# The Intricate Interplay of Supply Chain and AI Dependency in Beverage Alcohol Part I

Editor's Note: NABCA continues its series of articles exploring the influence of AI in the beverage alcohol marketplace. You can find the previously published articles by clicking here. This article looks at AI's influence on the supply chain in business, overall and how one beverage alcohol supplier uses it. Prior to COVID, many people likely had not thought about the fragile, interconnected process of sourcing raw materials that eventually arrived at home in the form of a complete and useful product. Prevalent at that time were shortages, price hikes, shutdowns, and frustration in wanting something that was not readily available as it previously was. The supply chain process is a fragile system. Without availability of the source of the raw material (grain), the people needed and the activities they do (transportation) as well as the information and resources involved in moving a product or service from supplier to customer, a breakdown can cause lost revenue, increased logistics costs, damaged brand reputation, and other issues that can threaten a business. For this edition of NABCA's AI and Alcohol series, Margaret Barchine invited input from supplier member Heaven Hill's (HH) George Wilson and Shreyas Shukla of Info-Tech Research Group's (ITRG), a global IT firm and NABCA member.

AUTOMATIC WAREHOUSE ISOMETRIC FLOWCHART
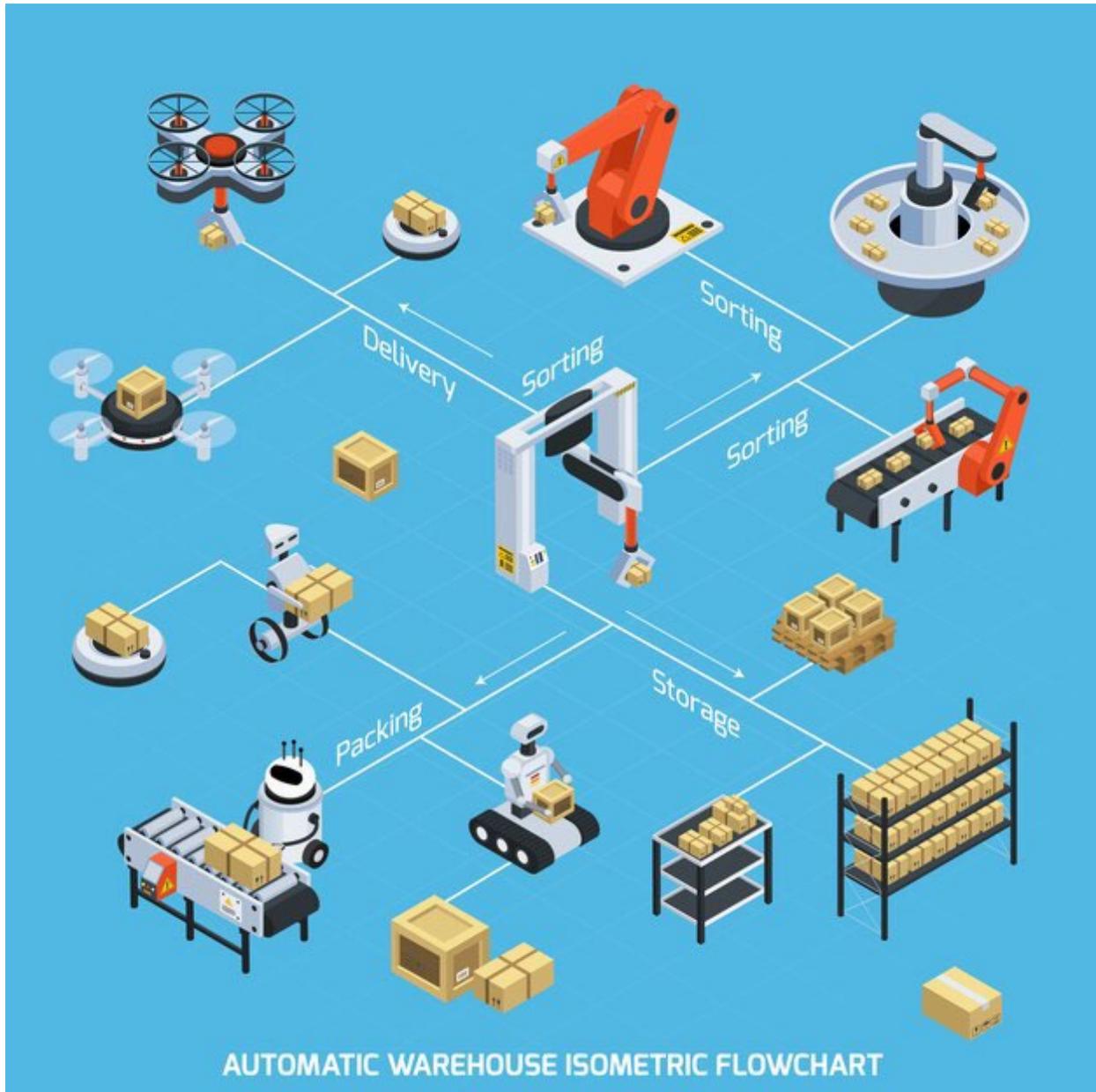
AI & Supply Chain from Freepick.com

NABCA: Define supply chain at your company and explain how you use AI as part of your beverage alcohol efforts?

