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Achieving Real AI Results

The definitive buyer's guide to delivering AI/ML autonomy within retail and the supply chain

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It’s coming from every direction. Disruption. The sea change is endless. The digital age won’t end retail, but the industry will never be the same. Customer expectations, e-commerce, escalating service levels, extreme weather, increasing competition and a different kind of workforce are moving the marketplace in a new direction.

This buyer’s guide explores why more than half of retailers are adopting artificial intelligence (AI) and machine learning (ML)[1], as well as how to find the right technologies to achieve an autonomous supply chain.

1 According to the 2019 Retail C-Suite Viewpoint Survey, research from JDA Software conducted by Incisiv in partnership with Microsoft.

Transformation Is Unstoppable.

Artificial intelligence and machine learning make the autonomous supply chain a reality. So what is the autonomous supply chain, and how do these technologies bring it to life?

What's next?

An autonomous supply chain constantly answers this question. With an autonomous supply chain, your business can deliver on demand, navigate disruptions months in advance, and move in real-time with the pulse of disruption and changes in consumer behaviors. Armed with AI, ML and the right data, the autonomous supply chain self-corrects in real time.

Traditional supply chain management approaches supported decision-making based on historic performance. The introduction of Internet of Things (IoT) devices and sensors empowers decision-making based on real-time information gathered across the supply chain.

The autonomous supply chain makes these decisions based on what's going to happen in the future, in an automated manner and without human intervention. Fueled by data, robust algorithms and predictive analytics, the autonomous supply chain senses disruptions like material shortages or a weather event, days or months in advance. The autonomous supply chain course-corrects automatically, based on predictions right now, considering the latest data, to minimize disruptions and protect profit margins.

How is this possible?

This level of autonomy is enabled by turning the decision-making process over to machines and advanced mathematics. Now decisions reflect billions of data

points, aggregated internally and via third-party sources. This data volume is cognitively impossible for humans to manage, due to its size and complexity. Modern technology and data science make it more than possible. It becomes effortlessly achievable.

With an autonomous supply chain, your business can navigate the digital age and evolving retail environment and make strategic decisions that balance cost with service. You can anticipate changes in demand and buyer behaviors ahead of time. Backed by AI and the right data, your company can move forward into the future, prepared for any market and industry shifts.

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Go Beyond the Hype.

An autonomous supply chain demands the right technologies. Software compares everywhere talk about AI and ML, but how do you know what's real and what's just hype?

Navigating all the noise

Artificial intelligence and machine learning are more than buzzwords. How can you navigate the buying process to partner with a software company that develops true AI and ML solutions? First, you need to understand AI.

The power of AI and ML to steer the supply chain

Artificial intelligence and machine learning control the supply chain by making autonomous decisions on a regular basis. A modern AI/ML system works on these principles:

- AI and ML are fed by objective data (your company's daily or real-time operational data and master data on a granular level, in addition to important external data).

- These technologies use that data to make laser-focused predictions about the near future (up to months) on a granular level, with results in the form of probability distributions.

- They define a strategy or utility function to be optimized, e.g., balancing availability versus stock levels.

- AI- and ML-supported decisions are based on the optimization of aggregated key performance indictors (KPIs), given all cost/utility functions and all probabilistic predictions.

- These solutions easily adapt the strategic/utility function as business goals change and immediately apply any new strategies across all decision-making processes.

- AI and ML make autonomous decisions on a massive scale in exact alignment with your corporate strategy.

- They enable automatic monitoring and human control to manage exceptions and unique events.

- These technologies assist with operational simulations that help supply chain executives redefine the KPIs as needed.

AI/ML versus existing time-series predictions

Traditional methods of predicting demand use historical-based algorithms to predict demand for a specific item at a specific location and time. Frequently, a “baseline” forecast is determined and adjusted by hand for special events and promotions.

This approach assumes that year-over-year demand does not evolve. Artificial intelligence and machine learning take this further.

AI and ML make demand predictions for a given item/location/day not only based on own history, but also based on the behavior of all items, in all locations, at all times. These technologies learn causal effects from the properties of products, locations and dates. As time goes on, these technologies gain knowledge and become more accurate, while also adapting to current trends. Everything is learned from data, without any human intervention.

AI, ML and individualization

Capable ML algorithms can individualize all information, using classical statistical methods, for clusters of any size. It isn't necessary to build clusters first and then assume that all individuals in the cluster behave similarly. Accurate AI and ML represent an automated, exact science. Based on all observations, the mean behavior is easily predicted. The art is to individualize each prediction as much as possible, but no more than necessary to solve a given problem. Particularly for more challenging problems, like slow-moving items, new ML algorithms have

Ask the Right Questions.

Identifying the right software partner can be challenging, but it’s easier if you know exactly what you need to achieve a successful implementation. Here is the kind of information you need to determine the right fit.

Finding the right partner to power your autonomous supply chain means gaining answers to these critical questions:

Does the provider have real AI/ML expertise and experience?

