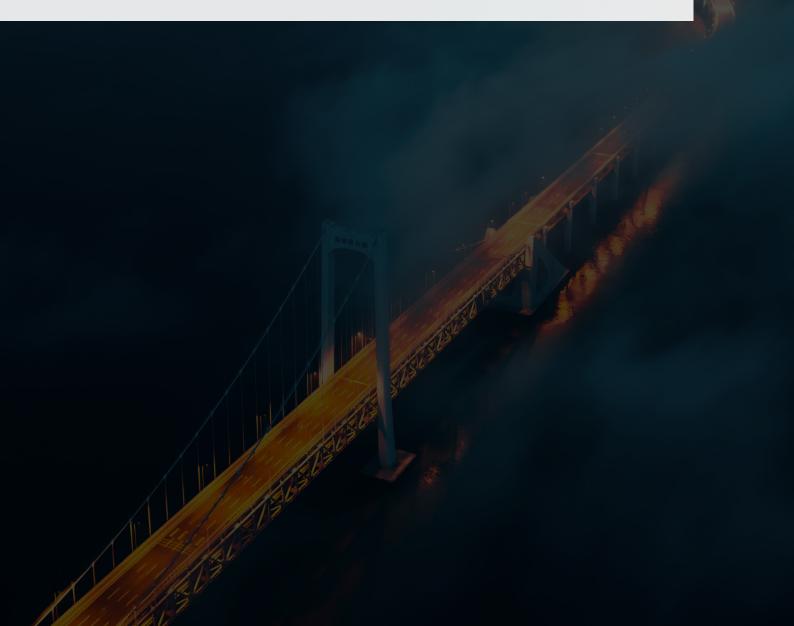


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Introduction

GenAl is accelerating the rise of autonomous supply chains, but many are struggling with implementation. Leading companies can show the way.

Since 2020, the global economy has <u>entered a new paradigm</u>, marked by disruptions and changes that are more forceful, appear more frequently, trigger more interconnected and widespread impacts, and often strike at once. Chief operating officers (COOs) and supply chain managers know this all too well – the supply chains they oversee exist on the frontier of this high-risk climate, bearing the brunt of its disruption.

In response, many companies refocused on boosting resilience in supply chains, which involved diversifying operations across multiple countries and suppliers. Supply chains that had once been ultra-lean gained protection against external shocks – but often at the price of reduced efficiency.

Enter generative artificial intelligence (GenAI), which can help companies leapfrog their technical maturity and accelerate their path toward an autonomous supply chain. All is being used to not only analyze and interpret vast amounts of data but also to create new scenarios, generate innovative solutions and remove frictions in real-time. This gives managers end-to-end visibility and frees human time for higher-order work.

The use of AI is not new in supply chains. Traditional AI has been used in supply chains for years, and 90% of survey respondents have embedded traditional AI in some form in their supply chains.

Unlike traditional AI, which primarily focuses on data-driven insights and automation, GenAI can design new processes, forecast future demands with greater accuracy to alleviate external shocks, and seamlessly identify the most cost-efficient routes and carriers in the event of a disruption.

But the combination of GenAl and traditional Al is a game changer in bridging the gap to self-driving supply chains, both because of GenAl's breakthrough capabilities and because of the ways in which the strengths of the two technologies complement each other.

This level of creativity and adaptability is crucial for developing supply chains that can dynamically adjust to changing market conditions and operate with limited human intervention.

It is a compelling vision, but one which has so far remained elusive. EY global research of 460 supply chain and operations executives has found that even among organizations that have started preparing for GenAl in their supply chain, only 28% have achieved a low-human-touch supply chain, and only 50% have achieved end-to-end visibility across the supply chain.

This report is part of the <u>COO Imperative Series</u>, which provides critical answers and actions to help operations and supply chain leaders reframe the future of their organizations.

In brief

- Most supply chain and operations executives
 (73%) are planning to deploy GenAl. Yet
 62% have reassessed projects, and only 7% have completed implementation.
- Organizations further ahead in the autonomous supply chain journey are
 5.2 times more likely to see success with GenAl, further widening the digital gap.
- ► The greatest gains from GenAl come when projects align to a strategic vision, data is Al-ready and value is maximized by addressing cyber and data risks.