I-T-R-G: Analysts often simplify supply chains into four functional categories: Plan, Source, Make, and Deliver. This representation helps frame initiatives that cut across the enterprise. In the beverage and alcohol sector, the supply chain is an

ecosystem of interdependent processes and capabilities spanning agricultural inputs, packaging suppliers, production, warehousing, distribution, and retail execution, with regulatory reporting and allocation governance in control states.

There is no shortage of content that describes supply chains as a single, linear entity. In practice, they are tightly coupled systems of people, processes, technologies, and data, operating under real constraints. In beverage and alcohol sector, those constraints are not just operational or commercial, but also regulatory.

In this environment, AI shows up less as a standalone initiative promising to solve everything and more as a multiplier of effort. In most organizations I work with, AI is embedded within existing knowledge work such as planning and analytics. It helps teams surface patterns earlier, explore scenarios more quickly, and focus attention on the decisions that matter most. While some organizations may aspire to fully autonomous supply chains, the real value today comes from using AI to sharpen judgment in a complex environment where trade-offs are unavoidable and decisions must remain explainable.

H-H: At Heaven Hill, the supply chain covers everything from sourcing grains and barrels to bottling, packaging material, warehousing, distribution, transportation, and customer fulfillment.

Today, we use AI in limited but growing ways, mostly through tools embedded in planning software:

- Machine Learning (ML)-based forecasting enhancements inside demand planning systems to help predict demand in future periods/months.
- Generative AI for reporting, tracking and summarizing metrics.
- AI-enabled logistics estimated time of arrival (ETA) tools behind the scenes. For example, transportation management tools use AI to estimate delays and arrival times. This is much like WAZE, which provides valuable user-generated information and other personal apps that streamline many tasks for convenience, customization and proficiency.

NABCA: Has AI helped with efficiency in your company's beverage alcohol supply chain initiatives? If so, how has it or has it not?

I-T-R-G: I do see real-world evidence of AI delivering efficiency gains, but they show up differently across the supply chain.

In sales and operations planning, AI's impact has been the most visible. AI-driven forecasting and demand sensing have improved accuracy in managing seasonality, promotions, and regional variability. This has reduced the amount of manual rework planners do each cycle and improved confidence in inventory and allocation decisions.

In sourcing and procurement, AI has been useful for supplier performance analysis, lead time variability modeling, and risk monitoring. This helps organizations understand which suppliers are becoming less reliable and where exposure is increasing, though it does not eliminate constraints such as allocations or limited supplier options that are common in this industry.

In manufacturing operations, efficiency gains are more incremental. AI is being used to improve production scheduling, yield optimization, and quality monitoring, particularly in environments with repeatable processes. However, many beverage and alcohol producers and most manufacturers really, still rely heavily on human expertise on the shop floor.

In warehousing and logistics operations, AI has helped with transportation planning, warehouse labor planning, and service-level optimization. Organizations are using AI to better sequence shipments, reduce expedited freight, and improve on-time delivery performance, especially during peak periods.

However, there are also documented instances of AI struggling with structural limitations, such as regulatory constraints, fragmented data, or legacy systems. AI has not yet been successfully used to remove this friction. It is important to acknowledge this, because it keeps expectations grounded and helps organizations focus on AI investment where it can improve efficiency.

H-H: AI has helped in several ways. It has improved forecast accuracy by enhancing the models used in our demand planning tools. It has made reporting faster and more efficient by using generative AI to summarize data and create insights. Finally, AI has provided better freight visibility by enabling transportation partners to deliver more accurate and timely shipment information.

NABCA: Which AI tools are most broadly adopted among supply chain users in the beverage alcohol space?

I-T-R-G: One of the challenges in discussing AI adoption is that the term "AI" is used to describe very different technologies at very different stages of maturity. In practice, most manufacturers, if they are, are using multiple forms of AI at the same time.

