The Collaborative Supply Chain

Tech-Driven and Human-Centric
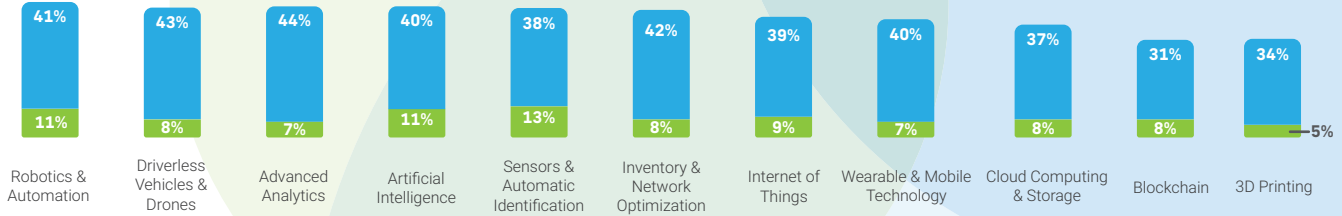
THE COLLABORATIVE SUPPLY CHAIN
2024 MHI Annual Industry Report Key Findings

IMPACT OF TECHNOLOGIES
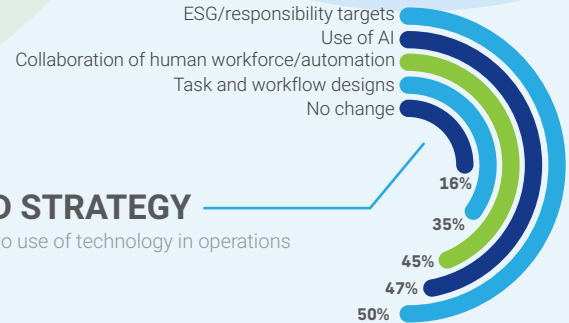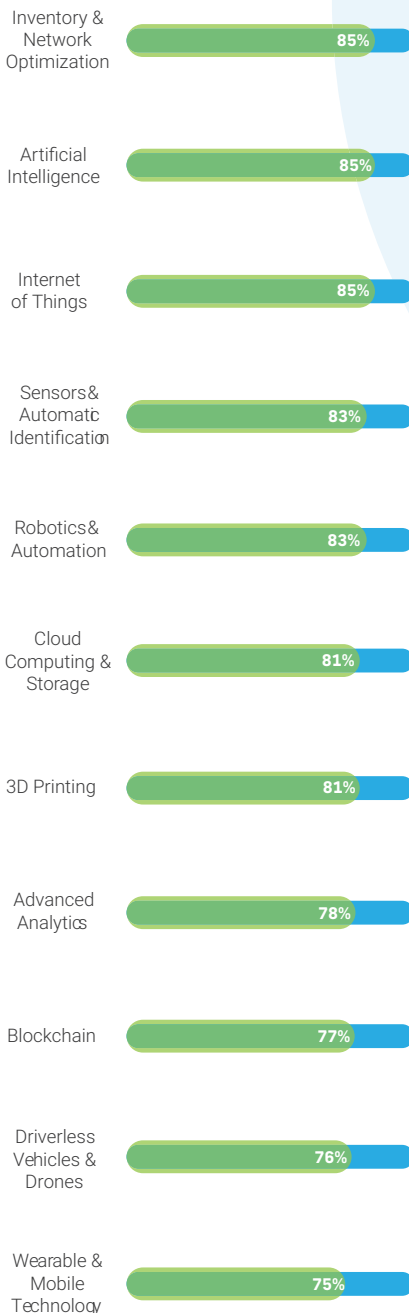Potential to disrupt the industry or create competitive advantage

- Potential to disrupt the industry
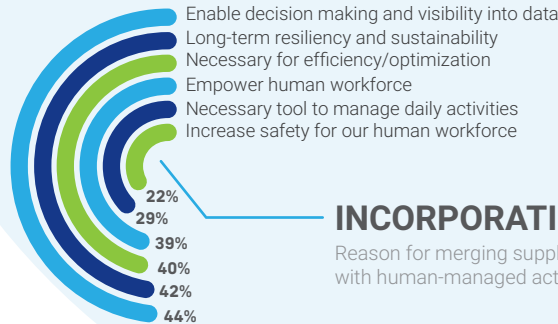- Potential to create competitive advantage

Technology	Potential to create competitive advantage	Potential to disrupt the industry
Robotics & Automation	41%	11%
Driverless Vehicles & Drones	43%	8%
Advanced Analytics	44%	7%
Artificial Intelligence	40%	11%
Sensors & Automatic Identification	38%	13%
Inventory & Network Optimization	42%	8%
Internet of Things	39%	9%
Wearable & Mobile Technology	40%	7%
Cloud Computing & Storage	37%	8%
Blockchain	31%	8%
3D Printing	34%	5%

ADOPTION TRENDS - PREDICTED USE
Predicted adoption of technologies within 5 years

Technology	Predicted Use
Inventory & Network Optimization	85%
Artificial Intelligence	85%
Internet of Things	85%
Sensors & Automatic Identification	83%
Robotics & Automation	83%
Cloud Computing & Storage	81%
3D Printing	81%
Advanced Analytics	78%
Blockchain	77%
Driverless Vehicles & Drones	76%
Wearable & Mobile Technology	75%

HUMAN-CENTERED STRATEGY
Where focus is increased related to use of technology in operations

- ESG/responsibility targets — 16%
- Use of AI — 35%
- Collaboration of human workforce/automation — 45%
- Task and workflow designs — 47%
- No change — 50%

INCORPORATING TECHNOLOGY
Reason for merging supply chain technology with human-managed activities

- Enable decision making and visibility into data — 22%
- Long-term resiliency and sustainability — 29%
- Necessary for efficiency/optimization — 39%
- Empower human workforce — 40%
- Necessary tool to manage daily activities — 42%
- Increase safety for our human workforce — 44%

USE OF ARTIFICIAL INTELLIGENCE
Current or predicted adoption of AI within 2 years

Category	%
Logistics, Shipping, & Transportation	34%
Supplier Selection/Due Diligence	33%
Inventory Management	27%
Consumer Behavior Tracking	24%
Contracts	24%
Pricing	23%
Demand Forecasting	19%
Product Development	17%
Manufacturing	17%
Procurement	11%
Supply Chain Security	6%
No plans to use AI	5%
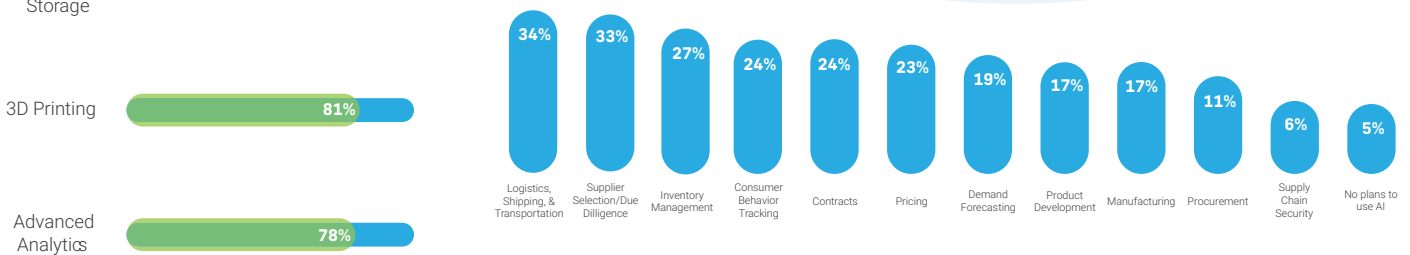
TOP SUPPLY CHAIN CHALLENGES
Top 5 company challenges rated extremely or very challenging

- 53% Price increases from inflation
- 52% Talent shortage
- 51% Customer demands
- 50% Insight into customer behavior
- 50% Supply chain disruptions/shortages

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INTRODUCTION

The focus on technology in supply chains is undeniable. But supply chains are run by people, and human-centricity is the key

- John Paxton, CEO of MHI

ROBOTICS

AUTOMATION

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI), automation, and robotics have dominated headlines over the past year, putting significant pressure on organizations and decision-makers to quickly adopt and integrate these new performance-enhancing tools. The big challenge is how to do so in a human-centric and collaborative way that maximizes performance gains while at the same time empowering workers.

New forms of AI work best when they enhance and extend the capabilities of workers and decision-makers throughout the supply chain. According to this year's survey, more than a third of organizations (39%) are already using supply chain technologies such as AI to empower human workers to be more productive and make better decisions, not to replace them. (Figure 1)

Similarly, many organizations are considering human-centric technology strategies as they increase their focus on use of AI for decision making (47%). (Figure 2). Such a strategy typically features strong collaboration between new AI tools and human workers.

The survey data shows AI investment is rising significantly year-over-year, even when accounting for the post-COVID jump in overall supply chain spending. These increased AI investments, in addition to generating their own standalone benefits, can help enhance the other innovative supply chain technologies highlighted in our survey—for example, by improving the pace and thoroughness of onboarding/training processes, increasing the scope and efficiency of managerial actions, and significantly enhancing the ability of distributed teams to collaborate effectively.

This year's report features an extensive focus on emerging AI technologies such as generative AI and offers evidence-based insights on how to integrate them most effectively with your existing systems and workforce.
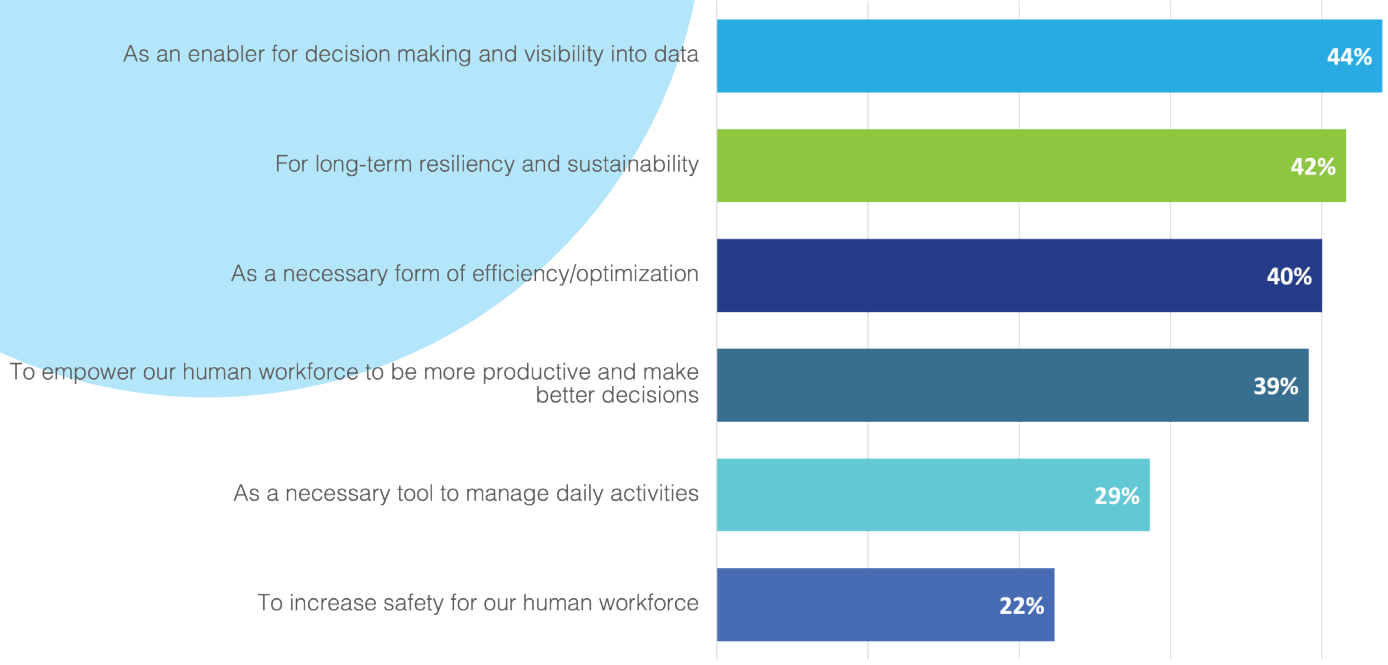
As an enabler for decision making and visibility into data — 44%

For long-term resiliency and sustainability — 42%

As a necessary form of efficiency/optimization — 40%

To empower our human workforce to be more productive and make better decisions — 39%

As a necessary tool to manage daily activities — 29%

To increase safety for our human workforce — 22%

Figure 1: Survey results - Incorporating tech into human-managed activities

Increased focus on ESG and supply chain responsibility targets — 50%

Increased focus on use of AI for decision making — 47%

Increased focus on collaboration between human workforce and automation/emerging technologies — 45%

Increased focus on task and workflow designs — 35%

No change to existing supply chain strategies — 16%

Figure 2: Survey results - Human-centered strategy related to technology

CASE STUDY

COLLABORATIONS BETWEEN HUMAN/ AUTOMATION AUGMENTED WORK ENVIRONMENT

Situation

Dorman, a leading automotive spare parts supplier with annual revenue of over $1.7 billion, was looking to scale up its operations to improve efficiency and flexibility in its 1 million sq. ft. distribution center, which processed 2,000 pallets per day. It was limited by legacy distribution center structures and dependence on forklift labor with high costs and inconsistent reliability, negatively affecting productivity and order flow.