About the research

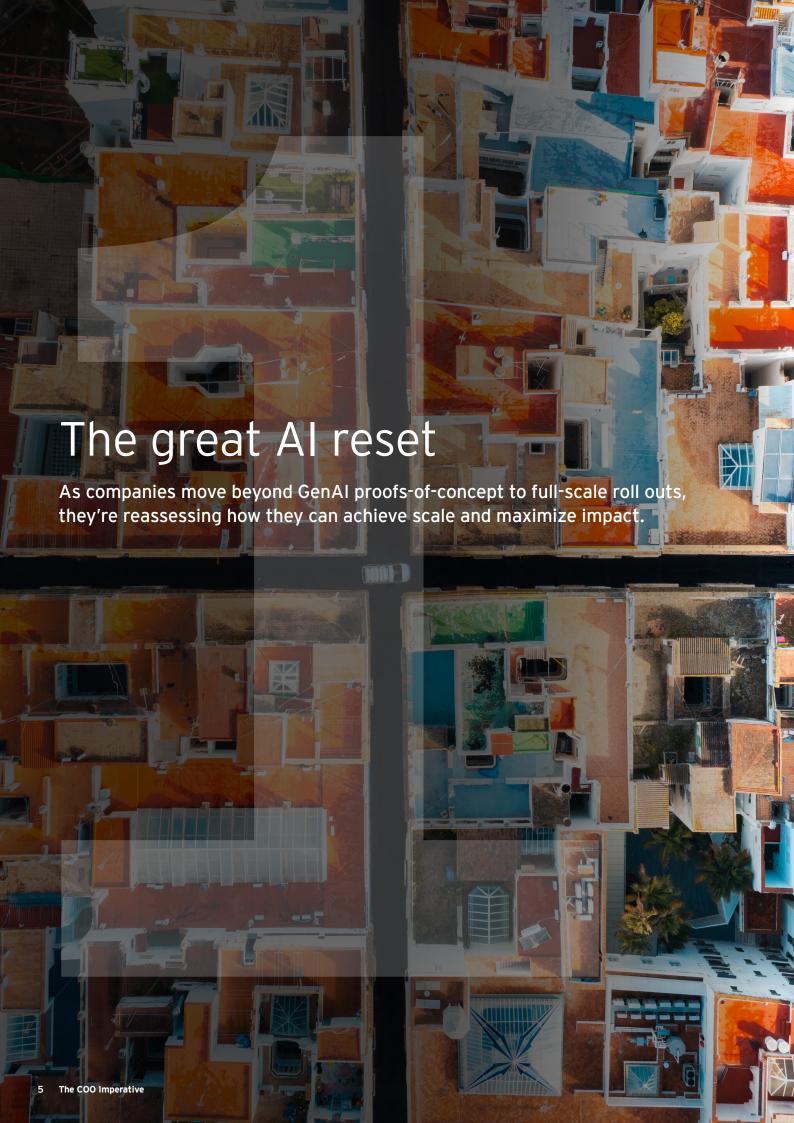
In February and March 2024, in collaboration with HFS Research, the global EY organization conducted research to better understand how companies are utilizing GenAl throughout their supply chains. We surveyed 460 senior supply chain and operations leaders with a significant role in their organization's initiatives in the supply chain.

Responses were collected across 19 countries covering the Americas, Asia-Pacific (APAC), and Europe, the Middle East, India and Africa (EMEIA) in the consumer, health sciences and wellness, energy and resources, technology, telecommunications, and manufacturing industries. Respondents represented organizations with over US\$1 billion in annual revenue that were at least in the planning stages of deploying GenAI in their supply chain.

In addition, in-depth qualitative interviews were conducted with supply chain and operations executives to better understand organizations' approach to adopting GenAI in the supply chain.

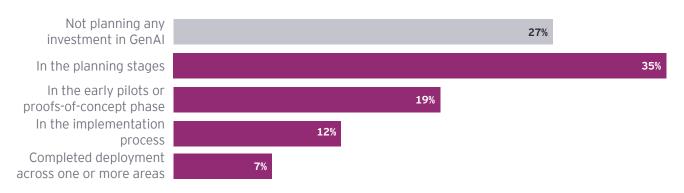
When conducting the research, the following definitions were provided:

- ► Artificial intelligence: a broad term for a set of technologies that develop or simulate intelligence in machines, including by performing tasks that traditionally required human intelligence. At can be broadly segmented into two categories:
 - ► Traditional artificial intelligence: Al that is rules-based, requiring prepared data sets and predefined logic to solve business problems.
 - ► GenAl: a type of Al that can create new content such as images, text, audio or video based on the data it has been trained on, using techniques such as large language models, transformer neural networks and generative adversarial networks.



Recognizing its potential, companies see GenAI as a critical capability for remaining competitive in the future and are investing in it accordingly. Three-quarters are planning to deploy GenAI in their supply chains and 80% believe it can reinvent supply chains and are making it a high priority. In addition, 69% believe that failing to integrate GenAI into their supply chains will put them at a competitive disadvantage.

The majority of organizations are planning to deploy GenAl in their supply chain



Note: Respondents not planning any investments in GenAl were excluded from the rest of the data and analysis

A bar chart showing where the majority of organizations are in planning to deploy \mbox{GenAI} in their supply chain.

Yet, despite this optimism, a retrenchment is taking place. In the past 12 months, 62% of respondents have reassessed their GenAl supply chain initiatives and only 7% have gone on to complete deployment. Why? Two reasons:

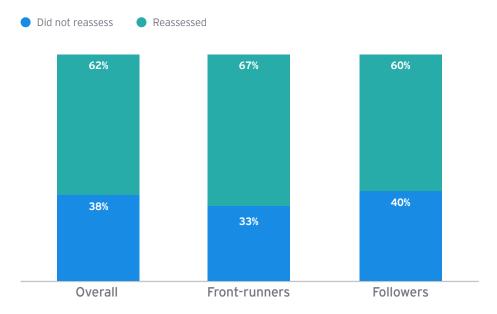
- 1 Concern and lack of understanding around the unique risks created by GenAl
- 2 Challenges of implementing this complex technology

Our findings suggest this reset is about achieving scale and maximizing impact. In-depth interviews with seven supply chain and operations executives highlight that it was tougher than expected to make the technical leap from proof-of-concept to GenAl at scale.

Given the complex web of external relationships and data that supply chains command, companies are using the reset to proceed in a more strategic and deliberate way. This aligns with recent research by EY and the University of Oxford's Saïd Business School, which shows that successful leaders navigate critical moments in transformations by continuously evolving the course of action through active listening to all involved in the transformation. This dynamic process ultimately builds confidence and capability in the transformation team by creating a sense of shared ownership and psychological safety.

