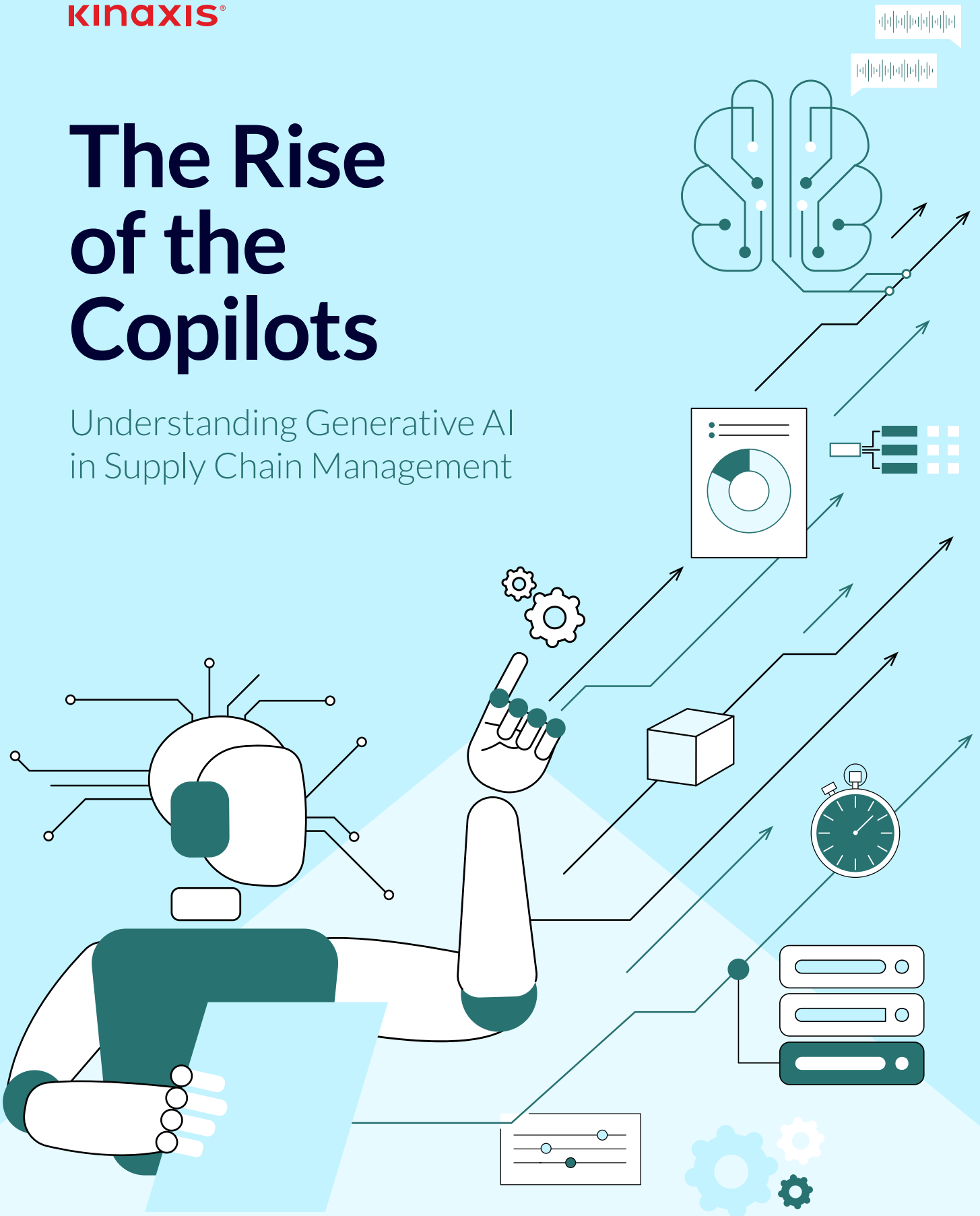


# The Rise of the Copilots

Understanding Generative AI in Supply Chain Management



In the fast-paced world of supply chains, a crisis is unfolding. Gone are the days of stable supply and predictable demand. You're being asked to do everything more quickly while juggling higher-than-ever customer and board expectations. All in a challenging economic environment.

One thing's for sure: supply chain management is not a career choice for the fainthearted.

Enter artificial intelligence (AI), heralded as a potential antidote to all that ails today's supply chains. Some swear by its miraculous powers, while others dismiss it as technological snake oil.