Action

Dorman implemented advanced fulfillment AI software, which optimizes and orchestrates how order fulfillment workers and robots work together, with a robotics solution to reduce reliance on forklift labor. Twenty-five autonomous mobile robots that help move pallets were layered onto existing systems to provide dock-to-stock, stock-to-active inventory, and empty/flow recycling. Combined with fulfillment AI orchestration, these bots use 2D/3D lidar sensors to offer flexible routing, dynamic congestion avoidance, and flow-based prioritization while acting as an independent system, significantly reducing the integration process with existing systems.

Result

Dorman achieved significant gains in analytics visibility and operational flexibility. In particular, it achieved a 30% reduction in forklift labor, leading to projected savings of $4.2 million over three years. It also achieved a 50% reduction in worker travel time and was able to significantly simplify the onboarding process for new warehouse associates.

SURVEY HIGHLIGHTS

This year's survey included more than 1,700 supply chain leaders worldwide and highlighted eleven import-ant technology innovations that are transforming the landscape of the global supply chain industry:

Artificial Intelligence (AI): AI can help with complex tasks and decision making throughout the supply chain, improving efficiency and accuracy in everything from demand forecasting to customer service.

Cloud Computing & Storage: This technology allows businesses to store and access data over the internet instead of on local storage devices, improving flexibility and scalability.

Internet of Things (IoT): IoT connects devices via the internet, enabling them to collect and share data. In supply chain management, IoT can provide real-time tracking and monitoring of goods.

Sensors & Automatic Identification: These technologies aid in tracking products across the supply chain. They can help automate inventory management, reducing human error.

Robotics & Automation: Robotics and automation tools are increasingly used in warehous-es for picking and packing goods, reducing labor costs, increasing accuracy, and improving efficiency.

Wearable & Mobile Technology: These technologies can enhance connectivity and informa-tion flow in the supply chain. Workers can carry or wear them to access real-time data about inventory, shipments, and more.

Blockchain: A secure, decentralized ledger system that can provide transparency and trace-ability in the supply chain, reducing fraud and errors.

Autonomous Vehicles & Drones: These can be used for swift and efficient delivery of goods, potentially reducing transportation costs and improving customer service.

3D Printing: This technology can be used to manufacture products on-demand closer to their destination, reducing shipping costs and times.

Advanced Analytics: These use the use of mathematical approaches and tools aimed to turn data into new insights into supply chain operations and performance.

Inventory & Network Optimization: These tools use advanced algorithms to optimize the stor-age, flow, and distribution of goods across the supply chain.

These technologies are not only reshaping how supply chains operate but also paving the way for future innovations in the industry. Adoption of the 11 categories of technology covered in the report is predicted to rise dramatically over the next five years.

- Inventory and Network Optimization – 85%
- Internet of Things – 85%
- Artificial Intelligence – 85%
- Sensors and Automatic Identification – 83%
- Robotics and Automation – 83%
- Cloud Computing and Storage – 81%
- 3D Printing – 81%
- Advanced Analytics – 78%
- Blockchain – 77%
- Autonomous Vehicles and Drones – 76%
- Wearable and Mobile Technology – 75%

INVESTMENTS CONTINUE TO RISE

The survey revealed that 55% of respondents have increased their supply chain investments.
88% planning to spend over $1 million.
Forty-two percent plan to spend over $10 million.

This indicates that the majority of surveyed businesses recognize the value of investment in a robust and efficient supply chain in ensuring smooth operations, reducing costs, and improving customer satisfaction. (Figure 3)

Increased investment
Decreased investment
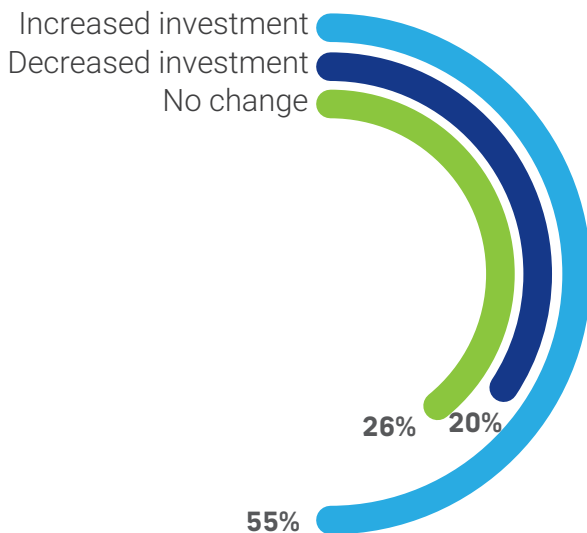No change

26%   20%

55%

Figure 3: Survey results - Planned investments in the next two years

This trend of rising supply chain investment has persisted despite the uncertainties, mainly due to the COVID-19 pandemic, that rocked the global economy in 2020 and 2021. The COVID crisis tested the resilience of supply chains and highlighted the importance of agility, flexibility, and digital readiness in overcoming disruptions.

Interestingly, the momentum towards increased investment in the digital supply chain began as early as 2019. This was a time when businesses were starting to grasp the transformative potential of digital technologies—such as cloud computing, AI, IoT, and automation—in streamlining supply chain operations and enhancing visibility and control. (Figure 4)
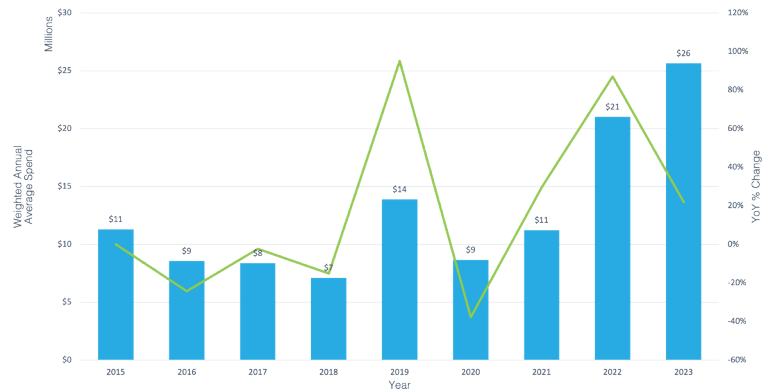

Figure 4: Survey results - Annual trend of planned investments

The significant rise in investment since then suggests that businesses are not just reacting to short-term challenges, but instead are strategically positioning themselves for long-term success. They are leveraging digital technologies to make their supply chains more responsive and resilient, helping them adapt to changing market conditions, anticipate disruptions, and seize new opportunities.

This ongoing investment trend underscores the increasing recognition of the digital supply chain as a key driver of competitive advantage. Businesses that continue to invest and innovate in their supply chains are more likely to emerge as leaders in their respective markets, ready to meet the demands of the future.
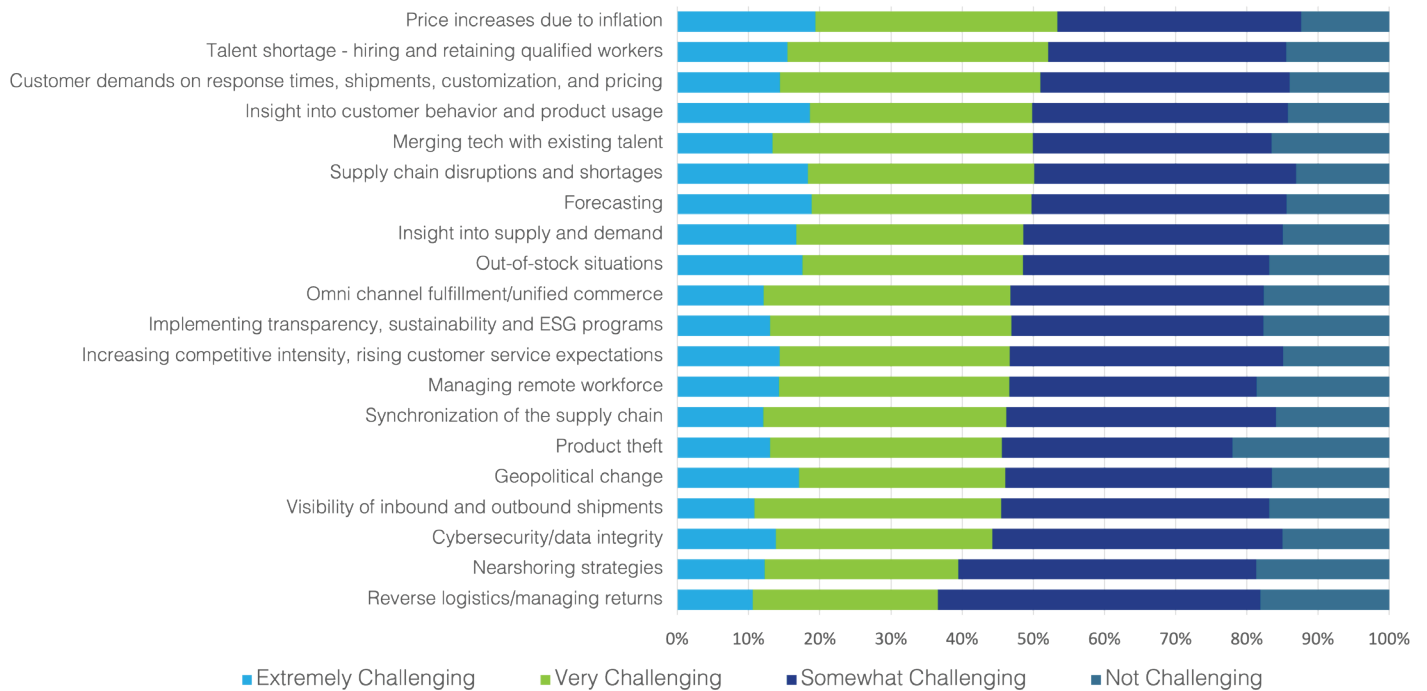
Figure 5 - Survey results - Company challenges

Inflation concerns temper growth as workforce and customer demands remain top challenges.

The issue of rising prices due to inflation has become a major concern for supply chain leaders, with 53% of this year's respondents identifying it as a significant or extreme challenge to their supply chain operations. In the context of supply chain, inflation can increase the cost of raw materials, labor, and other operational expenses. This can squeeze profit margins, especially if companies are unable to pass the increased costs onto customers due to competitive pressures or price-sensitive demand. The supply chain talent shortage is also a top challenge, with 52% saying it is a significant or extreme challenge, followed by customer demands (51%), insight into customers (50%) and merging tech with existing talent (50%). (Figure 5)

The rising cost of capital also showed up as the second highest ranked trend impacting supply chains. The cost of capital is directly related to the return a company is expected to provide to its investors and can include interest payments on loans, dividends to shareholders, and returns to other types of

investors. An increase in the cost of capital means a company must generate higher returns to satisfy its investors, which can reduce the funds available for reinvestment into its supply chain operations. This could potentially hinder the ability to make necessary improvements or innovations within the supply chain. In addition to rising costs, supply chain agility, workforce, sustainability/ESG and visibility are the top five trends currently impacting supply chains.