Most organizations, including Front-runners, have reassessed their supply chain's GenAl initiatives due to risks or implementation challenges

Reassessment of GenAl program:



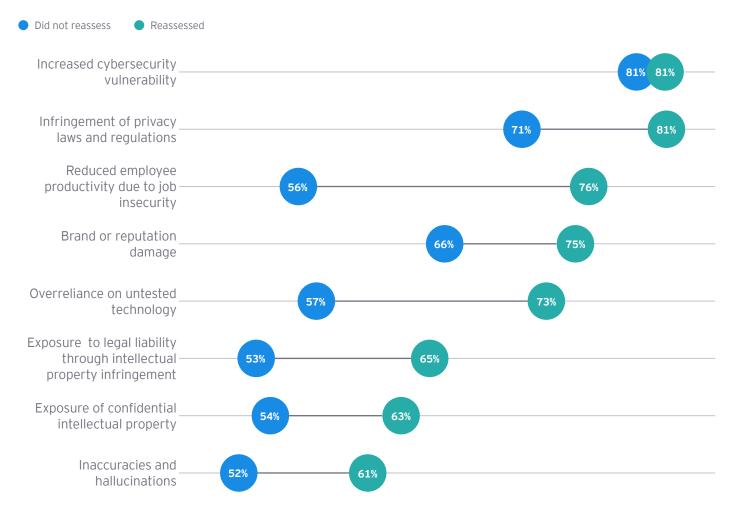
2 Organizations who have reassessed their GenAI initiatives emerge more committed and take a more collaborative approach



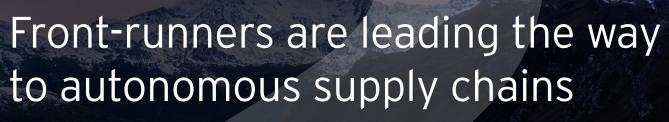
Data visualization showing how many organizations have reassessed their supply chain's GenAl initiatives and the differences between organizations who haven't reassessed.

Organizations who have reassessed their GenAl initiatives are also more realistic about the risks

Percentage of respondents saying each is a moderate or major risk



Data visualization showing how many organizations have reassessed their supply chain's GenAI initiatives and the differences between organizations who haven't reassessed.



Leading companies are finding that GenAl gives them a faster pathway to the transformative benefits of autonomous supply chains.

Organizations further ahead on the journey to autonomous supply chains (Front-runners) have created strong digital foundations that enable them to adopt and take advantage of GenAl quickly. This momentum is likely to widen the digital divide, unless those who are behind (Followers) take prompt action.

Defining Front-runners: the Autonomous Supply Chain Index

To segment companies, we created the Autonomous Supply Chain Index to measure organizations' progress on implementing eight components of an autonomous supply chain:

- ► End-to-end visibility across the supply chain
- ▶ Use of advanced analytics across the supply chain
- ▶ Responsive in real time to internal and external issues
- ▶ Use of automation hardware
- ► Low-human-touch supply chain
- Alignment across supply chain functions
- ► Alignment with other business functions
- ► Alignment with external partners and suppliers

Using the total score of each component, normalized from 0 to 100, we identified the top 20% of those leading on the autonomous supply chain journey, known throughout as Front-runners. The rest of organizations are referred to as Followers.

Front-runners – the 20% of companies further along in their autonomous supply chain journey – are also the ones demonstrating greater success in deploying both AI and GenAI in their supply chain: they are 3.5 times more likely to have achieved significantly higher than expected success with AI, and 5.2 times more likely with GenAI.

Front-runners are:

3.5x

more likely to overachieve with traditional Al

5.2x

more likely to overachieve with GenAl

5.7x

more likely to have implemented a GenAl use case

GenAl is giving organizations a faster pathway to the autonomous supply chain. Front-runners are more ambitious about using GenAl in the next two years, anticipating deploying GenAl in 12 use cases for the supply chain on median compared to eight for Followers. Front-runners are outwardfacing, going beyond the supply chain to align more closely with other business functions and external parties and driving end-to-end visibility across the supply chain.



Not all drivers for GenAI are about technology. We're using GenAI to help meet our sustainability goal to be carbon neutral by 2030. That's what is driving investment decisions.

Head of R&D

Global life sciences company

It's clear that the integration of GenAI into supply chain management is not just a matter of implementing advanced technology. To really create a more autonomous supply chain, a strategic perspective is required that encompasses the entire business ecosystem. For many companies, the introduction of GenAl has triggered a rethink of their technology roadmaps and vendor relationships.

"Before GenAI, we relied on vendors that embedded AI into their manufacturing equipment," says the CIO of a global electronics manufacturer. "When generative came out, it changed the entire equation for us.".



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CIO

Global electronics manufacturer

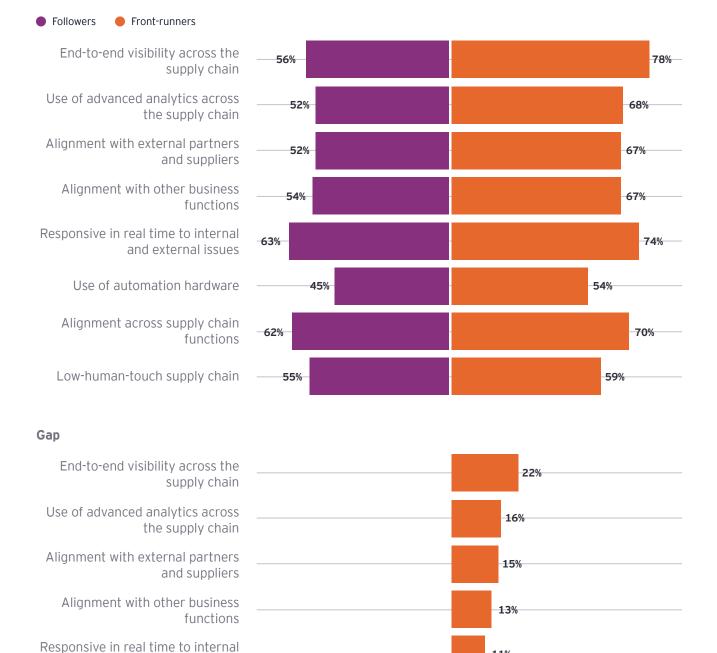
Viewing the adoption of GenAl as part of a broader digital transformation strategy means involving stakeholders across various departments - including IT, operations, finance and customer service - as well as external partners such as suppliers, distributors and customers. Only then can organizations create a seamless flow of information that results in a more responsive, resilient and agile supply chain.