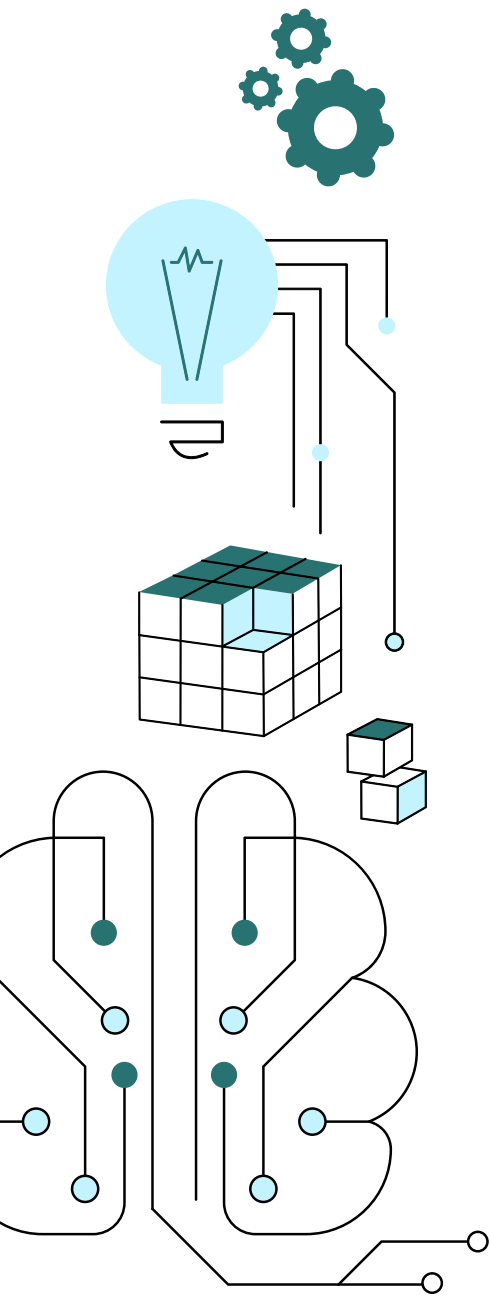
As a supply chain professional, not a day goes by without you being bombarded with information about artificial intelligence. At the same time, your CEO and board are asking how it can be a quick fix to improve the financial performance of your supply chain. So, is AI the miracle cure you desperately need, or is it merely a placebo?

To answer those questions, in this ebook, we'll delve into the intersection of AI and supply chain management, focusing on the transformative capabilities of generative AI.

From understanding the fundamentals, exploring use cases, avoiding the pitfalls, and sneaking a peek into the future, each chapter offers valuable insights and practical guidance.

Whether you're a seasoned industry veteran or a newcomer to the world of AI, this ebook aims to help you understand how generative AI is reshaping the future of supply chain management.

Join us on this journey as we explore the possibilities, challenges, and opportunities that lie ahead in the era of AI-powered supply chains.



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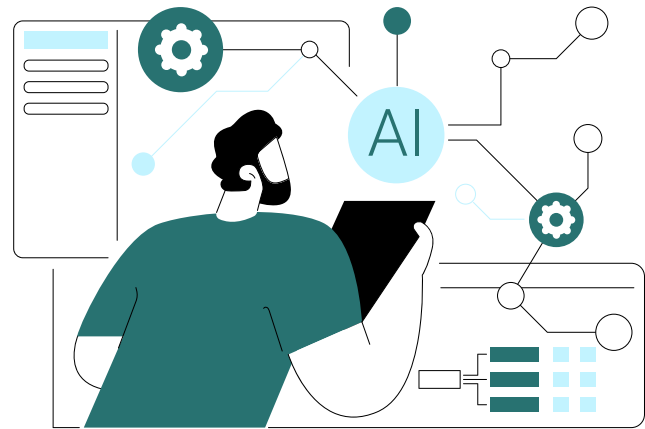
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# Understanding AI in supply chain management

AI has the potential to bring about positive change in society, like improved healthcare, greater productivity in agriculture, and increased access to education. And when it comes to the supply chain, AI-powered technologies can bring powerful capabilities to help address the kinds of complex problems that supply chains are facing. In fact, Gartner reports that half of supply chain organizations want to implement generative AI this year.<sup>1</sup>

But, before jumping in with both feet, it's important to start with the basics.

AI encompasses a range of technologies that enable machines to perform tasks that traditionally required human intelligence. In supply chain management, some of the most relevant fields of AI are optimization and machine learning, including two of its major branches, deep learning and generative AI. These technologies empower organizations to analyze vast amounts of data, predict and prescribe outcomes, and automate decision-making processes.



## What AI can do

- › Generate recommendations
- › Predict and surface insights
- › Provide speed and scale
- › Automate processes
- › Enhance productivity

<sup>1</sup> Gartner Survey Shows Half of Supply Chain Organizations Plan to Implement GenAI in the Next 12 Months. <https://www.gartner.com/en/newsroom/press-releases/2024-01-10-gartner-survey-shows-half-of-supply-chain-organizations-plan-to-implement-genai-in-the-next-twelve-months>

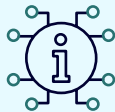
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# Areas of AI development



## **MACHINE LEARNING**

Acquire new insights without being explicitly programmed to make decisions or predictions.



## **DEEP LEARNING**

Extract features for more complex pattern recognition using multiple layers.



## **GENERATIVE AI**

Learn from data patterns without human direction to generate seemingly new realistic content.



