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AI Buyer's Guide: Setting the Record Straight

Cutting Through Marketing Hype to Drive ROI

Executive Summary

Artificial intelligence (AI) is a term that has been dominating the headlines for some time now. This is largely due to the sense of mystique and intrigue that goes hand-in-hand with any rising technology. However, there is a significant gap between the amount of discourse and the degree to which the average person understands what AI actually is or how it works.

Outside of the media hype, AI has also become a buzzword used liberally by supply chain technology providers, and with good reason. The drive to create agile and resilient businesses is causing today's leaders to ask more and more of their supply chains and making them hundreds or thousands of times more complex. This complexity necessitates a new approach in which AI can have a much-needed, significant positive impact. Yet the characteristics that determine the success of AI technology are often hidden behind a blitz of confusing and misleading marketing language.

This buyer's guide explores the truth beyond the hype. Topics covered here will include the three main categories of AI available, why not everything technology providers market as AI is, in fact, AI, and the importance of embedded AI for supply chain applications. Use cases for supervised, unsupervised, and reinforcement machine learning will provide a practical foundation for understanding AI's versatility and value in the supply chain.

Finally, valuable buyer's tips throughout the guide will offer insights and best practices for business leaders considering AI investments at any stage of the supply chain journey — from augmenting functional activities to full decision automation and digital transformation.

KEY TAKEAWAYS:

- Understanding why AI without data is meaningless
- How to get the internal- and external-system data required to make quality AI decisions
- The importance of field-proven technology for mission-critical operations like supply chains

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Background: Why AI, and why now?

AI has come to the forefront today because supply chains themselves have changed and continue to do so. For years, outsourced global manufacturing with complex, cost-optimized networks was standard practice in many industries. Goods and materials flowed predictably through multiple tiers of supply, manufacturing, and distribution with just-in-time delivery and marginal tolerance for variances. This worked well while the world was relatively stable.

However, pandemic-related disruptions, the rise in economic nationalism, and escalating trade tensions have changed all that. After years of relative stability, recent extreme oscillations in the supply chain now pose an existential threat to companies that lack the resiliency to adjust to new conditions and the agility to seize new, unforeseen opportunities. Risk and resiliency have become a top priority for executives and shareholders as they look to rebalance their supply chains to work in today's less predictable conditions. In particular, the crisis precipitated by the novel coronavirus has raised a new awareness of how the long-enjoyed operational stability is really an illusion. It is as if the water levels have suddenly lowered, exposing rocks in what were previously considered safe channels.

As a result, end-to-end visibility, resiliency, and agility have become business imperatives, and the demand for technology to enable them is at an all-time high. The urgency many companies feel is exemplified by media reports of Tier-3 suppliers going out of business and jeopardizing a once stable and cost-optimized global supply chain. As a recent McKinsey & Company report on risk and resiliency highlights, "The number of tiers in a supply chain determines how much visibility is possible—and the degree to which downstream companies can spot problems and respond to them before events snowball."[1]

Visibility into and data from all upstream and downstream tiers are essential to enable a new type of business decision-making that has these characteristics:

Boundaryless: informed by the complete end-to-end supply chain

Current: reflective of what is happening right now

Agile: equipped to react quickly to capture unforeseen sales opportunities

Resilient: able to withstand disruptions stemming from any part of the supply chain

Decision-making like this requires that systems not only encompass and process more, but also do it faster and in a cross-functional way that maximizes corporate goals instead of optimizing siloed departmental metrics.

Clearing the air: common misconceptions about AI

As is the case with most technology solutions, it's important to separate fact from marketing overhype, and when it comes to AI, there is a lot of hype to dig through. There are some common misconceptions that business leaders considering investments in supply chain AI should beware of — and technology providers often gloss over or even conceal in an effort to close more sales.

Misconception #1: AI tools are more important than the data

Simply put, AI without data is useless. This is an essential takeaway for business leaders evaluating AI for their supply chains, and one that many technology providers will try to obscure with flashy marketing. This encompasses much more than merely the data within the four walls of the enterprise, which is typically siloed by function. For modern supply chains, the data required for AI to truly enable agile and resilient decision-making must come from every partner at every tier.

Also, the scope must include real-time operational data as well as extensive historical information. Regardless of whether a vendor purchased an AI company, rolled out an impressive rebranding campaign, or has the most advanced algorithms, if the vendor lacks access to this level of data to power AI, the value will be limited.

BUYER'S TIP

Remember that data is critical. AI without data is useless, so stakeholders must have a clear plan on how the supply chain will get the data when considering any investment.