"Not all drivers for GenAl are about technology," says the Head of R&D at a global Life Sciences company. "We're using GenAl to help meet our sustainability goal to be carbon neutral by 2030. That's what is driving investment decisions."

GenAl itself is expected to accelerate the autonomous supply chain journey

Percentage reporting GenAl will play a major role in achieving the following by 2030

Overall



11%

9%

Data visualization showing how Front-runners and Followers expect GenAl to impact aspects of the autonomous supply chain.

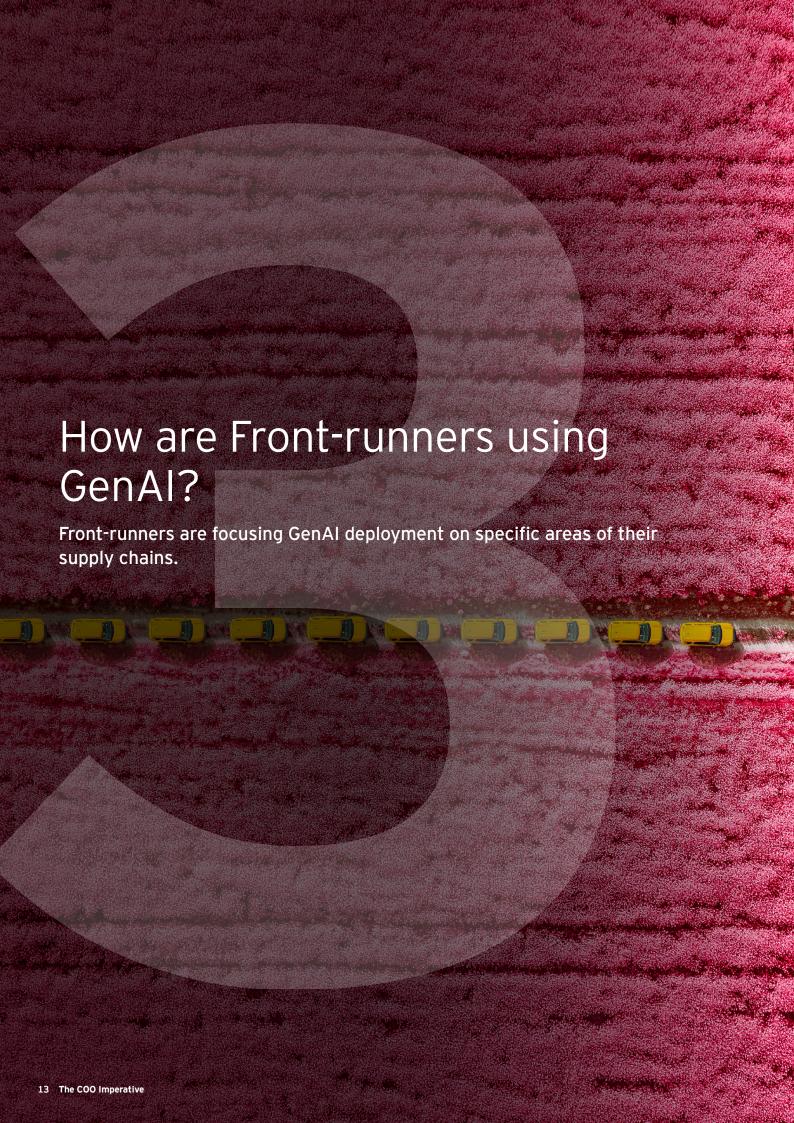
and external issues

functions

Use of automation hardware

Alignment across supply chain

Low-human-touch supply chain



Today's use cases

Most organizations' supply chains (82%) are using both AI and GenAI across a wide array of use cases to take advantage of their different, often complementary strengths. Traditional AI is rulesbased, requiring prepared data sets and predefined logic to solve business problems. GenAl is great for text-rich environments and unstructured data, creating new content based on the data it has been trained on.

For example, companies using traditional AI for demand forecasting and quality optimization are finding that a GenAl layer improves accuracy and democratizes adoption of the tools.

"The implementation of GenAl has improved the accuracy of demand forecasting by 50% in the last six months," says the Head of Distribution at a global consumer electronics company. "We're seeing considerable success across the supply chain."



The implementation of GenAI has improved the accuracy of demand forecasting by 50% in the last six months. We're seeing considerable success across the supply chain.

Head of Distribution

Global consumer electronics company

Substantial GenAl growth expected

Substantial growth in GenAl is anticipated over the next two years. Given that Front-runners already use traditional AI more, are further ahead with GenAI and are more confident about future growth, this is likely to widen the gap with Followers. Looking more broadly at where Front-runners are focusing the first wave of use cases, those with high GenAl deployment today and continued high anticipated use in two years, could include:

- Product design (manufacturing)
- Logistic network design (logistics)
- Global trade optimization (logistics)
- Demand forecasting (planning)

These are areas where traditional AI has long been available but has been limited by the need for highly trained data scientists to stand up and maintain, placing them out of reach and too expensive for many. The benefit of GenAl is in providing a natural language, interpretive layer that can become a democratizing force that puts these tools in the hands of the workforce. These areas are also supply chain functions with well-defined datasets, a high percentage of unstructured data and high value to be gained.