## **OPTIMIZATION**

Leverage advanced mathematical modeling techniques to find the best possible solution.



## **GENETIC ALGORITHMS**

Mimic the process of natural evolution over generations to find optimal solutions organically.



## **DECISION MANAGEMENT**

Imitate human decision-making to automate, optimize, and manage complex decision-making processes.



## **ROBOTIC PROCESS AUTOMATION**

Automate repetitive, time-consuming, and rules-based tasks to streamline processes.

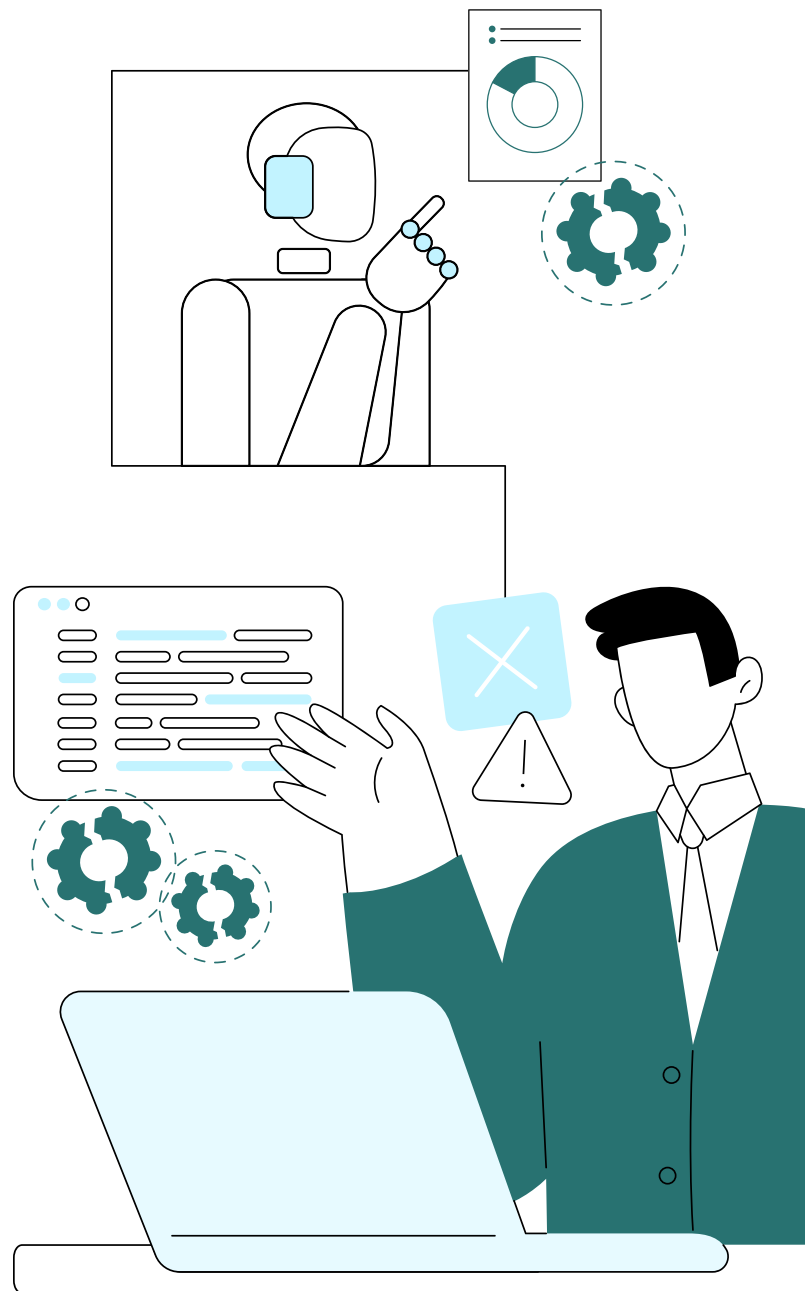
# AI vs Generative AI

Generative AI is like the cool new kid on the block, opening up new possibilities for supply chain management. While applications of machine learning and optimization have been adding value to supply chains for many years, generative AI is a newer subset of artificial intelligence that focuses on generating new data or content based on existing information. You may have heard references to large language models (LLMs), which are the foundation that powers generative AI.

## The good, the bad, and the ugly

One of the big pluses of generative AI is its knack for handling natural language. It can digest large amounts of text, synthesizing information from multiple places in multiple languages to answer questions in whatever language works best for you in a single, curated response.

But be warned. Because generative AI works based on statistical probabilities, it doesn't always get things right.



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According to AI expert, Polly Mitchell-Guthrie, there are a few things to watch out for. She says: “First, generative AI doesn’t deal in real-time information because its training was fixed at a point in time. Second, while it’s good with words, it’s bad at math.