Fairly common today is machine learning embedded within enterprise applications. These models have been in use for years inside demand planning, inventory optimization, production scheduling, and transportation management tools. They are trained in historical data to identify patterns and improve forecasts. Most users do not interact with these models directly; they experience them as "better recommendations" inside familiar systems. Sources report improvements of roughly 15% in logistics costs, 35% in inventory levels, and 65% in service levels when machine learning is embedded into planning and inventory processes.

A rapidly expanding category is large language models, often referred to as LLMs, which power conversational and generative AI. They sit on top of existing data and systems to help users ask questions, summarize performance, explain forecast changes, or explore scenarios using natural language. This is why adoption has been fastest among planners, analysts, and managers rather than in execution roles. A whitepaper reports that LLMs are being applied to support S&OP, network strategy, resiliency modeling, and supply risk monitoring by reasoning over existing planning tools and data, materially reducing time to decision for planners and executives.

Some organizations are beginning to experiment with AI agents, which are systems that can take a goal, break it down into individual steps, and act across multiple

tools. These are still early-stage and typically limited to narrow use cases such as monitoring exceptions, preparing recommendations, or triggering workflows for human review. Fully autonomous or agentic AI, where systems act independently, remain largely aspirational, particularly in regulated industries like beverage and alcohol.

Understanding these distinctions is critical, because value today comes from using the right type of AI for the right job, not from treating all AI as a single capability.

H-H: Enterprise Resource Planning (ERP) is critical for our day-to-day business operations in supply chain management. ML forecasting tools are needed within this framework along with an Integrated Business Planning (IBP process to align our financial and operational long-term goals.

Generative AI assistants also play a vital role by offering:

- **Decision support:** Rapidly synthesize data across inventory, logistics, and customer service to highlight risks, trends, and opportunities.

- **Operational execution:** Draft executive-level communications, standardize operating procedures and training materials, and support change management for initiatives such as stock keeping unit (SKU) discontinuations or process transitions.

- **Strategic sourcing and supplier management:** Assist with supplier performance reviews, contract summaries, sustainability tracking, and identifying cost-reduction or risk-mitigation opportunities across transportation, packaging, and warehousing.

NABCA: What role does machine learning (ML) play in beverage alcohol supply chain?

I-T-R-G: Machine learning is often grouped together with "AI" in everyday conversation, but it is important to separate the two.

The key difference is that machine learning does not reason or converse. It looks for patterns in data and uses those patterns to make recommendations. It answers questions like: What usually happens when demand spikes in this region? Which suppliers tend to run late? Where does variability show up most often? It does not decide what to do. It helps people decide.

In beverage and alcohol companies, machine learning is most visible in forecasting and planning, where it helps teams better anticipate demand swings tied to seasons, promotions, and local behavior. It is also used to highlight supplier reliability issues, flag unusual production behavior, and improve how shipments and labor are planned during peak periods.

What makes machine learning so effective is that it supports experienced planners, operators, and managers by improving the quality of input.

H-H: Machine learning improves truck estimated arrival times (ETAs) by analyzing historical lane data, carrier performance, traffic, weather, and dwell times to generate more accurate predictions than static transit assumptions. As real-time data is received, ETAs are continuously updated to reflect current conditions and flag shipments at risk of delay. This enables better dock scheduling, proactive customer communication, and improved service reliability to warehouses and customers.

NABCA: In my research about supply chain, there was a comment that said AI "enhances risk management by predicting disruptions, automates quality control, and provides real-time visibility for better decision-making." Has this been your experience? Can you explain further?

I-T-R-G: That statement is directionally correct, but it simplifies important context. In practice, each of those benefits shows up a little differently than what the language suggests.

This statement is largely true for risk management, in my opinion. AI, through machine learning, has been effective at identifying early warning signals. While it does not predict disruptions with certainty, it does a great job of highlighting where risk is increasing, whether that is supplier reliability, transportation delays, or unusual demand behavior.

The impact on quality control is more uneven. AI-driven quality monitoring works well in controlled, repeatable production environments, where sensors and process data are readily available. However, quality in the beverage and alcohol sector is not limited to production alone, and many downstream quality checks such as packaging accuracy, labeling compliance, product handling, storage conditions, and damage or spoilage during transportation and storage, still rely on human judgment. AI can help flag anomalies or trends, such as temperature deviation, or labeling inconsistencies, but it cannot fully replace human judgment.

Finally, visibility comes from having data captured at the right points in the supply chain and connected across systems in a timely way. AI does not generate that data or connect systems by itself. AI adds value after the data is available. If data is missing, delayed, or fragmented across systems, AI cannot fill those gaps. It can only work with what is already there.

H-H: Not yet, but we do see the use cases and will implement new tools in the near future.

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