Front-runners use of GenAI in supply chain will increase substantially in the next two years, with certain use cases showing stronger potential

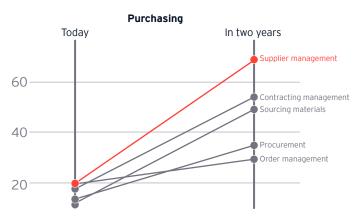
Current and future use of GenAl by Front-runners

GenAl usage (%)

Highest growth in next two years







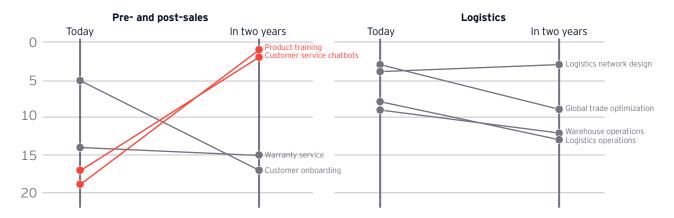
Data visualization of Front-runners' GenAl use today and in two years, highlighting the use cases that have the highest growth in the next two years.

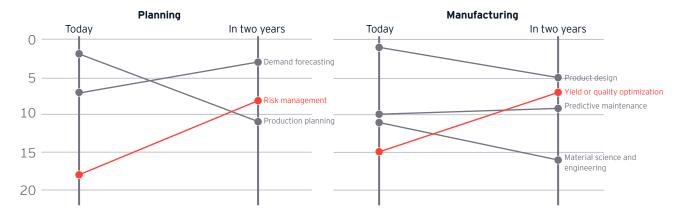
Front-runners use of GenAI in supply chain will increase substantially in the next two years, with certain use cases showing stronger potential

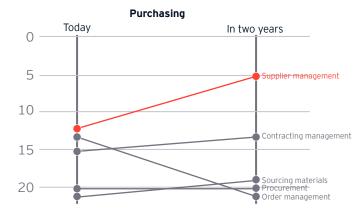
Current and future use of GenAl by Front-runners

Rank

Highest growth in next two years







Data visualization of Front-runners' GenAl use today and in two years, highlighting the use cases that have the highest growth in the next two years.

The next wave of use cases, those with lower GenAl deployment today but high anticipated use in two years, potentially includes:

- Supplier management (purchasing)
- Production yield or quality optimization (manufacturing)
- Risk management (planning)
- Customer service chatbots and product training (pre- and post-sales)

For example, customer service chatbots and product training are language-rich environments where organizations can train GenAI on voice recordings and transcripts from previous customer calls to rapidly expand the number of queries that chatbots can resolve. With product training, GenAI can massively speed access to key information that is stored in product manuals.

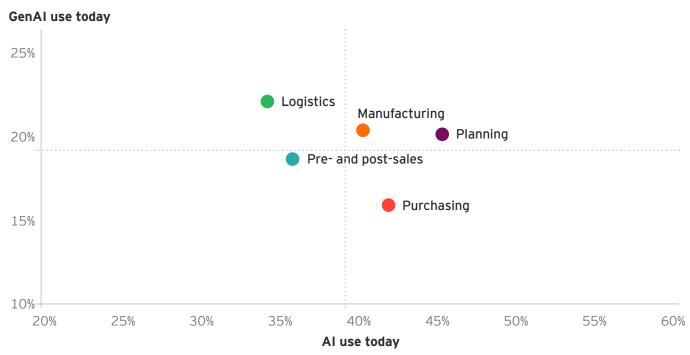
These areas of high growth also offer clear commercial returns, either by improving the speed of customer service through chatbots or reducing costs through quality optimization in manufacturing. Demand forecasting is another key area of focus for GenAl. It's perceived to be a use case that will resolve a lot of pain points for the supply chain and offers clear metrics that can make the business case an easier sell to the CEO and the Board.

Many of these use cases suffer from back-end challenges when using traditional AI (quality optimization, predictive maintenance) and require bespoke solutions. Customer service chatbots also have a high degree of risk given the chatbots' direct interaction with the public. Both factors may be contributing to the time horizon suggested here.

Front-runners use AI and GenAI to complement each other, with use cases in planning and manufacturing leading the way

Al and GenAl use today by Front-runners



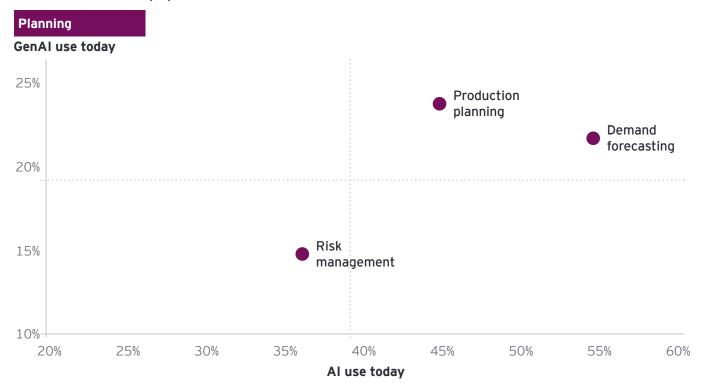


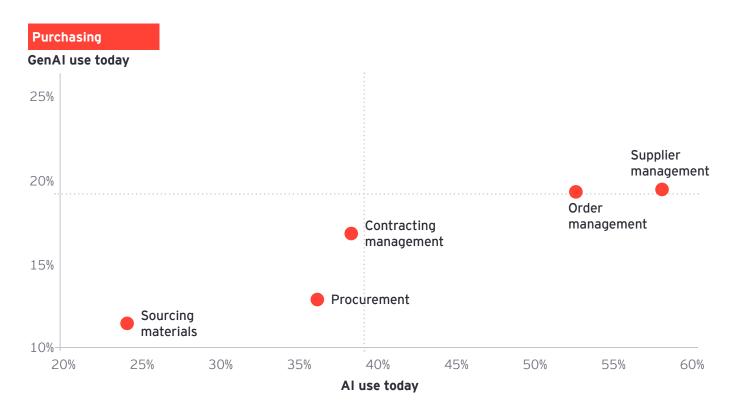
Note: Dotted lines represent the average use of AI (39%) and GenAI (19%) across all use cases.