These two factors combined — inflation and the rising cost of capital — can create a challenging environment for supply chain management. Companies might need to find ways to improve efficiency and reduce costs elsewhere within their operations to offset these increased expenses. This could involve leveraging technology, renegotiating supplier contracts, or finding other creative solutions to protect profit margins and ensure the continued smooth operation of their supply chains.

Navigating AI is a challenge that needs patience. Companies that are successful recognize the change and understand the reallocation, not elimination, of people to meet the needs of the business.
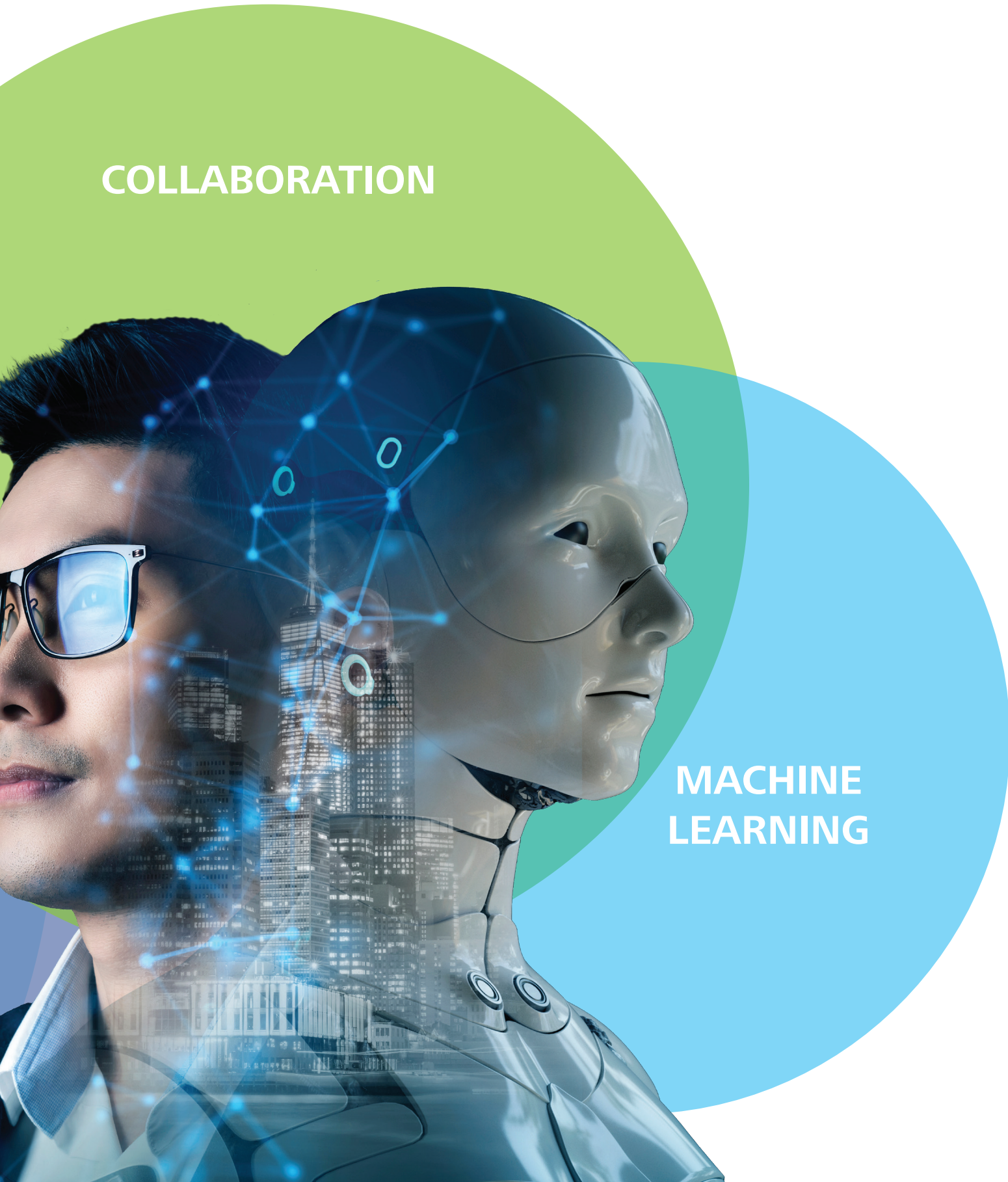
- Chaneta Sullivan, Director of Facility Development and Safety, Chick-fil-A Supply

GENERATIVE

LABORATIVE SUPPLY CHAIN?

COLLABORATION

MACHINE LEARNING

AI WITHIN THE COLLABORATIVE SUPPLY CHAIN

In 2019, when this ongoing series of survey reports first highlighted artificial intelligence (AI), the Deloitte Analytics Academy defined artificial intelligence as "decision-making enabled by machine learning, where computers learn on-the-fly from data rather than being pre-programmed to follow a fixed set of rules".[1] (Figure 7)
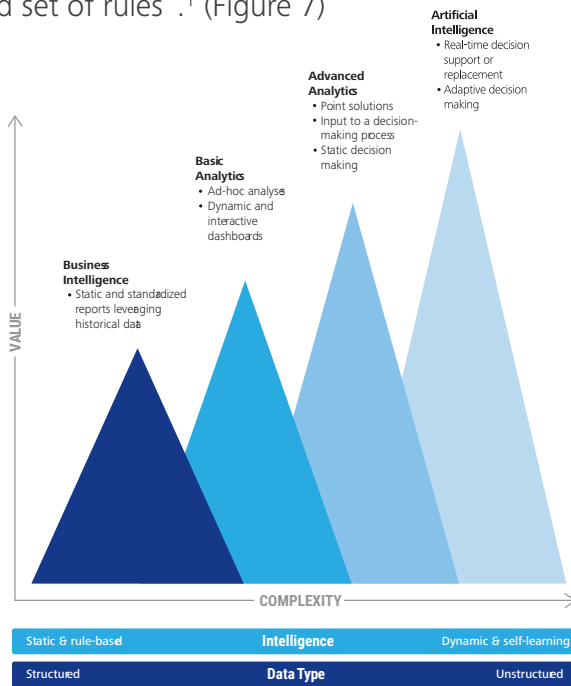

Figure 7: Evolution of decision-making using technology

Such rules can be divided into two distinct categories, reasoning and interacting, each requiring effective implementation and integration of systems and data.

Reason
(pattern matching and optimizing)
- Generate insights
- Predict
- Recommend
- Optimize

Interact with
(Communicating and sensing)
- Text
- Sound and voice
- Image and video
- Humans

The definition of AI from 2019 still holds true, but is now supported by many proven examples of AI being used effectively in numerous supply chain areas, including demand forecasting, maintenance planning, scenario analysis and optimization, supply chain intelligence, and supplier assessment.

Looking towards the future, 51% of this year's survey respondents believe AI technologies will create a competitive advantage or disrupt their industry within the next ten years, while only 16% say their organizations are unlikely to adopt AI technologies within the next five years. Whether or not AI ultimately creates disruption and competitive advantage, it's clear the majority of leaders surveyed see AI as a key part of their future supply chains.

It should be noted that while 47% of survey respondents report an increasing focus on use of AI for decision-making, AI is currently best viewed as a tool that helps humans make decisions as part of a collaborative supply chain. For now, it is not making critical decisions by itself.

WHAT IS GENERATIVE AI?

Generative AI (GenAI) builds on previous AI technologies, but is unique in its ability to mimic human decision-making. Moving beyond AI's traditional domain of expert data analysis, GenAI can serve as a collaborator for a wide range of tasks. It can also contextualize data and produce human-like analysis and insights, further boosting productivity and efficiency.[2]

In 2019, 79% of survey respondents believed AI would be a core competency in the next three years (i.e., by the end of 2021). Yet, according to this year's survey, only 27% of participating supply chain organizations are currently using AI. Why the large gap between expectations and real-world adoption? A key barrier cited by respondents is lack of adequate talent. However, this barrier could be greatly reduced by GenAI, which relative to other forms of AI tends to be much easier for non-technical people to use, understand, and access.

Situation	Example of GenAI Uses
Supply chain intelligence to review and mitigate risks	• Review port congestion to identify alternative ports or expedite other shipments • Examine suppliers (n-tier) to understand potential disruptions and suggest alternatives to address identified risks • Track severe weather to reroute shipments around or towards events, depending on the product being shipped
Scenario analysis and optimization	• Create alternative scenarios in a digital twin environment that mimics the real world • Model and adjust the distribution network based on real-world shipping, real estate, and labor data for full optimization and sensitivity analysis
Supply chain planning	• Answer detailed, specific questions about planning, inventory, supply assurance, logistics, and other key supply chain elements by analyzing numerous data sets and systems simultaneously

Figure 8: Examples of supply chain use cases for GenAI[3]

GEN AI IN THE COLLABORATIVE SUPPLY CHAIN

GenAI has the potential to disrupt and improve the end-to-end supply chain, and early adopters are already starting to see significant benefits beyond what previous forms of AI have delivered. One key area where GenAI is having a particularly large impact is resiliency, which remains a top priority for many supply chain owners and specialists. (Figure 8)

In the months and years ahead, as GenAI drives adoption and helps AI become a true core competency throughout the supply chain industry, use cases will likely expand with a key focus on helping organizations manage risk and improve predictability.

CASE STUDY

USE OF ROBOTS TO SUPPORT HUMAN WORKERS

Situation

A multinational tier 1 automotive supplier found itself grappling with bottlenecks in its raw material storage facility and manufacturing facility dock operations. Although the facilities are only 15 minutes apart, it took about 2.5 hours for a truck to complete one round trip due to prolonged loading and unloading times (40+ minutes and 25+ minutes, respectively). Despite these operational inefficiencies—as well as safety issues and other concerns related to forklift use (e.g., pallet damage, poor visibility, etc.)—the company had never previously ventured into the realm of automation or robotics in any part of its manufacturing operation. However, it was now exploring solutions to increase dock throughput, reduce truck idle times, enhance safety, and explore the potential benefits of incorporating automation into its operations.

Action

To address the company's challenges, nine SlipBots from Slip Robotics were deployed in a continuous flow operating model. The SlipBots, each with up to 10 double-stacked pallet positions, could be loaded in the dock staging area (instead of loading pallets directly onto a trailer). When a trailer arrived, any SlipBots on the trailer could be quickly unloaded, and any SlipBots from the staging area could be immediately loaded back onto the trailer, clearing the staging area for the next shipment. Note: the robots were implemented one route at a time, allowing the company to test and confirm a single route's new efficiencies before introducing the robots company-wide.

Result

The company's first venture into automation proved highly successful, showcasing the adaptability and efficiency of Slip Robotics' solution. Trailer loading times were reduced from 40 minutes to three minutes; pallet damage was reduced by 40%; and dock and truck driver productivity rose by 400%. The manufacturing facility also saw a 20% increase in output, with room for a new manufacturing line because improved reliability and efficiency of loading and unloading freed up space that had previously been needed for storage space. The successful SlipBot adoption was due in part to Slip Robotics' human-in-the-loop approach, which positions the robots as helpful tools rather than as complete replacements for their human counterparts.

After just a couple hours of training, forklift drivers could use a gaming controller to easily steer the SlipBots around the dock and command the bots to auto-enter and auto-exit trailers, optimizing one of the most difficult and stressful parts of a driver's job. This approach led to improved worker safety, and company surveys also revealed measurable improvements in worker satisfaction, employee retention, and morale.