*As this tech keeps evolving, it’s crucial for businesses to keep their finger on the pulse, understanding what generative AI can and can’t do.*

“Most importantly, it doesn’t understand. It feels like it understands when you ask your questions and it gives you what feels like a very personalized answer. But what feels like human understanding is actually a probabilistic sentence completion machine that is predicting one word at a time. And it can be prone to hallucinations – if you ask it a question, it ‘generates’ an answer, which could be made up. For example, it could give you citations of professors who’ve written papers

and give you papers they’ve written. Only they haven’t written those papers, and maybe those professors don’t even exist, or the professor exists, but they haven’t written that paper!”

But, even with these fallibilities, generative AI has enormous potential to help companies work smarter and faster to solve for supply chain challenges. Its capacity for us to interact with it in our own language opens up a world of capability, providing a gateway to more advanced information previously inaccessible unless you had the right keys.

As this tech keeps evolving, it’s crucial for businesses to keep their finger on the pulse, understanding what generative AI can and can’t do, while also finding the most effective ways to apply it to stay ahead in today’s fast-paced business environment.

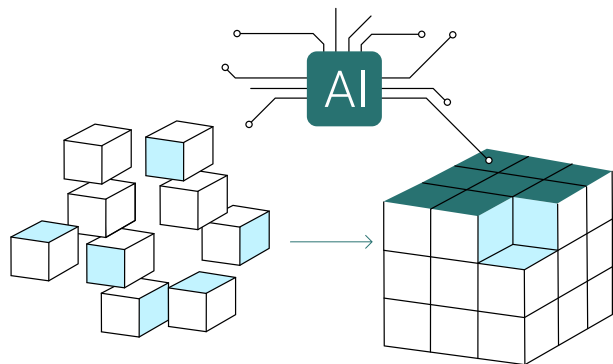
# The right tool for the right job

When it comes to AI in supply chain management, it's crucial to remember that it's not a one-size-fits-all solution. Whether we're talking established applications of machine learning, such as demand sensing, or the newer generative AI, it's important to understand the strengths and limitations of each and select the most appropriate solution for the specific challenge at hand. In fact, the fusion of techniques is arguably the best way to leverage the strengths while alleviating the drawbacks.

So, while generative AI might excel in understanding natural language and synthesizing information, as previously mentioned, math isn't its strong suit. Machine learning can boost forecast accuracy by incorporating additional demand signals, but its much-hyped branch called deep learning also illustrates its limitations. Research has shown that deep learning models can improve forecast accuracy over certain time horizons, but at the cost of significant time and computational resources. How many supply chain leaders are willing to wait 15 days for results, which is the compute time one leading researcher found it might take? These challenges make deep

learning impractical for many supply chain applications at the present time. In the same way, mathematical optimization's strength in finding the most optimal solution to complex supply chain problems often entails a trade-off with longer run times to solve.

That's why a fusion of approaches is the way to go. Blending disciplines like heuristics, machine learning, and optimization plays to the strengths of each while mitigating the trade-offs. The key is knowing when to use which tool and not trying to force one solution to solve every problem.





# The rise of the copilots

The need for intelligent decision-making tools has never been greater. Generative AI is providing new ways for companies to streamline operations, optimize processes, and adapt to dynamic market conditions.

Copilots such as Microsoft's branded 'Copilot' product represent one application of generative AI specifically designed to augment human expertise by automating tasks a human would do and allowing the human to direct those tasks in natural language, without requiring technical proficiency. A copilot is like having a smart assistant for writing or coding. It's a tool that helps you come up with ideas, write text, or even generate code by providing suggestions and completing your sentences. It's like having a helpful teammate that assists you in your creative or technical tasks.

These intelligent assistants can do things like access advanced machine-learning algorithms, natural language processing capabilities, and vast repositories of domain-specific knowledge without the supply chain practitioner needing to know how to do it. Copilots combine these capabilities to augment people by functioning

as collaborative partners, working alongside human users to analyze data, generate insights, and facilitate decision-making.

*From a productivity standpoint, it's a game changer.*

As Polly Mitchell-Guthrie says, "In supply chain management, generative AI is less about solving for a problem in a particular area such as supply or demand, and more about the user experience as a whole, allowing users to learn faster, create faster, and solve faster.

"So, we might be using machine learning to give us a better forecast, optimization for complex trade-offs, and automation to eliminate a lot of manual work, but what's really exciting about generative AI is how it democratizes the whole

process. You don't have to know the name of that worksheet you created somewhere. You don't have to know where to find it. You don't have to know how to write code. You can get that given to you, which basically means more people can do more things. From a productivity standpoint, it's a game changer."