Data visualization of the use cases of GenAl and Al that Front-runners have deployed.

Front-runners use AI and GenAI to complement each other, with use cases in planning and manufacturing leading the way

Al and GenAl use today by Front-runners



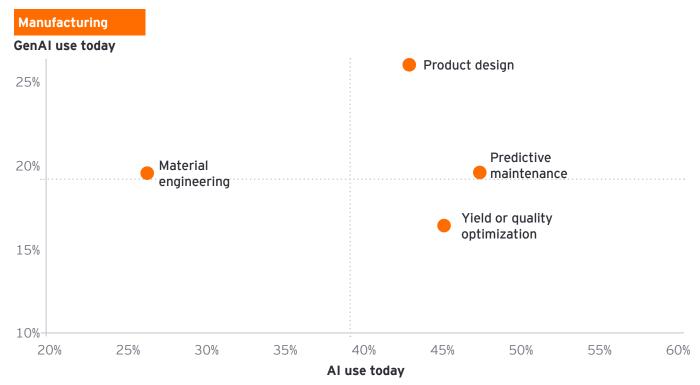


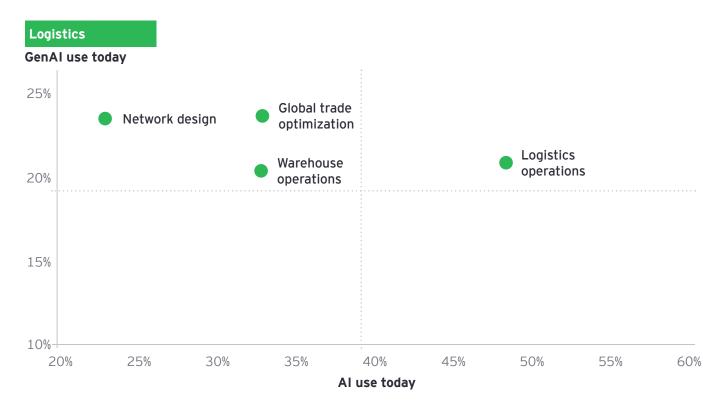
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Data visualization of the use cases of GenAl and Al that Front-runners have deployed.

Front-runners use AI and GenAI to complement each other, with use cases in **planning** and **manufacturing** leading the way

Al and GenAl use today by Front-runners



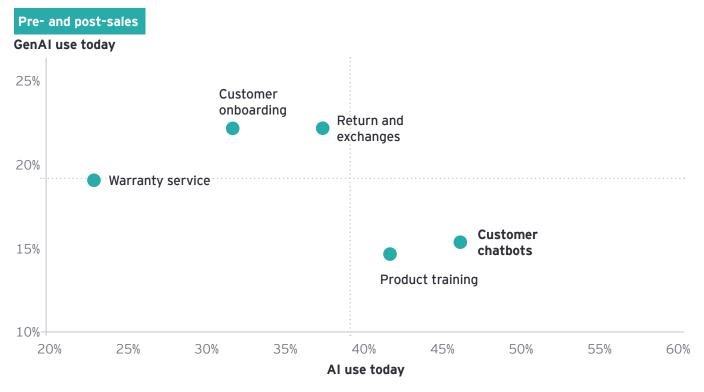


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Al and GenAl use today by Front-runners



Note: Dotted lines represent the average use of AI (39%) and GenAI (19%) across all use cases.

Data visualization of the use cases of GenAl and Al that Front-runners have deployed.

When comparing anticipated growth in GenAI in two years, data from the survey shows that Frontrunners are more likely to anticipate quicker progression of GenAl implementation in logistics, manufacturing and pre- and post-sales when compared with Followers. This is likely because the Front-runners are already seeing more success in other areas, are more integrated end-to-end and so have a better data foundation, leading to more confidence to go further faster and accelerating the gap from Followers. For example, logistics network design is an area that has evolved from a one-off project every five years to a dynamic task that is reassessed every six months. Leading companies are building this capability to future proof their organizations.