"[Success with AI implementation], change management, education on what [AI] is or is not, and helping people get over the fear of it, that's where companies can succeed or fail"

- Chaneta Sullivan, Director of Facility Development and Safety, Chick-fil-A Supply

LLABORATION

IMPLEMENT & COLLABORATE

In 1989, Barbara Gray wrote an innovative book, *Collaborating: Finding Common Ground for Multi-Party Problems*, that defined collaboration as "a process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible."[4]

For today's organizations, an important challenge is figuring out how to combine AI with collaboration to empower workers and drive tangible results. After all, if intelligent machines have the ability to help solve complex problems, why can't they use those same problem-solving abilities to conform with human behavior and collaborate effectively with human workers?

The first step is to identify and address the key barriers to AI adoption. One key barrier is the cost of AI solution design, implementation, and integration. Tackling this barrier requires a deep understanding and appreciation of AI's strategic importance and long-term impact. Another key barrier is the availability of talent with the required technical expertise to fully harness AI's potential. This barrier is partly addressed by the nature of GenAI, which, as noted earlier, is relatively easy for non-technical people to use and understand without extensive training and expertise. It can also be addressed by upskilling and retraining existing employees.

A recent study by Forbes Advisor, "How Businesses Are Using Artificial Intelligence in 2024," found that 52% of respondents use AI for task optimization and 51% use AI for process automation.[5] However, a common success factor for both strategies is deploying internal subject matter experts with technical capabilities as well as direct knowledge of the business. Other effective approaches include using an iterative process that incorporates employee feedback and experiences, and carefully aligning AI capabilities and functionality with business requirements. These approaches help accelerate AI adoption and build support throughout the organization.

The second step is to focus on compliance and trust, both of which are essential for collaboration. Regulators typically struggle to keep pace with rapidly emerging technologies such as AI, making compliance difficult. However, organizations still have a responsibility to establish a strong and robust AI framework that aligns with their existing cultural norms, processes, and tools. Providing this foundation early on enables an organization to tackle multiple AI-related tasks in parallel while fostering trust within the workforce.

This year's survey asked respondents to classify their organizations' adoption of specific innovative technologies as either "in-use today," "next 5 years," or "unlikely to adopt". (Figure 9)

As shown in Figure 8, AI technologies ranked highest, with 58% of respondents expecting to adopt them within the next 5 years, and 27% already using them (and only 15% saying they are unlikely to adopt them). Overall, this is a significant rise from last year's survey.

Current and near-term use cases for AI in supply chain span a broad range areas, with a noteworthy emphasis on "logistics, shipping, and transportation" (34%) and "supplier selection and due diligence" (33%). (Figure 10).

A key theme for AI use cases and adoption in supply chain revolves around decision-making—particularly, how AI can help supply chain leaders leverage vast amounts of information to make data-driven decisions that optimize their business processes and deliver tangible results.
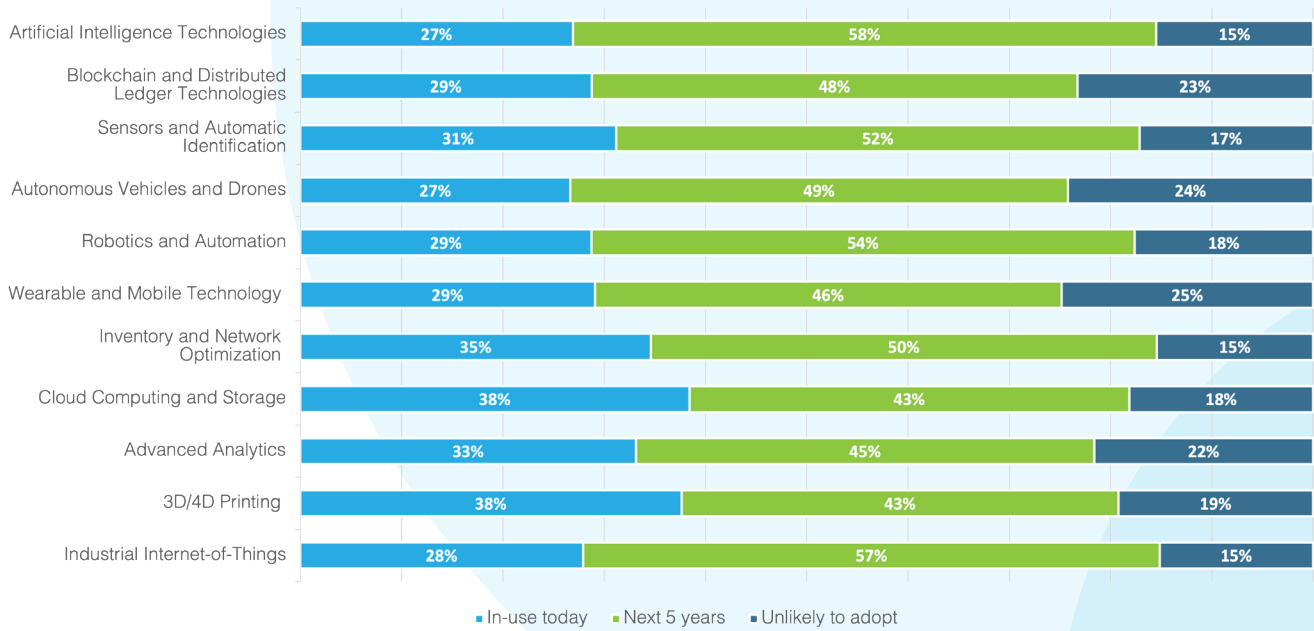
Technology	In-use today	Next 5 years	Unlikely to adopt
Artificial Intelligence Technologies	27%	58%	15%
Blockchain and Distributed Ledger Technologies	29%	48%	23%
Sensors and Automatic Identification	31%	52%	17%
Autonomous Vehicles and Drones	27%	49%	24%
Robotics and Automation	29%	54%	18%
Wearable and Mobile Technology	29%	46%	25%
Inventory and Network Optimization	35%	50%	15%
Cloud Computing and Storage	38%	43%	18%
Advanced Analytics	33%	45%	22%
3D/4D Printing	38%	43%	19%
Industrial Internet-of-Things	28%	57%	15%

■ In-use today ■ Next 5 years ■ Unlikely to adopt

Figure 9: Survey results - adoption of technologies

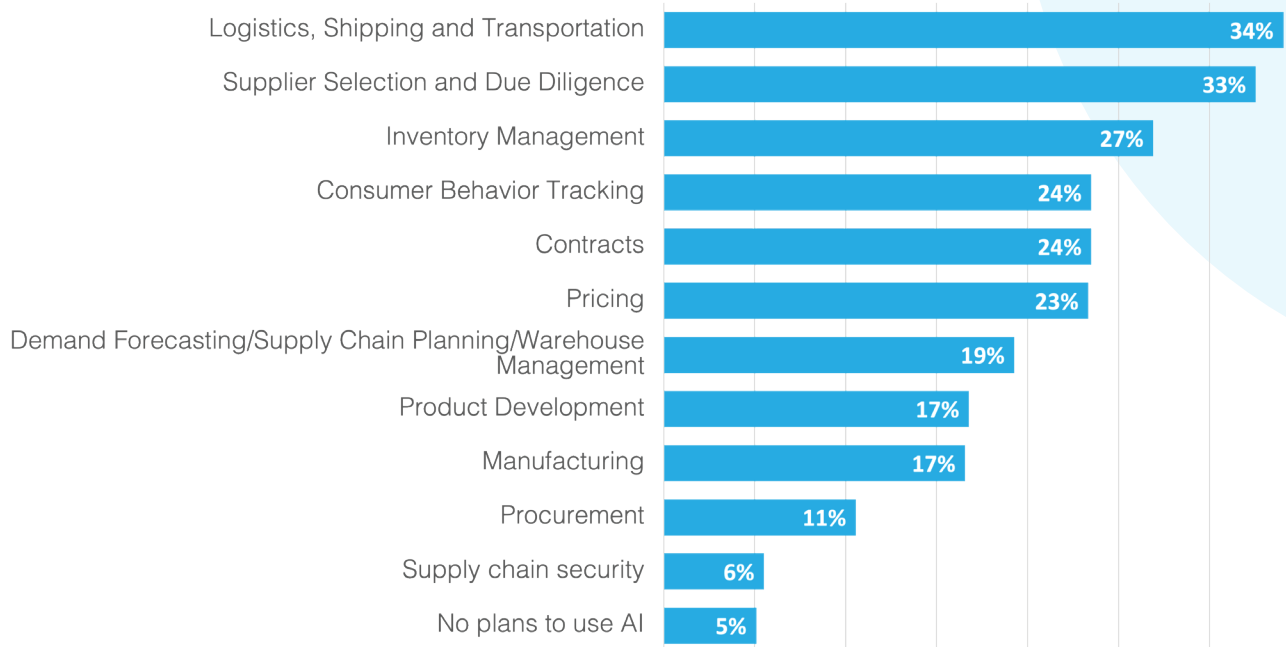| Use	Percentage
Logistics, Shipping and Transportation	34%
Supplier Selection and Due Diligence	33%
Inventory Management	27%
Consumer Behavior Tracking	24%
Contracts	24%
Pricing	23%
Demand Forecasting/Supply Chain Planning/Warehouse Management	19%
Product Development	17%
Manufacturing	17%
Procurement	11%
Supply chain security	6%
No plans to use AI	5%

Figure 10: Survey results - Uses of artificial intelligence

CASE STUDY

DEMAND SENSING FOR AN ELECTRIC VEHICLE MANUFACTURER

Deloitte's ConvergeCONSUMER suite is both a service and set of targeted solutions purpose-built to help organizations transform how they make decisions (incorporating mass and micro data, science, and strategy). ConvergeCONSUMER enables an organization to develop a holistic understanding of its customers; predict and localize demand forecasting; synchronize decisions; incorporate data points from products, locations, pricing, and promotions (to name just a few); personalize the internal employee experience, increasing adoption and utilization; and align personal customer expectations and trends to data-centric segmentation.

Situation
The electric vehicles (EV) division of large automotive manufacturer needed a novel approach to demand forecasting, its goal was to better understand which vehicle configurations would be in demand in the marketplace, in order to support optimal replenishment and order fulfilment decisions.

Action
Using Deloitte's ConvergeCONSUMER DemandBrain ™, the automotive manufacturer was able to develop Demand Sensing for its EV division predicting "free demand" for EV models to inform planning, order generation, and scheduling for future demand):
- Near-term: 11-week forecast to inform assortment and delivery
- Medium-term: 16-week forecast for EV models to inform production

Result
More than 20% greater accuracy than the legacy solution, enabling faster turns, fewer days of supply, and less need for pricing adjustments.

THE HUMAN-CENTRIC COLLABOR

"Solutions with a bilateral exchange that pairs humans and technology together have the best use cases; they allow the workforce to become more flexible and less task-oriented, and they become a decision-support system and not a decision-making mechanism".

- Dr. Randy Bradley, Associate Professor of Supply Chain and Information Systems Management at The University of Tennessee

ATIVE SUPPLY CHAIN

EFFECTIVE MANAGEMENT

A collaborative supply chain requires organizations to effectively manage both machines and humans—developing strategies that are both tech-driven and human-centric. Also, workers must trust the technology in order to unlock its full potential (as well as their own).

These issues are exacerbated by the decades-long talent crisis that has hindered digital transformations in the past. In particular, the skill sets required to operate and manage emerging technologies place supply chain organizations in direct competition for talent with tech giants like Apple and Google. As such, it's no surprise that the 1,700+ supply chain executives we surveyed this year continue to cite recruiting and keeping qualified workers as their greatest challenge aside from inflation. (Figure 11)

In response, organizations need to think differently about how best to pursue and invest in continuous workforce development that upskills workers, supports performance improvement, aligns with the work workers do, and creates career paths that are attractive to desired talent.