Misconception #2: All AI is created equal

Furthermore, not everything labeled as AI actually is AI. What determines the true value of AI is not just the underlying algorithms themselves but the combination of the technology and the data to drive it.

To cut through the hype and ensure any technology investments will yield a reliable return, it is crucial that business leaders challenge technology providers on not just the type of AI they are offering, but how the AI will be receiving the broad and deep data required to provide real value. Given the strategic importance of the investment, business leaders should also insist that potential AI technology providers provide use cases demonstrating field-proven robustness at scale.

Misconception #3: Using AI Requires Data Scientists

Most supply chain departments either lack extra data scientists or have none at all because they are allocated to the finance group. However, companies do not need to hire additional data scientists for core supply chain applications when using embedded AI that is part of their supply chain management software.

This is commonly misunderstood because generic AI tools — that is, those that are not purpose-built and not embedded — do require data scientists. Data scientists use these tools to sift through data lakes in search of nuggets of insight. For example, generic AI from Google and IBM was "trained" by data scientists to do things like beat the world champion at Go, win at Jeopardy, and identify cancer cells. While beneficial for certain tasks, generic AI is not the best type of AI for running the core operations of advanced supply chains.

BUYER'S TIP

Embedded AI is required for a digital twin. AI embedded within the network platform is key to analyzing operational data in real time and enabling decision automation. Creating a digital twin of the physical supply chain requires extremely efficient and low-latency normalization, cleansing, enriching and contextualization of data at a scale that is impossible without embedded AI.

Enhanced by years of historical data, embedded AI works on dynamic data streams in real time instead of pulling from static data lakes. No data scientists are required because AI for supply chain use-cases is already baked into the algorithms. Specialized for a specific supply chain function, this AI is high-performance, robust, and efficient. While it cannot cure cancer, supply chain AI can cleanse data or forecast demand with tireless precision — without the need for new data scientists.

The value of AI depends on far more than the quality of the algorithms. The scope, quality and timeliness of the data also play a key role in determining results and reliability.

New Approaches for New Complexity

To support agile and resilient supply chains, systems must process far more data with far more complexity from far more sources — and do it faster than ever before, with significantly less human involvement. However, the new complexity extends beyond the sheer volume and urgency of data and encompasses new levels of mathematics and decision-making complexity. This adds to the challenge companies face.

Data Complexity

Agile and resilient decisions require boundaryless, end-to-end data encompassing the entire value chain rather than just part of it. This means going beyond the data housed in the enterprise resource planning (ERP) system or other enterprise systems to include upstream and downstream ecosystem partners. The exponential increase in data volume requires automated techniques to normalize the data and make it decision- grade.

Data must also be processed much faster than before for timely decision-making, so manual analyses are not feasible and batch transfers are no longer sufficient. Data must be delivered and processed in real time, requiring AI. Consumer, economic conditions, regulations, and other factors can change moment by moment, so mitigating risk and capturing unexpected opportunities means leaders must understand the current situation across the end-to-end supply chain. Varying inputs combined with real-time feedback on execution compress planning cycles to the point where they start to become continuous instead of iterative.

Math Complexity

While there are many techniques for automating repetitive, unpleasant tasks, agile and resilient supply chains require a branch of extremely complicated pattern recognition and stochastic mathematics — calculations involving inherent randomness — that go well beyond human capabilities. This quickly crosses over into the domain of advanced algorithms and machine learning.

