. Let's explore a few of them here.

AI in Manufacturing

A participant in a recent supply chain management focus panel noted that manufacturers are looking to lower costs by 20% over the next decade. How are manufacturers planning to accomplish this? The answer is artificial intelligence.

Ever since General Motors introduced robotics to the manufacturing process in the 1960s, automation—and, by extension, AI—has been critical to the supply chain network. Today, AI has taken industrial robotics to greater heights with the incorporation of cobots. Cobots are highly intelligent industrial robots specifically designed to collaborate with human workers. Cobots can best be commissioned for

repetitive or difficult operations, such as sorting packages or lifting heavy objects, allowing actual manufacturing professionals to handle the more nuanced or specialized tasks.

Maintenance is another manufacturing activity that has been greatly improved by artificial intelligence. Modern manufacturers implement predictive maintenance, where advanced AI software detect failures or damages and prescribe repairs. To make maintenance decisions, AI systems gather data on an incredibly granular level, including machine vibrations, thermal imaging, and analyses of oils and other industrial liquids. Major corporations such as Pepsi have made AI-powered predictive maintenance a staple of their supply chain.

AI in Distribution and Warehousing

AI has become increasingly important to distribution and warehousing, commonly known as logistics. One logistical area that has featured emerging AI technology is in transportation safety. Multiple panelists noted the use of AI driver monitoring and vehicle tracking as commonplace in the modern supply chain environment. Similar to cobots, these AI iterations operate *with* supply chain professionals—working to enhance human contributions, not replace them.

Another essential aspect of logistics is warehousing. Similar to how AI is used for comprehensive oversight with respect to predictive maintenance, it can be used in a similar manner for a supply chain's warehouse management system (WMS). AI-WMS systems help design and organize warehouse layouts and manage inventory levels. AI software can also assist with warehouse order picking, matching the location of specific inventory and routing the most optimal path for picking and loading product. This facet of logistics is becoming more and more critical as warehouses continue to grow in size to stay competitive in the global order-fulfillment arms-race.

AI in Reverse Logistics

Arguably no function of supply chain management has evolved more in the last five years than reverse logistics, otherwise known as the returning of goods back through the supply chain. Due to the boom in online shopping, customers now expect a fast and convenient experience during the purchasing *and* returning processes, forcing supply chain managers to stay ahead of the demand curve.

Unsurprisingly, AI has been at the forefront of recent reverse logistics innovations. Supply chain management professionals in a recent focus panel mentioned how several companies are using AI software to identify and evaluate damaged or returned products and determine if the unit is resalable. AI is also being used to route returned products back through fulfillment centers and to recycle unusable products in an environmentally friendly manner, the latter of which is a growing concern in the reverse supply chain.

Looking Ahead

These are just a few of the many applications of AI in the world of supply chains. But if you notice any recurring theme across these AI technologies, notice how artificial intelligence is broadly being used to

enhance human input. While there are certainly some supply chain roles that will become redundant given the rise of AI in the field, it will also lead to [job creation](#) in SCM.

As supply chain professionals are looking to implement AI wherever and however they can, there is one principle that they are keeping in mind, which was put elegantly by one of our panelists: "Competency over capacity." Simply put, this means ensuring all technology within your supply chain fulfills a specific role—and does that role well—rather than hastily co-opting all the latest tech and figuring out its usefulness later. If supply chain professionals stick to this principle, then AI can perform the overarching role it was meant to perform—as humanity's critical companion in the ever-evolving professional world.

Links for Further Reading:

- "[For AI in Manufacturing, Start With Data](#)"
- "[How AI and Automation Are Transforming the World](#)"
- "[How Global Companies Use AI to Prevent Supply Chain Disruptions](#)"
- "[The Power of AI in Supply Chain Management for Increased Resilience and Growth](#)"
- "[The Role of AI in Developing Resilient Supply Chains](#)"

Discussion Questions:

- Think of a recent disaster or conflict that has impacted supply chains. This could be the Francis Scott Key Bridge collapse, or another issue that you have seen in the news or online. How could AI be used to mitigate—or avoid entirely—the impact of that disaster or conflict?
- Consider other functions within SCM not mentioned in the Action Brief, such as sourcing goods to meet demand or planning the entire supply chain. How could AI be used to improve those functions?
- What are some emerging skills that new supply chain professionals must have to work in a supply chain environment with artificial intelligence?
- What types of issues might arise with an increased AI presence in supply chain processes?
- After reading this Action Brief, has your opinion on AI in the workplace changed at all? Why or why not?

Sources:

- "['Predictive-Maintenance' Tech Is Taking Off as Manufacturers Seek More Efficiency](#)"
- "[10 Types of Warehouse Order Picking Systems](#)"
- "[15 Key Supply Chain Challenges to Overcome](#)"
- "[AI in Reverse Supply Chain. Solving the Challenges of Reverse Logistics](#)"
- "[Amazon Effect](#)"
- "[Artificial Intelligence in Manufacturing: Four Use Cases You Need to Know in 2023](#)"
- "[Driver Monitoring Using Artificial Intelligence](#)"

- "Harnessing AI for Enhanced Vehicle Tracking in Supply Chain Operations"
- "How AI Is Helping to Improve Transportation Safety on a Global Scale"
- "How AI Is Revolutionizing Warehouse Management"
- "How AI Will Enhance Supply Chain Careers"
- "How Baltimore's Key Bridge Collapse Will Affect Supply Chains and the Economy"
- "How Cobots Are Powering Smart Manufacturing"
- "Introduction to Supply Chain Automation"
- "Predictive Maintenance & its Impact on Supply Chains"
- "Return to Learn: Four Ways to Use AI and Machine Learning to Improve Reverse Logistics"
- "Returned Items Are Hurting Sustainability Efforts for SMBs—Here's How to Align Your Practices and Messaging"
- "The Impact of E-commerce Returns on Reverse Logistics"
- "The Latest on the Key Bridge Collapse and Recovery in Baltimore"
- "The Role of Artificial Intelligence (AI) in Returns Management"
- "Top Five Industrial Applications of Cobots"
- "Understanding the Growth in the Average Warehouse Size in US"
- "Warehouse Management System Overview"
- "What Is Reverse Logistics?"