USING TECH TO ENABLE HUMAN WORKERS

The survey found that firms are considering a variety of human-centered strategies related to their use of supply chain technology, including an increased focus on ESG and supply chain responsibility targets (50%), AI for decision-making (48%) and collaboration between humans and automation/emerging technology (45%). Additionally, 45% are using technology as an enabler for human decision-making, to
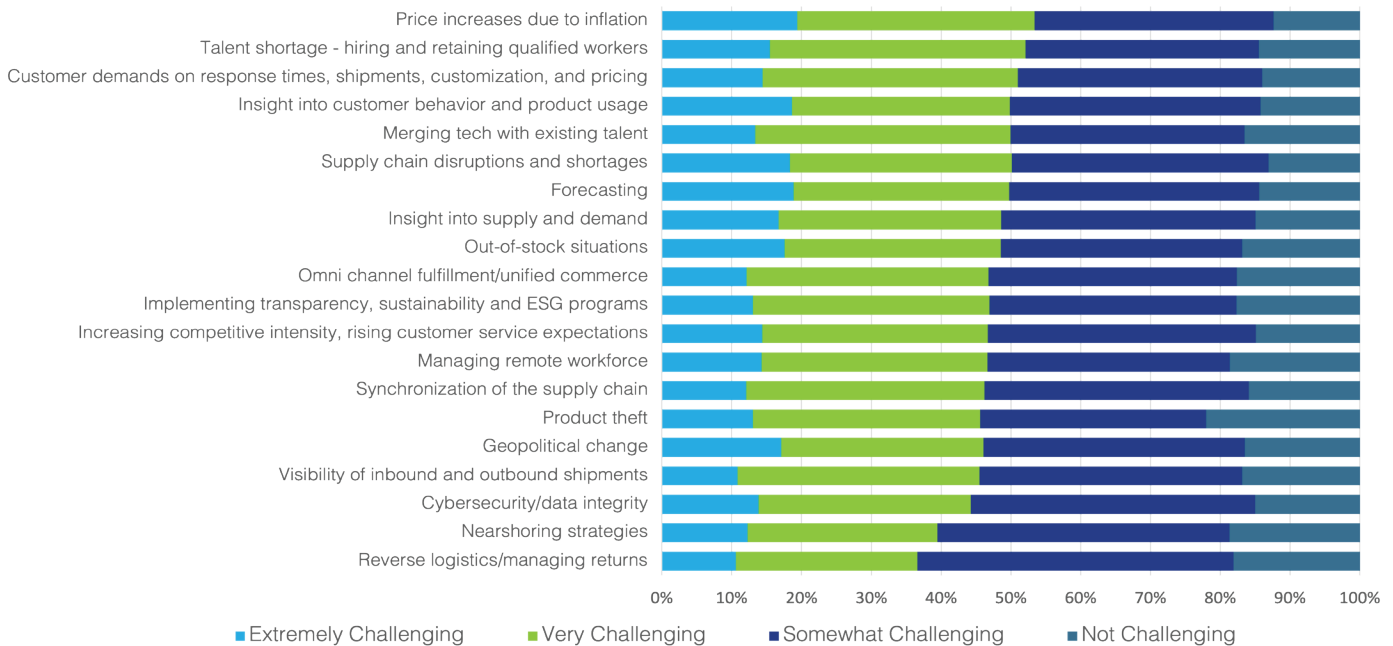

Figure 11: Survey results - Company challenges

improve sustainability/visibility 42% and to empower human workers (40%). (Figure 12)

An emerging concept that addresses these challenges is called "learning in the flow of work." With this concept, work and learning converge, allowing workers to access the right data and knowledge through the right tools—when and where they

need it—without disrupting their daily workflow. What is learning in the flow of work?

Over the past 20 years, the field of learning & development has changed considerably. With the rise of new technologies, organizations have evolved their thinking on how, when, and why workers learn—culminating in the concept of "learning in the flow
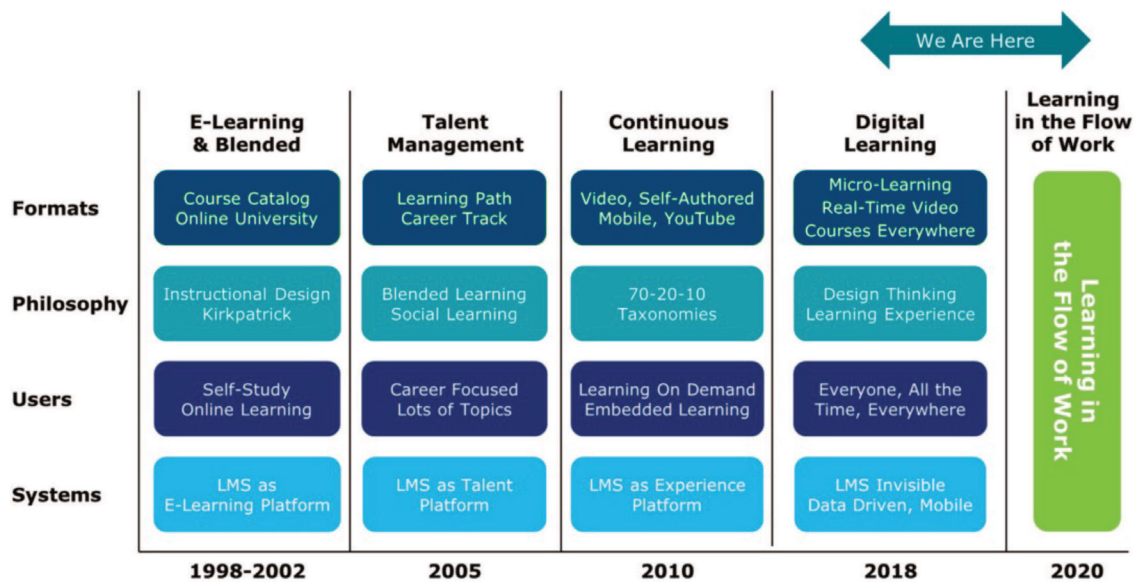
INCORPORATING TECHNOLOGY
Reason for merging supply chain technology
with human-managed activities

- Enable decision making and visibility into data
- Long-term resiliency and sustainability
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- Necessary tool to manage daily activities
- Increase safety for our human workforce

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HUMAN-CENTERED STRATEGY
Where focus is increased related to use of technology in operations

- ESG/responsibility targets
- Use of AI
- Collaboration of human workforce/automation
- Task and workflow designs
- No change

16%
35%
45%
47%
50%

Figure 12: Survey results - incorporating technology into
human-centered strategy

of work".[6] (Figure 13)

This new approach does not invalidate traditional training methods. However, it does reflect a fundamental shift in how organizations think about training (and when and where it should occur). Specifically, learning in the flow of work embeds learning into the day-to-day work itself, instead of taking workers away from their jobs for dedicated training.

According to a recent study, two-thirds of workers prefer to learn at work and nearly half prefer to learn at the point of need. By combining innovations such as GenAI with a human-centric technology strategy, organizations can enhance worker productivity by providing the right data, knowledge, and guidance at the exact time and place it is most needed.

We Are Here

	E-Learning & Blended	Talent Management	Continuous Learning	Digital Learning	Learning in the Flow of Work
Formats	Course Catalog Online University	Learning Path Career Track	Video, Self-Authored Mobile, YouTube	Micro-Learning Real-Time Video Courses Everywhere	Learning in the Flow of Work
Philosophy	Instructional Design Kirkpatrick	Blended Learning Social Learning	70-20-10 Taxonomies	Design Thinking Learning Experience	
Users	Self-Study Online Learning	Career Focused Lots of Topics	Learning On Demand Embedded Learning	Everyone, All the Time, Everywhere	
Systems	LMS as E-Learning Platform	LMS as Talent Platform	LMS as Experience Platform	LMS Invisible Data Driven, Mobile	
	1998-2002	**2005**	**2010**	**2018**	**2020**

Source: *Bersin, Deloitte Consulting LLP, 2018.*

Figure 13: Learning in the flow of work

CALL TO ACTION: FOUR PRACTICES TO EMBED LEARNING IN THE FLOW OF WORK

In a time of constant disruption, many organizations are struggling to figure out where to begin. Change can be overwhelming, leading to workforce fatigue and conflicting priorities that can mark the difference between a successful and unsuccessful digital transformation.

Here are four leading practices that can help organizations develop a deeper understanding of their workers' roles and tasks in order to determine where learning opportunities and information can best be delivered in the natural flow of work.

1. Anticipate workers' needs by understanding what they do

Work is constantly changing, and workers are often expected to take on additional tasks in response to emerging demands. The best way to gain a deep understanding of how workers spend their time is to speak with them and then observe them in action during their daily workflow.

Observe, ask, and listen carefully to identify pain points and then figure out what will best enable workers to perform well now and in the future.

Surveys are a useful tool at scale; however, in-person interviews create higher levels of empathy and connectivity—helping workers feel like part of the change journey, which can improve trust and talent retention.[6]

2. Use technology and data to provide timely, actionable information

Once organizations have a deep understanding of worker roles and tasks, they can use technology to augment worker performance and learning. Data made available in the flow of work provides workers with relevant, timely, and actionable information—similar to the information many consumers now receive from their mobile devices in areas such as fitness and finance. Such data also improves the work experience by empowering people to do their best work and make adjustments without waiting for managers to provide feedback, pushing personal ownership to the worker.

One pitfall to avoid, however, is overwhelming workers with too many learning opportunities or ineffective delivery methods, which can cause workflow breakdowns and change fatigue. Timing is everything. By anticipating workers' needs and putting data directly in their hands at the exact moment they need it, organizations can accelerate

Figure 14: Learning contexts (the four Es) and associated delivery methods

learning opportunities while enhancing performance and safety.

3. Accelerate learning opportunities by placing meaningful tools and information in the flow of work

When thinking about learning in the flow of work, four distinct contexts need to be considered: Environment, Exposure, Experience, and Education (better known as the four "Es"). Each of these four learning contexts is associated with specific delivery methods. (Figure 14)

The four Es are designed to promote flexible, structured learning. Delivery methods can be shifted between contexts, in different combinations, allowing organizations to tailor delivery based on workers' schedules and locations—offering individual workers exactly what they need to boost their performance. This enables each worker to create their own career path tailored to their own development wants and needs. High performing organizations accomplish this by leveraging technology to create automated systems that provide workers with accurate and relevant information at precisely the right place and time.

4. Recognize and encourage learning in the flow of work

Leaders should encourage learning and communicate that learning is an everyday part of the job. This means recognizing and rewarding learning within the flow of work. Workers need to know that mistakes will not lead to disciplinary action but rather be viewed as learning opportunities. When learning is supported in this way, workers feel empowered to push their own performance and take appropriate risks without being ordered to do so.

With this approach, workers are empowered to make choices about how they learn, collaborate, and work. And as technology evolves, additional options for capturing and disseminating information will continue to arise in the marketplace, improving an organization's ability to embed learning into the flow of work while equipping workers with cutting-edge technology—leading to improved worker development, safety, and well-being. Also,

allowing workers to influence the tasks they perform and how they learn and collaborate creates a greater sense of ownership and belonging, which can improve talent development and retention.

LEARNING IN THE FLOW OF WORK WITH GEN AI

Effective training is not about teaching; it's about creating an environment for learning. An AI-driven approach to learning can not only be more efficient but also more effective, enabling learning in the flow of work.

Workforce training is a $340 billion market and spending on learning & development typically averages $1,200 to $1,500 per person—even during recessions.[7]

GenAI tools can understand, consolidate, reorganize, and deliver information in ways that traditional instructors cannot. Workers can ask whatever questions they want and get answers that directly address their needs. This dramatically reduces the time workers spend searching for information, improving their performance and enabling them to focus on activities that create greater value while reducing downtime and wasted movement/effort.[7]

GenAI can also help tailor learning paths to individual needs, improving on traditional models that generically assign learning paths based on job roles. For example, Uplimit, a startup dedicated to building an AI platform that helps teach people about AI, is using its Cobot and other tools to provide personalized coaching and tips for technical professionals who want to learn about AI.[7] This customization ability allows organizations to shift from traditional generic training based on job roles to individual learning paths that better equip workers with the personalized skills they will need to succeed in the future.