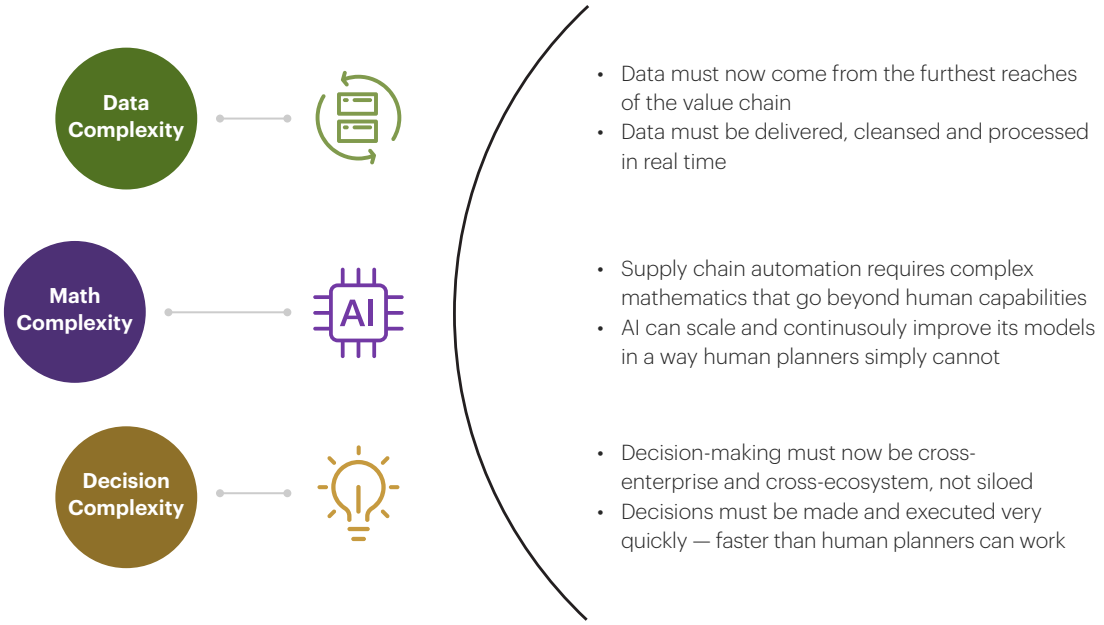
Stochastic models with uncertain system inputs, such as consumer demand, supply availability, and logistics performance, have inherently uncertain outputs. Models like this benefit from running as many iterations as possible. Instead of running the models 10 times with different variants, AI can conduct thousands of iterations in the time it would take a traditional system to run one. AI also learns from each run, providing the kind of continuous improvement and scalability that traditional systems could never deliver but is critical for establishing an agile and resilient supply chain.

Decision Complexity

To achieve the best business outcome, decision-makers also need to consider cross-functional tradeoffs. This is something traditional approaches rarely addressed because decisions were mostly siloed and focused on improving functional metrics. In addition, decision-making must now be cross-enterprise and cross-ecosystem. This added complexity strains the competencies of typical organizations but presents no difficulty for the right AI.

In addition to being extremely complex, decisions must now be made and executed very quickly — sometimes in seconds. Near-instant timeframes mean that automation technology is the only feasible solution. Even the most competent planning team will not be able to manually deliver on this new requirement.

> Every aspect of running a global business has grown exponentially more complex in recent years, and many key decisions must be made almost instantly. Making and executing data-driven decisions requires AI.



Classes of AI

There is one more distinction that must be made to truly cut through the AI hype. True AI includes three types of machine learning: supervised, unsupervised, and reinforcement. Each method has extraordinary strengths in specific scenarios and using them in combination when needed can provide maximum impact.

Supervised Learning

How it works: Supervised learning finds patterns across disparate datasets. These systems are trained to recognize what "good" looks like and learn over time to accurately predict outcomes.

With supervised machine learning, the algorithm uses inputs and outputs to establish correlations with or without human guidance. One rudimentary example is training an algorithm to identify pictures of trucks by showing it thousands or millions of images of trucks — of all different sizes, angles, and colors — and telling the AI what is in the images so that it can recognize pictures of trucks in the future on its own.

Unsupervised learning

How it works: Unsupervised learning discovers hidden clusters – many of which are not obvious to people – without any training or guidance.

In this case, AI uses inputs to establish correlations without outputs or human guidance, which is essentially an output. In short, when using unsupervised techniques, AI learns without the benefit of training. To return to the example of identifying trucks in pictures, the algorithm analyzes images of different kinds of trucks but receives no instruction on how to classify them. AI learns to cluster the various types into vans, box trucks, flatbeds, tankers, and so on by identifying common attributes such as cab size, trailer shape, and number of wheels. One advantage of unsupervised learning is that the algorithm can detect patterns in equivalent items that may not be intuitively obvious to humans but have strong correlations.

Generative learning

How it works: Generative AI uses large language models to interpret masses of unstructured data and generate new content with similar characteristics, often featuring the human chat-like interaction that made ChatGPT famous.

Generative AI (Gen AI) is a deep-learning model that can take huge bodies of raw data and use it to "learn" how to generate output similar to the original work with a high probability level. We've all heard about products like ChatGPT®, which can write stories, articles, songs, term papers, and even software code using a prompt. The true potential of generative AI is from unlocking masses of unstructured data for traditional AI – without a strong foundation of traditional AI, most of the value of Gen AI remains hidden.