The vendor should have long and deep experience with the supply chain, speak its language, and be fluent in supply-chain processes and their intricacies. They should also have significant experience in data science. They need to understand how to install and operate AI- and ML-based systems within a complex enterprise software environment.

Does the vendor have quantifiable customer stories?

The provider's experience can't be in the form of proof-of-concept. You need a

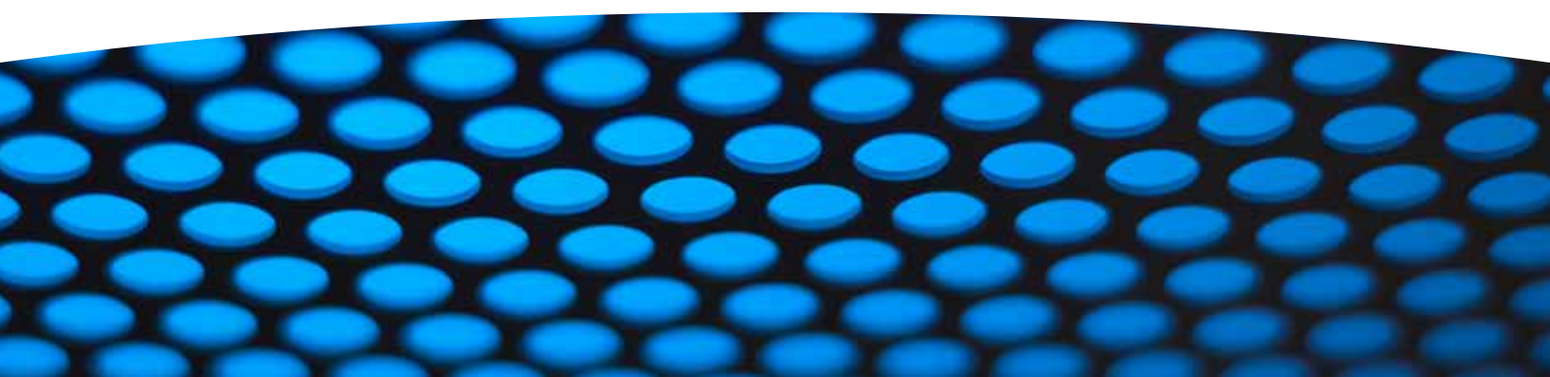
trusted partner that has developed and installed technology systems that perform and do the work, reliably and daily. Your vendor should have led full-scale implementations that encompass thousands of items in hundreds of stores. The potential partner should be able to answer these questions: What were the results over time? How have customers fueled more sustainable, more powerful and more competitive decision-making? How has the vendor managed difficult cases such as perishable foods? How much have they reduced customers' excess inventory and other costs? Have they delivered new revenues, new profits and a more robust end-customer experience? What KPIs have been improved? How much manual and repetitive human labor has been reduced?

Does the potential partner offer a scalable solution?

In today's fast-changing landscape, a flexible and scalable solution is key. The vendor should also have the focus on innovation that's necessary to embrace emerging technologies and build a credible roadmap for the future.

Does the vendor have strong customer references?

Qualified providers will always have customer success stories ready, demonstrating that they can solve problems similar to your own. References from industry experts and C-level executives provide the most value and credibility.



Dig Deeper for Clarity.

Powerful AI technology uses prediction models that push further and deeper, for more pin-pointed precision and accuracy. They help you know what can't currently be known. They make intelligent decisions, based on all your knowledge and data.

What is a prediction model?

A causal prediction model makes recommendations based as much as possible on the aggregate properties of items, locations and time, instead of only based on items' individual history.

The model's predictions should not just be a point estimator (a single number), but instead represent a complete probability distribution. Models should predict both a value and an uncertainty.

Why isn't a single number enough?

Consumer behavior is not deterministic. No matter how precise the forecast, there is always a chance that the actual demand will be higher or lower than forecasted. It's impossible to know everything that will happen tomorrow and how shoppers

will react. That's why it's important to make supply chain decisions based on the likelihood or probability of every possible scenario, considering both history and external factors like day of the week, weather and current events.

Why are prediction models important?

Prediction models are crucial in making the right decisions, because they take into account the complete risk profile and the individual cost/utility function for a given item, location and date. In the world of supply chain and retail, costs often arise from the unexpected. If demand is much higher than expected, the result will be out-of-stocks, empty shelves, lost sales and dissatisfied customers.