Examples of GenAl use today

Pre- and post-sales: Reduced errors in product categorization by 50%

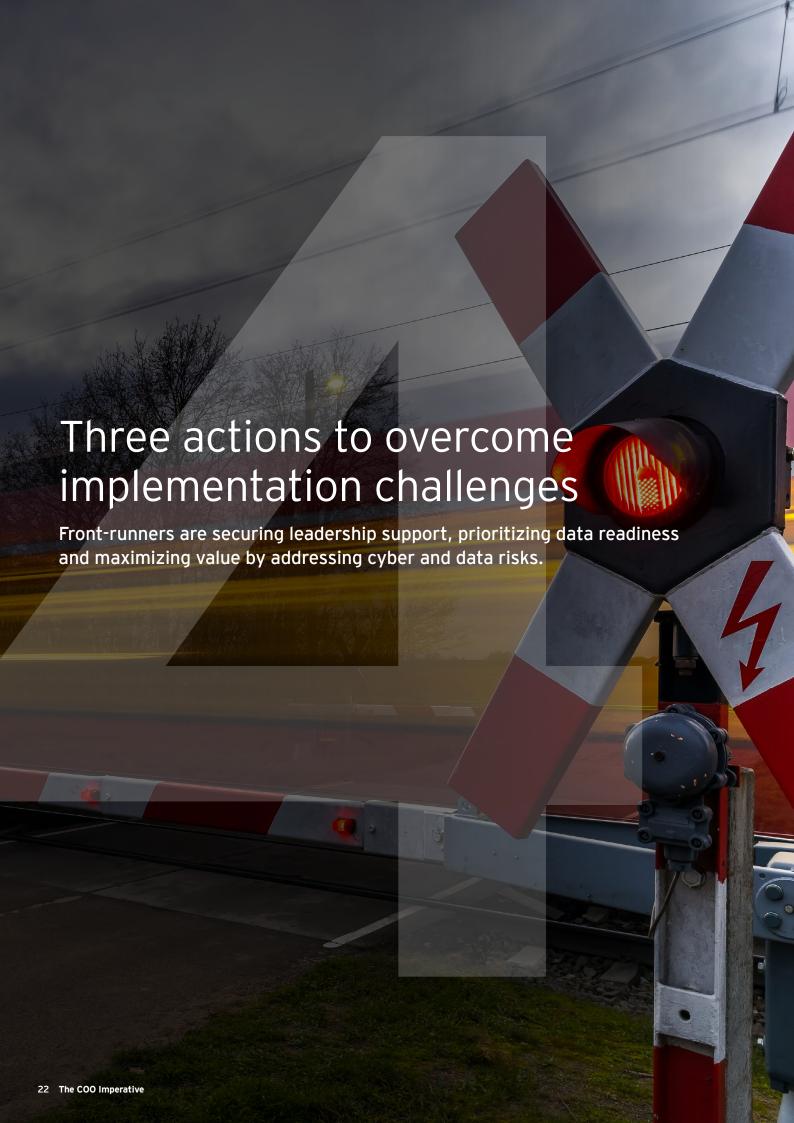
"We had a high rate of errors on the platform from sellers putting products into the wrong categories. Using GenAl, we created a chatbot to guide them on which categories were appropriate for their products. This reduced categorization errors by 50% and increased seller satisfaction." Head of Technology, Global online marketplace.

Manufacturing: Firsts steps toward higher autonomy with quality optimization

"Before GenAI, we relied on equipment vendors that embedded traditional AI into their automated visual inspection to monitor quality. We didn't invest in our own IoT and sensor data collection. When generative AI came out, it changed the entire equation for us. Now we're experimenting with GenAl-driven optical equipment for a more autonomous quality system. I spend 25% of my time talking to key vendors, asking them about their Al roadmap for their product sets. They have the data, not us. And it's triggered a buy-or-build dilemma. Do we rely on equipment and software vendors and pull AI through them, or do we build our own LLM?" CIO, Global electronics manufacturer.

Planning and logistics: Improved accuracy of demand forecasting by 48% and optimized resources and routes

"We've been using neural networks and machine learning for over four years now. But layering GenAl on top gives us more data points and has improved the accuracy of demand forecasting by 48% in the last six months. We're also using it for production logistics, to help allocate which SKUs we allocate to which factories, and route optimization across our distribution centers. We're seeing considerable success across the supply chain." Head of Distribution, Global consumer electronics company.



Implementing GenAl in the supply chain involves a complex interplay of technical, organizational and operational challenges. Organizations should take the following action steps to advance their journey to the autonomous supply chain and exploit the full potential of GenAl.



Align people and investments to strategic vision

For Front-runners, the top factors for success in GenAl deployments are securing support from leadership (67%), building support from third parties (65%) and availability of technical talent (64%). The largest gaps between Front-runners and Followers are in prioritizing the strategic vision (62% of Front-runners versus 39% of Followers) and support from third parties (65% of Frontrunners versus 47% of Followers), which highlight the importance of a cohesive vision and external support in ensuring GenAl pilots and implementations are focused on delivering business value.

"My advice is to do your homework. Is the newest thing on the block really going to add value?" says the Global Operations Director of a consumer products manufacturer. "And vet external partners thoroughly on a technical level to verify their claims."

Skills gaps are a recognized challenge during implementation for survey respondents, coming second after data readiness. Human factors will dictate the speed of adoption, so robust plans for upskilling, alongside targeted talent and hiring plans, are essential. Front-runners are tackling this by putting GenAI with appropriate controls into the hands of their employees (a priority for 51% of Front-runners versus 33% of Followers). This is especially pertinent given the findings from the EY Work Reimagined Survey, where nearly half (49%) of employees are already using, or expect to use, GenAl in the next 12 months. However, few (17% of employees and 22% of employers) are making training in GenAl skills a top priority.

A cohesive, strategic vision can clarify investment priorities against the seemingly endless list of use cases of GenAI, minimize the risk of multiple business units duplicating investments and improve AI outcomes by guiding the augmentation of large language models (LLMs) with reusable algorithmic patterns, such as retrieval-augmented generation.



My advice is to do your homework. Is the newest thing on the block really going to add value? And vet external partners thoroughly on a technical level to verify their claims.