BUYER'S TIP

Understanding the three categories of what is commonly called "AI" is a crucial step toward cutting through the hype to discern fact from fiction. By becoming familiar with these different capabilities, business leaders can challenge the claims that technology providers of generic AI make and better understand the actual AI technique and the data required to drive it.

Reinforcement learning

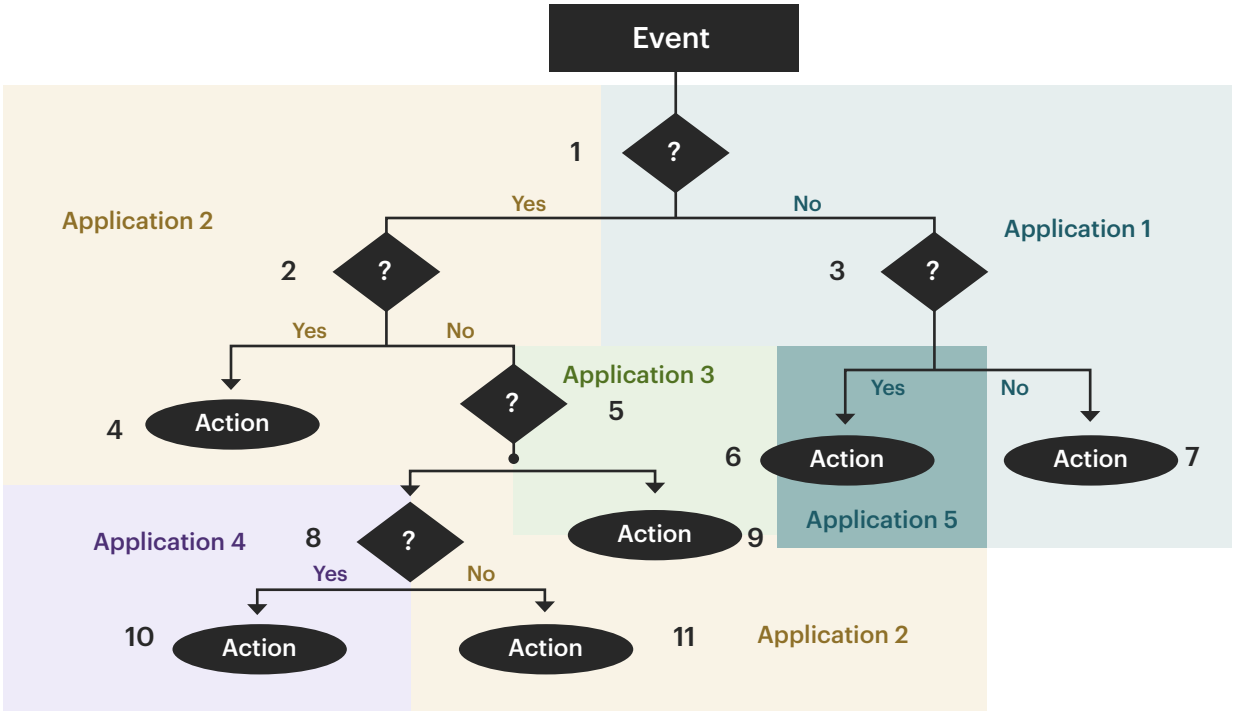
How it works: Reinforcement learning explores different options on its own through trial and error, learning which actions to take based on the best outcome.

The third AI method is reinforcement learning. Unlike supervised and unsupervised learning, reinforcement learning does not require historical data for training. Instead, the algorithm repeatedly simulates how future events could unfold under specific circumstances. Exploring all possible scenarios, AI identifies the optimal course of action for any given one. No matter which scenario occurs, AI has already simulated them and knows the optimal course of action to take. In the supply chain, reinforcement learning is used to significantly improve decision-making when complex scenarios have multiple, interdependent, time-sensitive variables.

As with the other learning methods, reinforcement learning has many real-world use cases, such as aligning dynamic forecasts with supplier orders and logistics and trade compliance variables when each of these has quantities and timelines that impact the others.

BUYER'S TIP

AI should apply to all operations, not just one or two functional workflows in supply chain or channel management. Business leaders are best served by seeking a vendor that meets their immediate needs, has the AI breadth and depth to provide assistance across all parts of the business, and creates a pathway for making cross-functional decisions. In short, the vendor of choice should be able to grow with the organization as its needs mature.



Reinforcement AI enables decision automation for complex, cross-functional process workflows.