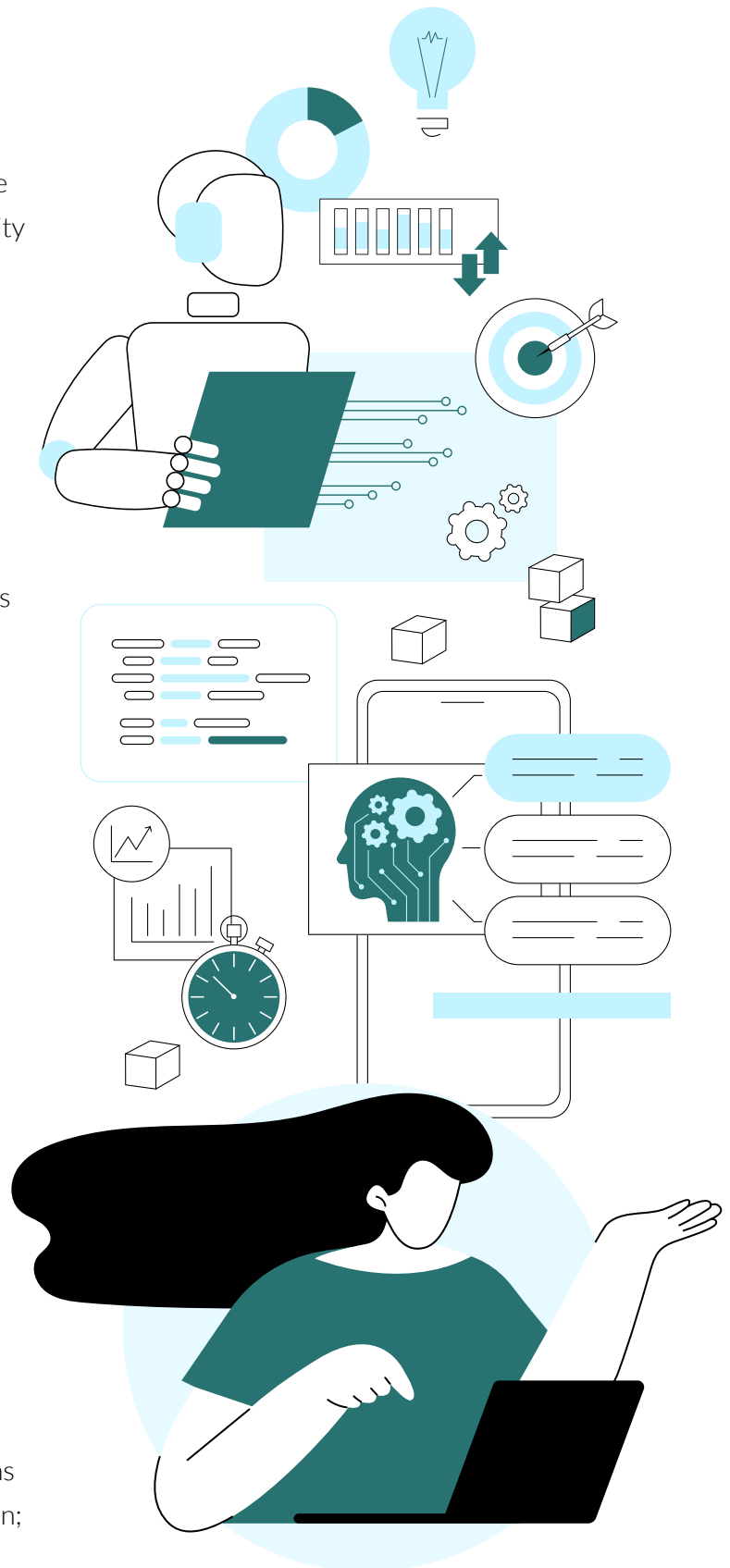
## Learn Faster, Create Faster, Solve Faster

From answering questions to creating resources and solving complex problems, generative AI offers a spectrum of capabilities that can drive significant benefits across various facets of supply chain management. Let's explore three compelling applications of generative AI – the helpbot, copilot, and intelligent agent – each offering unique advantages and allowing your planners to learn faster, create faster, and solve faster.

### Helpbots

Think of a helpbot like a friendly assistant that's always there to answer your questions and give you a hand. It's like having a super knowledgeable friend you can ask to help you pinpoint exactly what you need, providing quick answers, guiding you through processes, and offering helpful tips or suggestions. It's there to assist you whenever you need support or clarification.

No more wasting time trawling through reams of documentation to find the right information;



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your planners can simply ask the helpbot a question and receive a synthesized answer in seconds.

## Copilots

Now, imagine a copilot as your partner in crime, but in a professional sense. It's like having a collaborator who works alongside you to tackle challenges and get things done. A copilot doesn't just provide answers; it also executes tasks for you, for example, by writing code or authoring new resources without the need for you to know how to do it. And, even if you do, your copilot can do it quicker!

## Intelligent Agents

Intelligent agents take things to the next level, allowing companies to interact with their data in a conversational manner.

These agents are connected to various data sources within the company's supply chain ecosystem, including databases, ERP systems, IoT devices, and more. They can access and integrate data from multiple sources in real time. Through a user-friendly interface such as a chatbot or virtual assistant, employees can interact with the intelligent agent using natural language queries, just like chatting with a colleague.

Upon receiving a query, the intelligent agent analyzes the data, retrieves relevant information, and generates insights or recommendations in response. This could include inventory levels, shipment status,

demand forecasts, supplier performance metrics, and more.