High-performing organizations can use AI and other technologies to embed learning into the flow of work—empowering their workforce; improving their learning & development ROI; enhancing worker well-being; and tackling the critical challenge of attracting, retaining, and developing talent.

CASE STUDY

GEN AI USED IN TRAINING

Situation

A global specialty material company recently implemented a new supply chain planning solution to improve efficiency, reduce costs, improve forecasting, and increase collaboration among different parts of its supply chain. However, the company was struggling to effectively train and upskill its workforce, hindering adoption. Instead of getting value from the new solution, planners were reverting back to their manual and spreadsheet-driven processes in order to keep up with daily demand. Meanwhile, the workforce was overwhelmed with change and struggling to find time to focus on learning the new ways of working (due to production priorities), resulting in sub-optimal decision making. This was costing the company time and money, with an estimated 10% to 20% of potential value remaining unrealized.

Action

To unlock the full capabilities of its supply chain planning solution and drive adoption of the new ways of working, the company focused on how to better support workers' learning needs and provide them with the information they need (exactly when they need it). Previously, when employees encountered issues on the floor, they had to stop what they were doing and spend an unpredictable amount of time locating the necessary information and then executing the applicable transactions. To improve the process, the company organized thousands of digital documents into a single curated library, added external supply chain planning resources to augment the learning repository, and built a GenAI model to search, retrieve, and tailor responses based on a planner's specific questions.

Result

The company built and implemented an AI-assistant to support work-ers' daily performance and reduce the time they needed to spend on learning activities. The AI-assistant provides workers with the data, knowledge, and coaching they need to make better plans, quickly address daily exceptions, use safety stock more effectively, improve forecasting accuracy, and improve their individual performance (while reinforcing and training the forecasting model on handling new ex-ceptions). As a result, the company unlocked 10% to 15% of addi-tional value from its S&OP plans, improved operational efficiency by up to 15%, and boosted productivity by up to 20%.

Successful firms are dedicating training resources to build the bridge between supply chain technology and the human workers.

- Wanda Johnson
Technology Fellow at Deloitte Consulting LLP

E RISK AND IMPROVE ADOPTION

AUTOMATION

TALENT

Almost four years after the start of the COVID-19 pandemic, two enduring lessons continue to be top-of-mind for today's supply chain executives. The first lesson is that in a global and connected world, an optimal supply chain is one that can quickly adapt and bounce back in the face of unexpected events. This year's survey respondents continued to cite supply chain agility and resiliency as the number one trend impacting their operations—a critical need that was starkly revealed by

the large demand spike for durable goods that occurred near the beginning of the pandemic, which left many companies scrambling to meet demand. (Figure 15)

The second enduring lesson is that talent continues to be a scarce commodity. Post-pandemic, there was a huge surge in consumer demand but a shortage of workers to satisfy that demand. This shortage can be seen clearly in Figure 16, which shows a
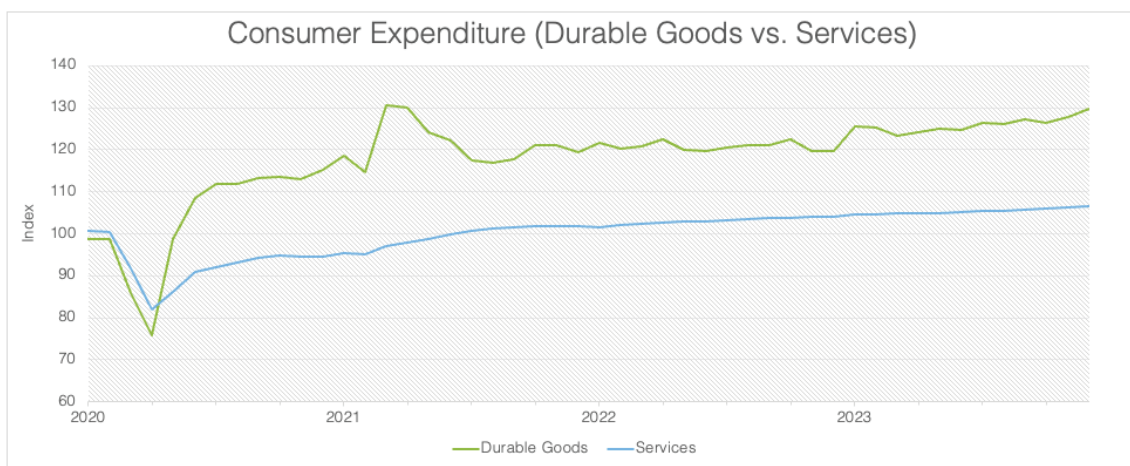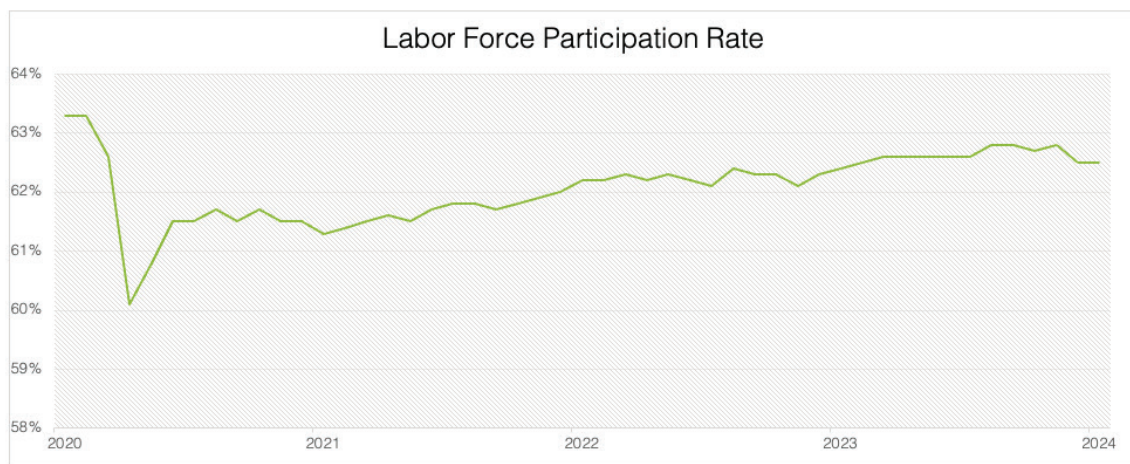

Figure 15: COVID-19 durable demand shock

Figure 16: Labor force participation rate

3 Month moving average of median wage growth
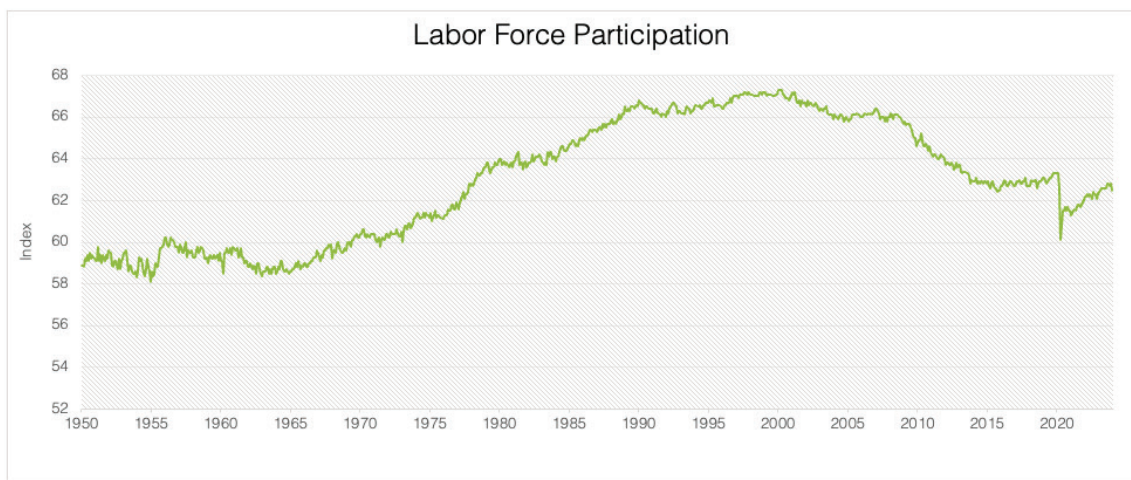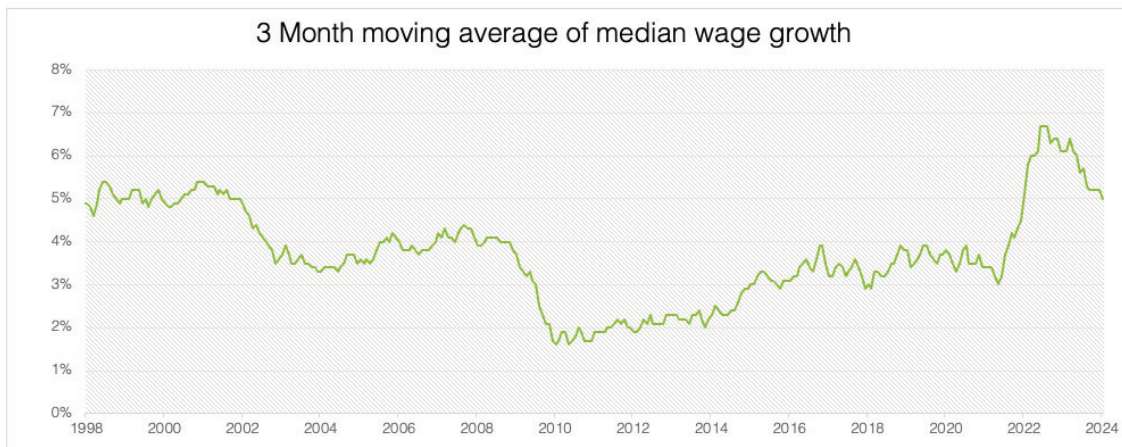

Labor Force Participation

Figure 17: Wages and long-term labor force participation

sharp drop in labor force participation in early 2020, followed by ongoing participation rates that remain significantly below pre-pandemic levels.

Not surprisingly, this labor shortfall led to higher wages and inflation. (Figure 17)

However, large wage gains and high inflation have been relatively uncommon in recent decades, whereas the decline in labor force participation is part of a long-term problem that has existed since the early 2000s. (Figure 17).

Our survey results reflect this reality, with 38% of respondents describing hiring and retaining talent as extremely or somewhat challenging for their organizations.

How can supply chain organizations overcome these talent challenges? In the past, automation, robotics, and enterprise software were the primary tools to drive cost optimization, productivity gains, and staff augmentation. For example, warehouse management systems (WMS) enabled managers to focus on higher-value tasks such as improving operational safety and analyzing the drivers of throughput volume, instead of spending their time doing paperwork and chasing after employees to complete tasks.

Now, with GenAI, supply chain organizations have an opportunity to improve productivity in unprecedented ways, while also empowering workers to take on real time decision-making, troubleshooting, and exception scenario handling.

A GenAI platform can serve as both an instructor and all-knowing information source for workers looking to learn about an organization's broader operations, solve problems, drive operating improvements, and better serve customers.

Two recent research papers highlight some of GenAI's real-world impacts. The first study, which assessed GenAI's ability to enhance writing samples, found that use of GenAI significantly raised average worker productivity and performance (reducing the time to complete a task by 0.8 standard deviations, and improving quality by 0.4 standard deviations).[8] The second study, which examined how GenAI affects law student exam performance, found that students at the bottom of the class derived the greatest benefit, demonstrating the technology's potential role as an equalizing force for performing knowledge work.[9]

What does this mean for supply chains? According to this year's survey, 51% of respondents believe AI technologies will create a competitive advantage or disrupt their industry within the next ten years. Supply chain areas where we believe AI will be particularly disruptive and impactful include:

- Learning and troubleshooting. Given GenAI's ability to structure unstructured data, we envision it becoming a game-changing tool for training and troubleshooting. For example, instead of having new employees watch videos, read slides, or attend generic training sessions, GenAI will allow them to ask a training system personalized questions and receive personalized instruction. This GenAI capability will likely be embedded in future enterprise software systems, enabling users to engage in ongoing learning by continually querying the systems with questions and even requesting personalized guidance. For example, instead of reaching out to a floor manager for help diagnosing a WMS issue, a forklift driver could simply ask the AI-powered system "what happened and how can I correct the problem?"