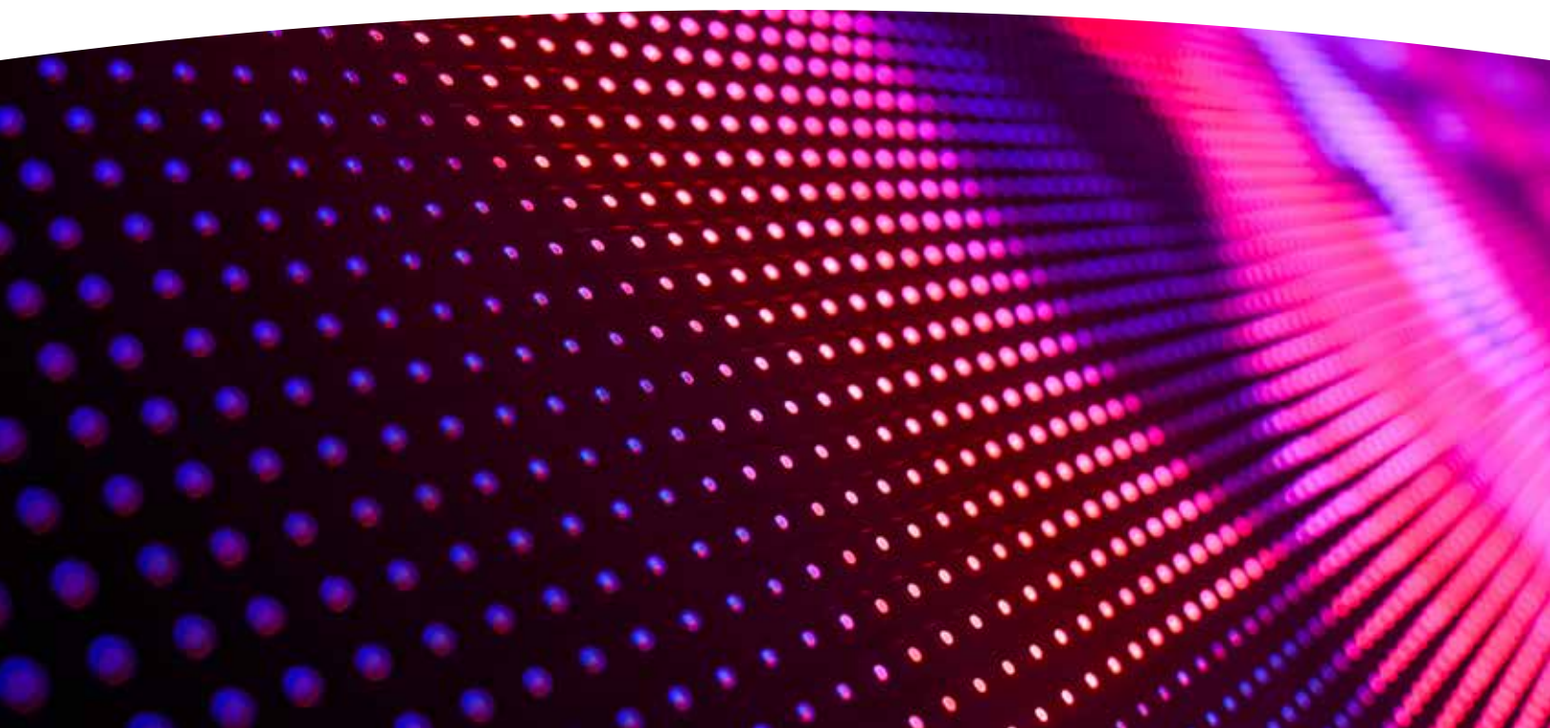
Conversely, if demand is much lower than expected, there will be markdowns, excess inventory, waste and lost revenues.

If a model only predicts what will happen on average, you can't know the risks. In order to achieve the autonomous supply chain, models must reliably and repeatedly predict the probability of out-of-stocks and the expected waste. Both types of predictions depend on understanding the uncertainty (the width of the probability distribution), not just knowing the average. Even if two items have the same predicted probability distribution, it doesn't mean that the stock levels for each should be the same. Actual costs may be asymmetric and depend on individual item properties, including shelf life and the ratio of sales to purchase price.

Can models be easily confused?

Reliable prediction models from trusted vendors are not easily confused, because they have been optimized to operate accurately for retailers. For example, they do not consider random demand or buying patterns, then incorporate these outliers into future forecasts.

Note: Common ML-based predictions models are not optimized for the complex retail environment, which can cause an inaccurate view of demand.



Ditch the Black Box.

The right AI/ML technologies make decisions using calculations beyond human cognition, but they should not be beyond your understanding.

Can your internal stakeholders understand the solution?

To drive acceptance and adoption of AI and ML, their automated decisions must be explainable. Retailers cannot afford to put one of their most critical business processes, the flow of goods, into a "black box" that their internal stakeholders fail to actually understand. While advanced ML algorithms can outperform the most experienced demand planners, these solutions must still provide clear insights into the causal factors underlying their predictions. Even if ML-enabled decisions are autonomous, the process must still be completely understood by employees.

The Future Is Here, Are You Ready?

The number of retailers using AI and automation is predicted to double in the next 2-3 years.[2]

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Global annual spending on AI by retailers alone is expected to exceed $7.3 billion by 2022. And virtually half of retail leaders are investing 5–10% of their IT budgets in AI.[3] That's because these technologies are fundamentally changing the way we think about business. With the exacting precision only machine learning can provide, more is possible than ever before, including reduced waste, increased operational efficiency, higher revenues and more personalized customer experiences.

Learn more at blueyonder.com

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2 According to a study published in 2019 by the National Retail Federation (NRF).

3 Capgemini Research Institute Report.