Based on the analysis, the intelligent agent can provide actionable recommendations to optimize various aspects of the supply chain, such as inventory management, logistics routing, procurement decisions, and demand planning.

Intelligent agents can also learn and improve over time through machine learning algorithms. They adapt to user preferences, refine their understanding of queries, and enhance the accuracy of their responses based on feedback and new data inputs.

By enabling companies to 'chat with their data,' intelligent agents democratize access to critical supply chain insights. Employees across different departments and levels of expertise can effortlessly engage with complex data sets, empowering them to make informed decisions and drive operational excellence within the organization.

Each of these use cases demonstrates how generative AI can be applied in different ways to streamline operations, improve decision-making, and enhance overall efficiency within the supply chain management domain.

# Realizing the value

While your best-in-class supply chain management platform has many powerful capabilities, it's only as good as your ability to use them. By providing an intuitive way for users to interact with your systems and your data, generative AI enhances the user experience and empowers your people to make smarter decisions faster than ever before.

Picture this: You're in your monthly executive S&OP meeting. Your management team identifies a gap between your operational forecast and your financial plan. Your head of sales suggests running a promotion in Q3 with one of your major retail customers. Your CEO approves the suggestion, and your supply chain function is instructed to go away and figure out how to make it happen. Your planners spend hours manually modeling the impact only to find you don't have the inventory or the delivery capacity in your network to execute on it. You're back to square one, only now you have less time to find a solution.

Now imagine you have a generative AI tool sitting atop your supply chain orchestration platform. You ask it to tell you how you can bridge the gap between your operational

forecast and your financial plan. It instantly executes all the necessary steps – creating a workbook and doing complex analysis that would otherwise take hours or days, identifying in seconds that you have surplus inventory in Canada, and suggesting running a promotion to clear it. It also suggests moving that inventory to Texas where there is higher demand for that product. You have a viable solution that solves not one, but two problems and the tool immediately commits the new scenario to the plan. In real-time. In your actual S&OP meeting!

Or, say you have a customer order but no stock of the required part number. You suspect you have similar products – or even the same product but with a different part number – in your network. Generative AI can instantly generate a list of potentially equivalent parts in different locations, so you can quickly determine whether these can be used to fulfill the order or expedite production.

And that's just two examples. While it's still early days for generative AI in supply chain management, as more companies begin to explore and experiment with it, the list of use cases is set to grow exponentially.

# Take a reality check

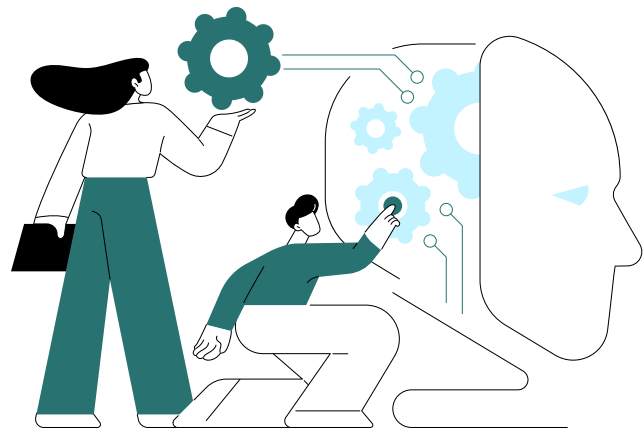
Although generative AI offers exciting potential in supply chain management, it's important to be aware of its limitations and set realistic expectations around what it takes to be successful.

If you want to use generative AI to solve a problem in your supply chain using your own data, remember that its success depends on the quality of that data. Generative AI uses different methods to find solutions, and all of them need data and machine learning. And machine learning loves good data like we love our morning coffee. But if your data is messy or missing, it's like trying to brew your coffee without the beans. To best leverage the power of generative AI in your supply chain operations, you need to improve the quality of your data, aiming for as clean, complete, and accurate as possible. At the same time, it's important to recognize when your data is 'good enough' and not let perfect be the enemy of good.

Then there's the issue of understanding how generative AI makes decisions. It often feels like trying to crack open a black box – you're left scratching your head wondering what's

going on inside. This lack of transparency can make it hard to trust the technology, especially for applications and in industries where clear explanations are a must.