- Streamlined and automated communication. AI has the potential to communicate information in ways that are highly relevant, accurate, and timely—without human intervention. In transportation operations, for example, we envision a world where AI systems will learn the type of information that carriers need during a load lifecycle (e.g., how weather and traffic might affect route changes); when communication needs to occur; and which channels carriers prefer to communicate through. This aggregation of behavior and content in communication could lead to significant improvements in service levels and route optimization.

- Real-time and customized reporting. In the past, creating customized reports and dashboards was time-consuming, labor-intensive, and expensive. But with GenAI, decision-makers can simply engage in an interactive conversation with the system and then have it to generate the desired reports on-the-fly in real time.

These three examples, while by no means comprehensive, offer a hint of GenAI's potential to powerfully transform supply chain operations and make them more adaptable and resilient to a wide range of unexpected events, from talent shortages to demand shocks.

CASE STUDY

GEN AI FOR SYSTEM IMPLEMENTATION / ADOPTION

Situation

Century Supply Chain Solutions is a tech-focused global logistics service provider. One of the firm's core business activities is providing Purchase Order and Origin Cargo Management services to retailers, manufacturers, and distributors that import products from around the world. Century operation teams in each port manage the process of transforming vendor bookings (created in Century's VIZIV Supply Chain Optimization Platform) into ocean carrier bookings. Booking requests are made electronically (if supported by the carrier) through EDI and API integrations. Unfortunately, detailed shipping orders from carriers (along with changes to vessel schedules, equipment, etc.) are generally sent as PDF files, Excel spreadsheets, and/or email content. Century manages hundreds of thousands of containers a year on behalf of its customers, which means its operations teams receive over 50,000 emails a month that must be manually interpreted and entered into the VIZIV platform (due to carriers' limited or non-existent EDI/API capabilities).

Action

Century recently partnered with Kognitos, a GenAI firm focused on AI-enabled workflow empowerment solutions that automate the process of parsing and logging information contained in emails, PDFs, and Excel documents from carriers, flagging important information such as changes to vessel schedules, container bookings, and other related transportation activities. Specifically, with Kognitos, all incoming emails are now transformed into JSON files that can be loaded directly into Century's VIZIV platform. If a document is received in a new or revised format and can't be fully transformed, the operations team is notified in real time and can engage with the Kognitos platform to explain where to find the required information in the new format.

Result

With the Kognitos AI Workflow platform, Century's operators can now rapidly and accurately react to carrier responses, confirming or revising each booking. This has put the company at the forefront of its industry in terms of the speed in which teams can see and react to carrier booking updates—helping customers keep their supply chains on schedule.

2024 SUPPLY CHAIN TRENDS

Supply Chain Agility
Including Geopolitical Risks and Reshoring

Rising Costs
Including Inflation and Cost of Capital

Workforce
Including Talent Shortage and Changing Skill Sets

Sustainability/ESG

Visibility and Transparency

In the 2024 survey, five key trends impacting supply chains were identified that will dictate the course of actions and focus for industry leaders moving forward. These key trends impacting supply chains are:

1. **Supply Chain Agility** as geopolitical concerns and ongoing risks are impacting operations. Organizations need to ensure their supply chains center on flexibility and adaptability in the face of dynamic market conditions, geopolitical risk, and growing reshoring initiatives.
2. **Rising Costs** including inflation and cost of capital. While inflation is easing in the U.S. firms will need to monitor and strategically manage rising costs globally and particularly in Europe.
3. **Supply Chain Workforce** including the talent shortage and changing skill sets. Automation is increasing overall worker satisfaction by making jobs better and more tech-forward. However, culture and flexibility are key in recruiting, retaining and re-skilling a high-achieving workforce.
4. **Sustainability and Environmental, Social, and Governance (ESG)** measurement and reporting regulations are on the near-horizon and organizations working with their suppliers to meet coming Net Zero goals and responding to risks associated with climate-related disruptions.
5. **Visibility and Transparency** goals are compelling leaders to prioritize technology-driven investments and supplier collaboration that enhance real-time insights and foster trust across the value chain.

In navigating these trends, leaders position themselves to not only meet current challenges but also foster long-term supply chain resilience and business growth.

ACTIONS FOR SUPPLY CHAIN LEADERS

In the dynamic landscape of supply chain management, supply chain leaders play a pivotal role in creating and enhancing a balance between technology-driven and human-centric approaches. To achieve this balance, five focus areas are paramount in helping an organization discover and integrate technologies that can simultaneously improve the human-centricity of its supply chain.

FIVE KEY FOCUS AREAS

- Create an enterprise portfolio of technologies and initiatives that can make the supply chain both more tech-driven and human-centric.
- Identify specific use cases for each technology/initiative, focusing on realistic solutions that address challenges and drive efficiencies within particular business processes.
- Assess total cost of ownership (TCO) and build a business case with a clear return on investment for the identified use cases.
- Identify and mitigate risks and ethical challenges associated with the new technologies being deployed.
- Follow a comprehensive approach for technology transformation, implementation, and support.

Here's a closer look at each of the five key focus areas:

1. Create an enterprise portfolio of technologies and initiatives

Start by conducting workshops (such as "Art of the Possible" sessions) to identify and prioritize all the different technologies and initiatives that could help create a more tech-driven and human-centric supply chain. In the workshops, encourage participants to be creative and think outside the box. (Examples of potentially relevant technologies include: AI and GenAI, robotics, logistics software, or any technology that could significantly enhance a supply chain operation).

After identifying all relevant technologies and initiatives, prioritize and classify them based on their expected impact to the supply chain and overall operations. Include an estimate of the level of effort that will likely be required to implement each technology/initiative. (See Figure 17 for an example of how to organize and classify the portfolio based on varying levels of ambition, value impact, and complexity).[10]

EXTENT OF Tech-Driven Human-Centric AMBITION

REIMAGINE THE SUPPLY CHAIN
New technologies that transform business functions and operations across the end-to-end supply chain with consideration for upstream and downstream supply chain partners

INNOVATE THE OPERATION
New technologies that can transform end-to-end processes across an operational network or the business allowing the organization to unlock new capabilities, drive efficiency, and derive value from existing systems, data sets and tools

OPTIMIZE THE OPERATION
Initiatives and new technologies that drive changes across specific operations and facilities that can modernize and streamline operational processes and improve efficiency

WHERE TO PLAY (Operational Functions Etc.)

HOW TO PLAY (Op Model, Capabilities, Culture)

Value Plays ENABLED

Efficiency Capability Experience

Efficiency Capability

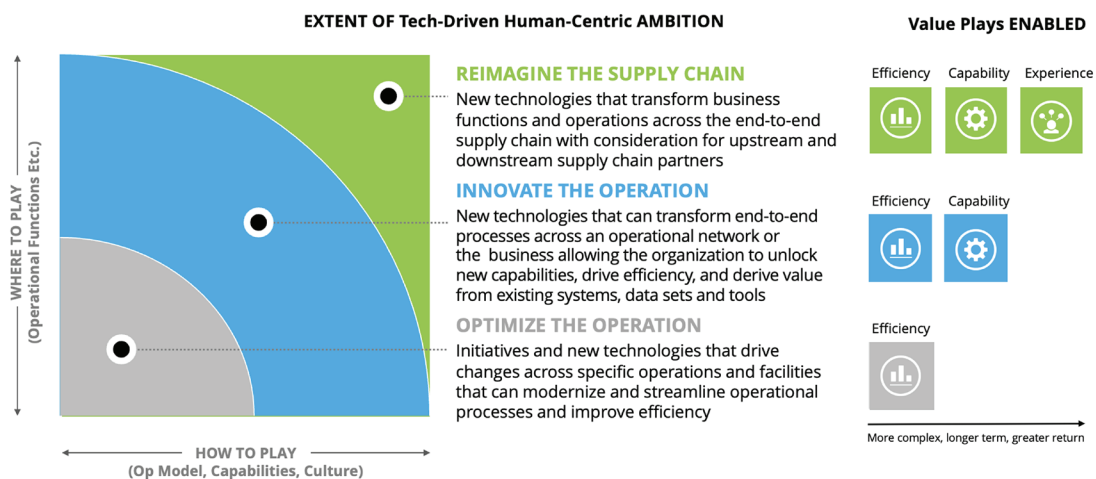Efficiency

More complex, longer term, greater return

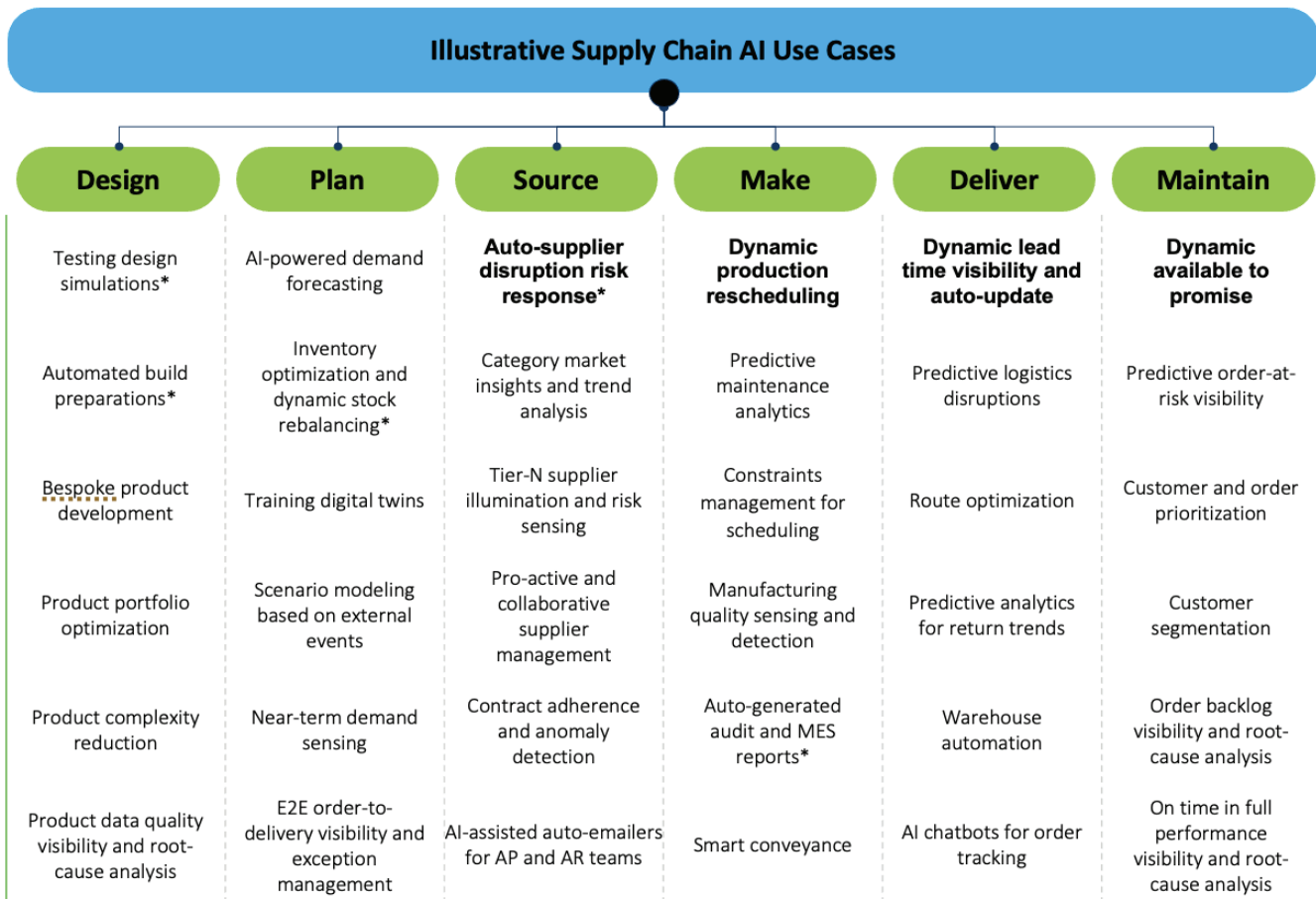Figure 18: Sample framework for organizing a portfolio of technologies and initiatives

The framework in figure 17 is just one example of how to classify and organize technologies and initiatives for a tech-driven, human-centric supply chain. Different organizations might prioritize different capabilities and competencies and should adjust their frameworks accordingly.