Value of Robust and Field-Proven AI

Since it is responsible for mission-critical planning and execution decisions that drive businesses, supply chain AI should be robust and field-proven, with years of production experience. A vendor that simply makes an AI acquisition or one that rebrands the company to emphasize artificial intelligence in its marketing cannot necessarily offer AI that is ready for prime time. Returning to the car analogy, most buyers would not entrust their loved ones to an autonomous car that was just commercialized, accompanied by a flashy marketing campaign. Instead, they would insist on an automaker that has millions of cars on the road and has built a safe track record over the span of years.

Due to the gravity of the AI buying decision and the consequences if the technology should fail, most buyers rightly insist on sustained, reliable, world-class performance in real-world situations spanning years or even decades. The same is true for enterprise technology investments. The stakes are enormous, and the consequences can be extraordinarily high if the technology underperforms or fails.

Supply chains are mission-critical, so the AI that powers them must have a long track record of reliability at scale. Proven AI provides a significant competitive advantage. Unproven or small-scale technology can be a liability, not an asset.

BUYER'S TIP

Nothing beats experience. Decision makers should ask technology providers for proof points on AI deployment scope, scale, and time in production. The following are some sample questions:

- How many clients does the vendor have and are they comparable when it comes to size and business needs?
- Is the deployment in one division, one region or the entire company?
- How many years has the deployment been in production for each client?

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Role of a Multi-Enterprise Business Network

To get all the data to power their new AI, companies must go beyond their four walls and connect with everyone in their upstream and downstream ecosystem, including all tiers of suppliers, distribution, logistics, and global trade partners. This requires a multi-enterprise supply chain business network. Gartner and IDC have both analyzed the market and evaluated vendors in the Gartner Magic Quadrant for Multienterprise Supply Chain Business Networks[2] and IDC MarketScape: Worldwide Multi-Enterprise Supply Chain Commerce Network 2018 Vendor Assessment[3], respectively.

Most traditional supply chain management vendors failed to even qualify for consideration in the analysts' reports because their solutions were designed to be enterprise-centric. These vendors typically offer application programming interfaces (APIs) to connect to external data sources in what is essentially a build-it-yourself strategy: the client builds individual connections to partners instead of reusing an existing network connection.

As a result, the API approach is cost- and time-prohibitive for any deployment of scale. Given the outsized cost and inefficiency, building hundreds or thousands of API connections is challenging enough. However, it is even more difficult to take the essential step of normalizing, contextualizing, cleansing, and enriching partner data to make it decision-grade after the connection is established, and then provide contextualization to create a digital twin of the physical supply chain. This requires an integrated data model, which is the heart of a multi-enterprise supply chain business network but a foreign concept for enterprise-centric systems. As such, the concept of a network is beyond the scope of traditional enterprise-centric supply chain technology providers.

Multi-enterprise supply chain business networks also collect the data to feed AI to make better decisions and put AI-enabled decisions into action. This includes the closed-loop communication of findings back to all ecosystem partners to ensure execution, monitor performance to detect deviations from the plan, and proactively take corrective actions. End-to-end supply chain orchestration requires the combination of a network, a full suite of software applications, and proven AI — all harmonized on a single operating platform.

A multi-enterprise network is the only feasible way to get the end-to-end supply chain data required for AI to deliver more than marginal value.

Key Takeaways Before Making an AI Investment

The pressing need for agile and resilient decision-making has made AI essential for supply chain management. As a result, most executives are no longer asking whether to invest but where to invest. Despite misleading market hype, the truth about AI in the supply chain is remarkably simple. To realize — and hope to maximize — the return on investment (ROI) from next-generation supply chain management technology, leaders should choose a vendor that can provide these four things:

- Data from every part of the extended supply chain and a multi-enterprise business network to get it from all tiers of ecosystem partners
- Robust, field-proven AI with use cases at scale
- AI that is embedded within a full suite of planning and execution applications instead of merely a data-lake overlay
- A single operating platform that brings together the network, decision-grade data, and AI-enabled applications to meet current and future needs

Want to dig a little deeper? Check out our other AI resources:

AI Buyers Guide: Supply Chain Use Cases

AI Buyers Guide: Data is the Currency

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2. Christian Titze, William McNeill and Bart De Muynck. Magic Quadrant for Multienterprise Supply Chain Business Networks. Gartner, May 4, 2020. [https://www.gartner.com/doc/reprints?id=1-1YYVD2FX&ct=200505&st=sb] Gartner does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with the highest ratings or other designation. Gartner research publications consist of the opinions of Gartner's research organization and should not be construed as statements of fact. Gartner disclaims all warranties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose.
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