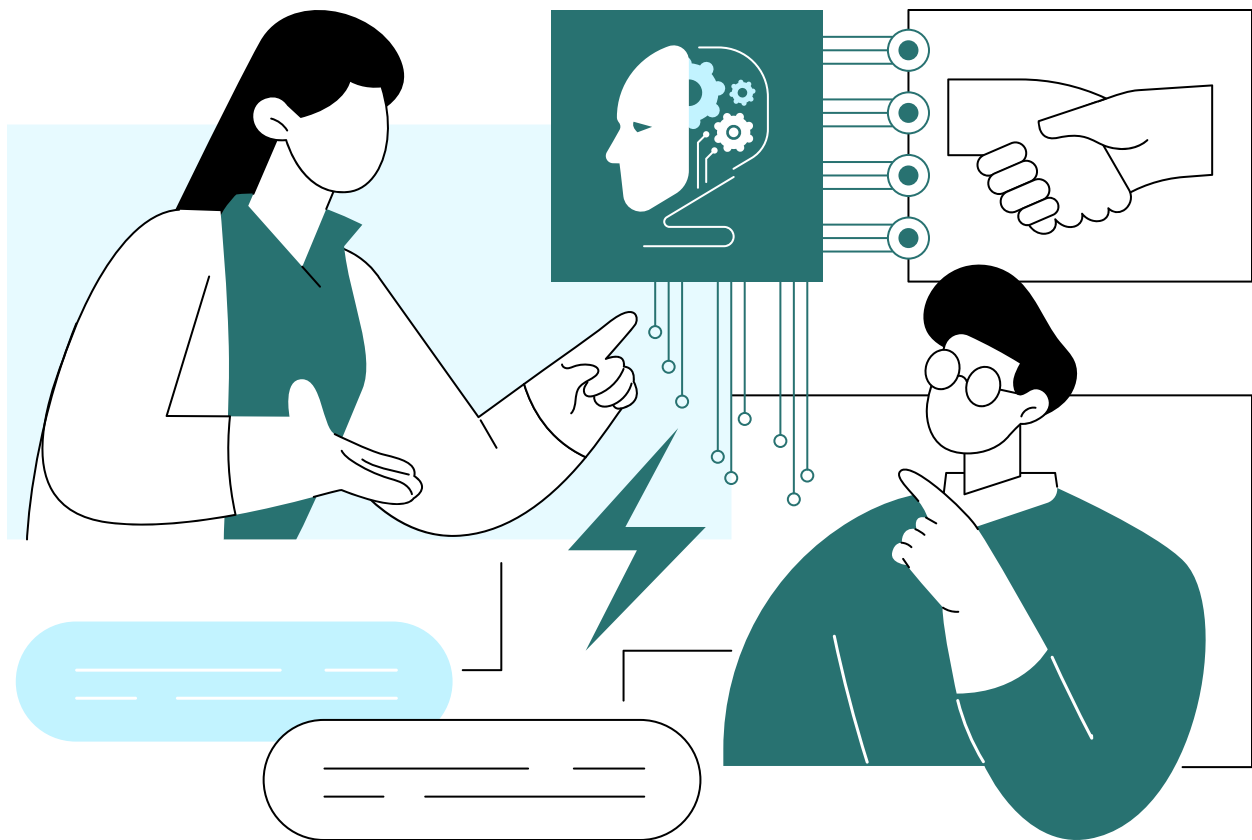
Scaling up generative AI solutions can also be a real challenge. It's not just a case of flicking a switch and suddenly everything works smoothly. There's complexity involved in managing implementations, from deciding which data it accesses, to employee use policies to prevent intellectual property leakage, to integrating with existing systems.



And, with so much sensitive information flying around, the last thing you want is a data breach or privacy violation on your hands.

Lastly, while generative AI can take care of a lot of the heavy lifting, human expertise is still essential. After all, someone needs to make sense of all those insights and recommendations, make sure they align with your company's goals, and monitor results on an ongoing basis since they know what to expect.

So, what's the solution? It's all about taking a holistic approach. By addressing data quality issues, improving transparency, scaling effectively, beefing up security measures, and fostering collaboration between humans and machines, you can unlock generative AI's full potential in revolutionizing supply chain management.



# The future of work

Imagine you walk into your office one morning. You grab coffee, log in to your supply chain management platform and your AI copilot tells you that based on the plan you had yesterday, it's gone ahead and fixed seven problems for you. For another three, it has recommendations

that you go ahead and execute. But, there are two others for which it doesn't have an answer. Instead of having 12 things to work through, you now only need to attend to two critical issues that require your unique human intelligence and experience.

While that's a way off what's possible today (despite what some may have you believe!), generative AI will have a profound impact on the work of supply chain planners.

Despite advancements in supply chain management technology, the reality today is that in the majority of companies, supply chain planners still spend the bulk of their time on transactional MRP activities. In more advanced companies, they're creating and evaluating scenarios and, in a small number of cases, they're using decision support tools to help them.

In the future, this role will likely evolve further so that planners spend their time training the models and defining the guardrails to allow generative AI to create those scenarios.

To do this, they'll need new data literacy and governance skills to structure, understand,

*The future supply chain workforce must possess a multifaceted skill set, combining technical proficiency, ethical awareness, adaptability, and strategic acumen to navigate the evolving landscape shaped by generative AI.*

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interpret, and work with the large datasets that generative AI relies on.

In the words of ChatGPT itself, “The future supply chain workforce must possess a multifaceted skill set, combining technical proficiency, ethical awareness, adaptability, and strategic acumen to navigate the evolving landscape shaped by generative AI.”