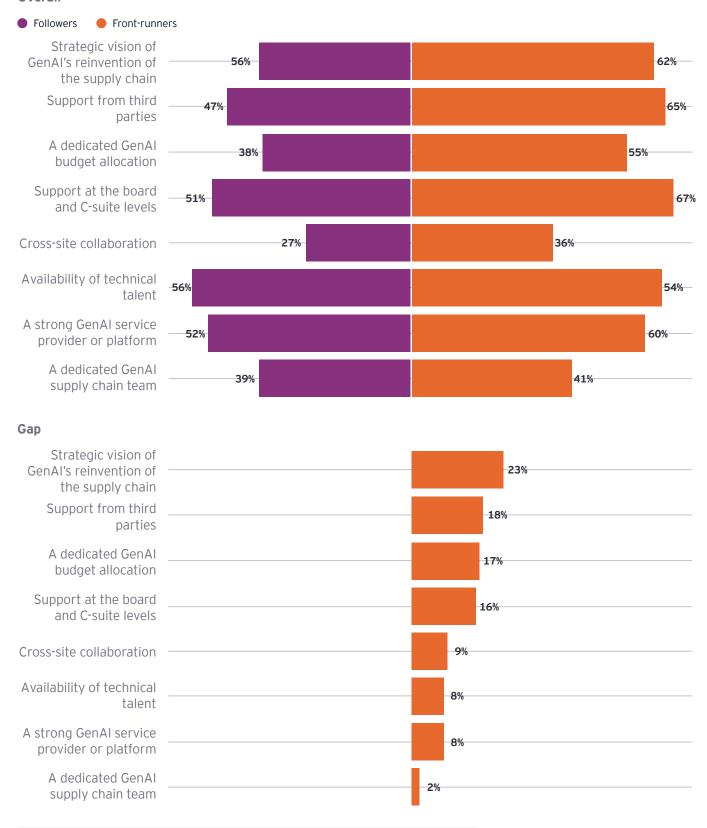
Global Operations Director

Consumer products manufacturer

Front-runners recognize the need to align people and investments with the strategic vision

Percentage reporting each as "extremely important" in their organization's deployment of GenAl in the supply chain

Overall



Data visualization comparing the importance of different components of GenAl deployment for Front-runners and Followers.



Prioritize data readiness when considering use cases

The demands of GenAl are shining a spotlight on the myriad complexities of enterprise data management. Despite data availability, quality and privacy being top of mind when prioritizing use cases, organizations are still struggling. Maintaining data quality is the number one implementation challenge cited by respondents (38%), with access to data (33%) a top challenge as well.

This highlights the data challenges particular to supply chains, where data is fragmented across different systems in the organization and across external parties. Resulting issues include massive volumes, incomplete data, data privacy regulations, data architecture, integration with other technologies, access management and other interconnected risks.

Given the fundamental importance of data to AI, it is no surprise that Front-runners are data champions.

"We see GenAI as key to navigating the huge volumes of customer data we possess and mining it for insights," says the Head of Distribution at a global consumer electronics company. "GenAl revealed that we were storing half a billion records on customers who hadn't interacted with the company beyond the initial sale."



We see GenAI as key to navigating the huge volumes of customer data we possess and mining it for insights. GenAI revealed that we were storing half a billion records on customers who hadn't interacted with the company beyond the initial sale.

Head of Distribution

Global consumer electronics company

Putting in place the right data architecture, tools and policies is an investment worth making, because these capabilities are foundational to the effective deployment of GenAI.

"You need real-time datasets for prompting predictive algorithms," says the CIO of a global electronics manufacturer. "But we gather data monthly; we don't have a real-time data tempo in the supply chain yet."



You need real-time datasets for prompting predictive algorithms. But we gather data monthly; we don't have a real-time data tempo in the supply chain yet.

CIO

Global electronics manufacturer

Any organization hoping to compete in GenAI needs to get its data house in order, by prioritizing data cleansing, standardization, systems and engineering to reduce latency, and enhancing metadata so data can be consumed by Retrieval Augmented Generation (RAG) systems to improve the accuracy of GenAl outcomes.



Maximize GenAl value by mitigating cyber and data risks

GenAl is a nascent technology, so it is not surprising to find 40% of respondents saying their organizations do not fully understand the new risks and challenges of GenAI in supply chain. While this should rise over time, there are two sides to maximizing value from GenAl initiatives: reducing risks and optimizing opportunities.

GenAl poses new vulnerabilities, for example through prompt injection attacks designed to provoke LLMs into leaking sensitive data or manipulate their outcomes. Front-runners are more likely than Followers to focus on the new risks that GenAl poses, such as inaccuracies and hallucinations, exposure to legal liability through IP infringement, overreliance on untested technology, brand or reputation damage and job insecurity.

"Our GenAl chatbot pilot performed well, but hallucinations crept in after a model update," says Head of Technology of a global online marketplace. "We reassessed each use case, changed models for some and discarded others that no longer added value."

The need for stronger cybersecurity, a top risk and implementation challenge in its own right, is paramount as organizations look to deploy GenAI. Topic clustering analysis from the 2024 Global Cybersecurity Leadership Insights Study shows supply chain vulnerabilities have doubled over the past five years. While cybersecurity functions are expanding their use of AI to stay ahead of threats, supply chain and operations leaders need to work closely with cybersecurity teams from the beginning to help with the secure adoption of GenAl in the supply chain. This includes embedding the cyber team in use case identification and governance to ensure the value potential of GenAI in the supply chain is maximized.



Our GenAI chatbot pilot performed well, but hallucinations crept in after a model update. We reassessed each use case, changed models for some and discarded others that no longer added value.

Head of Technology

Global online marketplace

Finding your North Star

The dream of an autonomous supply chain runs the gamut of reactions from operations and supply chain leaders – from excitement about the step change that GenAl represents to skepticism that full autonomy will ever be possible end-to-end.

Still, it represents the pinnacle of achievement. Even if organizations never reach end-to-end autonomy, it is a worthwhile "North Star" goal to align with an organization's strategy, because every step closer to autonomous supply chains boosts resiliency by improving visibility and agility. Automation is likely to continue as it has done to date, piece by piece, pocket by pocket.

GenAl is already proving it can be a game-changer for the supply chain, and this nascent technology is expected to establish itself firmly in the supply chain over the next two years. For organizations to realize the full potential of GenAI, agility will be key.

Summary

GenAl is emerging as a transformative tool, enabling more autonomous supply chains with end-to-end visibility and real-time problem-solving capabilities. EY research suggests that GenAl adoption is crucial for competitiveness, but challenges in understanding risks and implementation complexities have led to a strategic reassessment. Front-runners in GenAl adoption are leveraging it for improved demand forecasting and operational efficiency, while others lag behind. To overcome these challenges, companies must align strategic visions, prioritize data readiness and mitigate cyber risks.

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EYG no. 006146-24Gbl ED None

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