But while there’s work to be done before you can take full advantage of generative AI in your supply chain, existing tools also provide a more immediate opportunity.

Says Polly Mitchell-Guthrie: “When it comes to finding, understanding, and creating the resources your supply chain management processes are built on, integrating a tool like

GPT-4 into your planning platform can do a lot of the heavy lifting. Your planners can simply ask the system to locate or explain a particular workflow or algorithm and it will run off, look at all the relevant documentation, and come back with a synthesized answer. Or maybe a planner has created a scenario and wants it to update automatically as new information comes in. The system can generate the code or script to automate that for them, without that planner needing to know how to write that code.”

Although no touch-planning is neither achievable today, nor necessarily desirable, generative AI offers the potential to significantly automate and optimize planning processes, freeing your people to focus on those problems that only human ingenuity can solve.





# AI at Kinaxis

Imagine a world where optimizing your supply chain is as intuitive as having a conversation. Where real people interact effortlessly with advanced technology. Where complex questions have simple answers. Where humans and machines work in harmony to drive more efficient, resilient, and sustainable supply chain operations.

Where AI just makes sense.

The Kinaxis Maestro platform embeds AI across your supply chain to connect and make sense of data, align people and processes, automate routine actions, and learn from every action to improve future outcomes.

Our unique concurrent planning and execution engine seamlessly integrates AI across your supply chain, bridging organizational boundaries and driving alignment within and beyond your four walls.

Most importantly, Maestro eliminates both the guesswork and the grunt work by making AI approachable, accessible, and fully integrated.

Our AI-powered user experience accelerates productivity by helping users learn from documentation and best practices to onboard faster and work more effectively. Moving forward, Maestro will create dashboards, scenarios, and more, making it easy for users

***“Kinaxis, in collaboration with AI4OPT, is exploring how the fusion of machine learning and optimization may bring a step change in capabilities for the next generation of supply chain management systems.”***

**PASCAL VAN HENTENRYCK**

A. RUSSELL CHANDLER III CHAIR AND PROFESSOR,  
GEORGIA INSTITUTE OF TECHNOLOGY

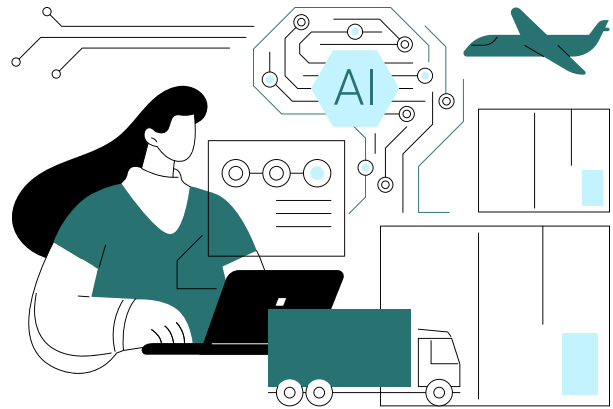
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to explore and interact with data in intuitive new ways.

To be successful with AI you need your people to ‘trust the math’ so we show them how and why our AI-driven insights, recommendations, and decisions are generated, in ways they can understand.

Maestro also offers an enhanced fusion of computational technologies and techniques to solve a broader range of supply chain problems. By combining technologies and techniques like machine learning, optimization, and heuristics in proprietary ways, organizations can amplify their teams’ decision-making with results that are faster, more accurate, and with a lower total compute cost – all without the need for a team of data scientists.

At Kinaxis, we’ve been actively working in the AI space for quite a while. Over time, we’ve come up with innovative new solutions that use AI to make supply chains better, and we’re excited to roll them out to our customers!



***“Having the ability to automatically detect changes in our supply plan, predict the impact on our business, and suggest alternative plans of action through advanced machine-learning capabilities gives Plexus an edge in meeting our customers’ needs.”***

**SCOTT THEUNE**  
SENIOR VICE PRESIDENT,  
GLOBAL SUPPLY CHAIN,  
PLEXUS CORP

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## CONCLUSION

Thanks to increasing customer expectations, cost pressures, and disruptions of all shapes and sizes, today's supply chains need all the help they can get.

While generative AI undoubtedly promises transformative potential, it's still early days and, in the short term, finding ways to combine tried and tested techniques such as machine learning, heuristics, and optimization can help solve for many of today's challenges.

At the same time, there are things you can – and should – do today to begin to unlock the power of generative AI. From using existing generative AI models to help more people do more, to laying the data foundations, establishing the guardrails, and educating the workforce in readiness for the future, doing nothing isn't an option.

In navigating the evolving landscape of supply chain management, embracing the synergies

between traditional methodologies and emerging technologies is paramount. As we chart a course toward the future, seizing the opportunities presented by generative AI requires proactive steps today. Whether it's harnessing existing models or fortifying data infrastructure, each action lays a foundation for the transformative journey ahead.

To learn more about how Kinaxis' AI-powered solutions are driving real-world results for real-world companies, visit [kinaxis.com](https://www.kinaxis.com)