2. Identify specific use cases

Next, identify potential use cases for each technology/initiative in the portfolio. The goal is to better understand exactly how each technology/initiative could benefit the business. As an example, Figure 18 highlights some potential supply chain use cases for AI and GenAI.[11]

When identifying use cases, a variety of approaches are possible. For example, with AI and GenAI, it often helps to seek input from unbiased third-party experts since the technologies are advancing so quickly. It can also be helpful to conduct detailed follow-up workshops involving cross-disciplinary teams with deep expertise in specific process and operational domains to understand where AI could have the biggest impact.

Illustrative Supply Chain AI Use Cases

Design	Plan	Source	Make	Deliver	Maintain
Testing design simulations*	AI-powered demand forecasting	**Auto-supplier disruption risk response***	**Dynamic production rescheduling**	**Dynamic lead time visibility and auto-update**	**Dynamic available to promise**
Automated build preparations*	Inventory optimization and dynamic stock rebalancing*	Category market insights and trend analysis	Predictive maintenance analytics	Predictive logistics disruptions	Predictive order-at-risk visibility
Bespoke product development	Training digital twins	Tier-N supplier illumination and risk sensing	Constraints management for scheduling	Route optimization	Customer and order prioritization
Product portfolio optimization	Scenario modeling based on external events	Pro-active and collaborative supplier management	Manufacturing quality sensing and detection	Predictive analytics for return trends	Customer segmentation
Product complexity reduction	Near-term demand sensing	Contract adherence and anomaly detection	Auto-generated audit and MES reports*	Warehouse automation	Order backlog visibility and root-cause analysis
Product data quality visibility and root-cause analysis	E2E order-to-delivery visibility and exception management	AI-assisted auto-emailers for AP and AR teams	Smart conveyance	AI chatbots for order tracking	On time in full performance visibility and root-cause analysis

Use case has high potential to be accelerated by new generative AI capabilities

Figure 19: Example use cases for AI and GenAI

One example use case for GenAI is the SOP writing process—using GenAI to review software design documentation and process flows, and to help create software test scenarios and test scripts. AI-enabled solutions can also be used to automate test execution.

A good place to start looking for relevant use cases is in process areas that are repetitive and require minimal skill. Often, technology solutions can streamline or eliminate such activities, freeing up workers to focus on tasks that are more valuable and strategic while boosting overall efficiency, productivity, and job satisfaction.

3. Assess total cost of ownership (TCO) and build a business case

Since 2019, MHI's annual surveys have consistently identified the lack of a clear business case as one of the biggest barriers to successful technology adoption.

With any prospective technology investment, important to build a robust business case based on the true cost of implementing and using the solution. Instead of focusing solely on a solution's required initial investments, a comprehensive total cost of ownership approach should used to account for all costs and benefits over time. (Figure 19)

An effective business case reflects all of a solution's potential benefits, ranging from cost savings and increased revenue opportunities to improved customer satisfaction and enhanced decision-making. It also reflects the solution's full costs, including (but not limited to) the cost of: development; deployment; software/equipment purchase or licensing; additional required IT infrastructure; data collection and cleansing; system integration and testing; ongoing operational cost, maintenance, and support; and future modifications.

4. Identify and mitigate risks and ethical challenges

Another set of issues that must be considered relate to risk management and mitigation. For AI and GenAI, potential risks and ethical issues that might

arise from use of the technology include:

- Systemic bias. Potential bias must be actively managed to ensure a system's decisions and behavior are not unethical or discriminatory. This is especially true for GenAI and large language models, which are trained from existing data sources and therefore highly vulnerable to implicit and explicit bias.[12]
- Privacy and confidentiality. Physical and logical access control mechanisms must be established to limit data access to appropriate personnel. Getting legal and technology experts involved early in the development process can
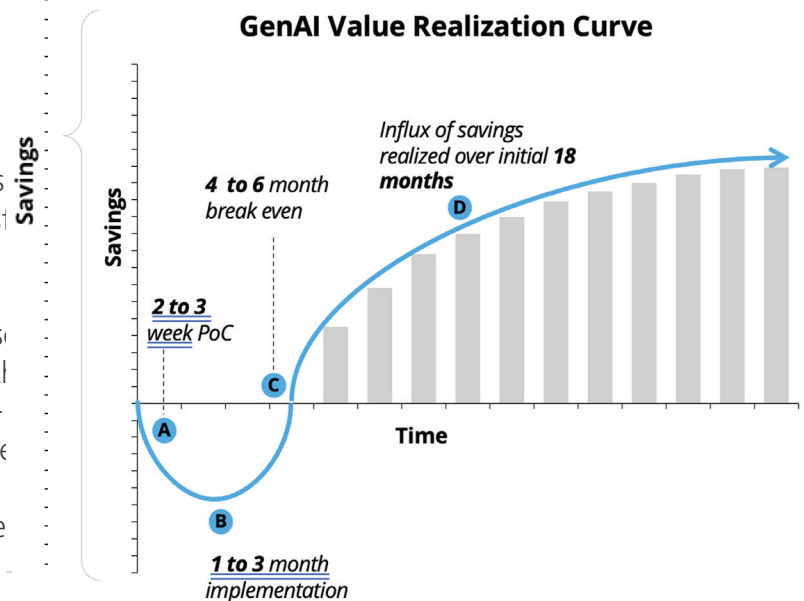

GenAI Value Realization Curve

Figure 20: Value realization curve example for GenAI

help create effective controls for protecting personal data.[13,14]

- Data security: Ensure the security of data by establishing privacy policies, encryption, and anonymization—addressing all challenges and risks related to external, physical, and digital security.[13,14]
- Accountability: Ultimately, humans are accountable for a technology's outputs and actions. As such, it's essential to understand how AI systems work and how decisions are made.[13,14]

5. Plan a comprehensive approach for implementation and support

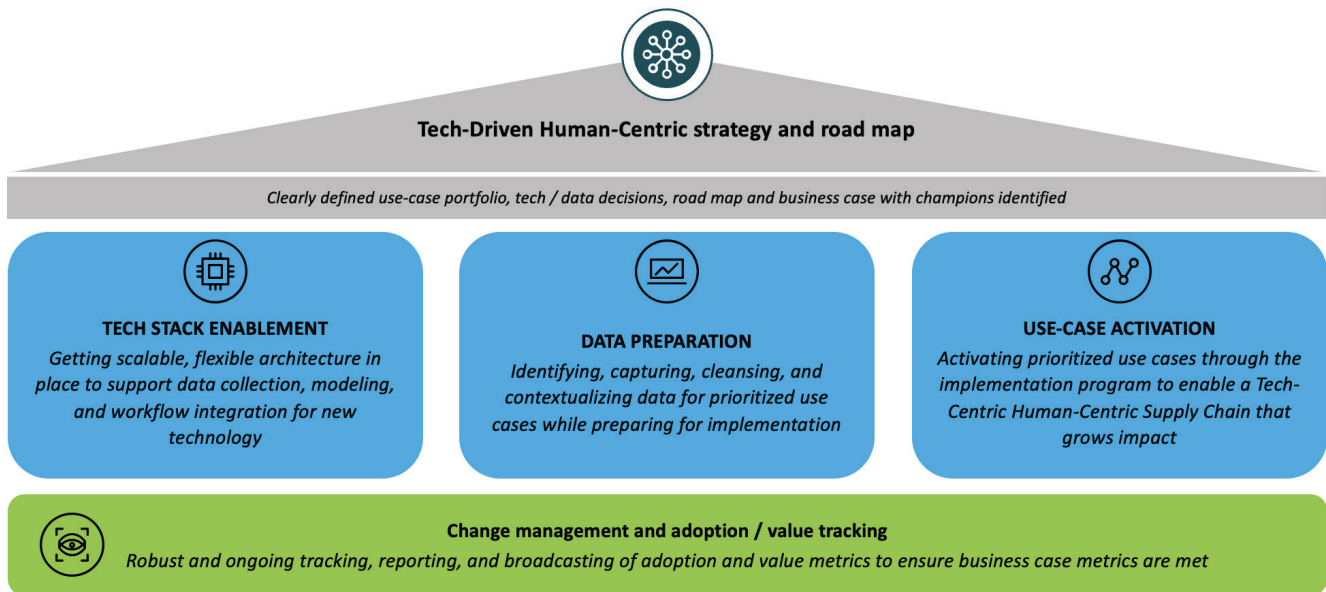Creating a collaborative supply chain that is both

Tech-Driven Human-Centric strategy and road map

Clearly defined use-case portfolio, tech / data decisions, road map and business case with champions identified

TECH STACK ENABLEMENT

Getting scalable, flexible architecture in place to support data collection, modeling, and workflow integration for new technology

DATA PREPARATION

Identifying, capturing, cleansing, and contextualizing data for prioritized use cases while preparing for implementation

USE-CASE ACTIVATION

Activating prioritized use cases through the implementation program to enable a Tech-Centric Human-Centric Supply Chain that grows impact

Change management and adoption / value tracking
Robust and ongoing tracking, reporting, and broadcasting of adoption and value metrics to ensure business case metrics are met

Figure 21: A comprehensive approach to supply chain technology transformation (sample)

technology-driven and human-centric is a complex undertaking that requires a structured and comprehensive approach. Such an approach is not a linear project plan but a broad framework that considers all aspects of what makes a technology transformation successful.

In the sample framework shown (Figure 20), the approach starts with a strategy and roadmap for achieving the goal of a technology-driven, human-centric supply chain. This overarching vision is supported by detailed pillars for enabling the technology stack, preparing data, and activating specific use cases—all supported by formal processes for managing organizational change and tracking value.[11]

The framework in Figure 20 is one example. The right approach will be different for every organization, depending on its unique needs and circumstances. The most important thing is to define and follow an approach that is structured and comprehensive, rather than haphazardly implementing new technologies in isolation.

CASE STUDY

EXOTEC "SMART WAREHOUSE AUTOMATION TRANSFORMATION"

Situation

A large retailer and distributor of shoes and boots was experiencing rapid sales growth, rising customer expectations, and an expanding product catalog. This growth created major challenges at one of its largest fulfillment centers, an omnichannel distribution center measuring 1 million square feet of physical footprint. In particular, the increased sales volume boosted employee turnover in the picking process (a very physical activity), leading to numerous quality and production issues.

The company sought a technology solution to help address the various challenges created by rising demand and an ever-increasing SKU count. Top priorities included improving operating efficiency and the day-to-day work experience of its warehouse associates, and drastically reducing repetitive, physically intense tasks in order fulfilment processes (such as walking multiple miles per day in search of ordered goods, and the lifting of heavy objects).

Action

The company decided to completely transform its operations through a tech-driven, human-centric approach that would address its efficiency challenges and reduce manual repetitive actions. To achieve this goal, it partnered with EXOTEC, which provides innovative smart warehouse and automation solutions. The company implemented, 86 of EXOTECs Skypod robots (a goods-to-person robotics solution), 9 pick and replenishment stations (designed to integrate with the Skypod robots to bring picked goods to an operator), and 71,785 EXOTEC storage modules in ASRS racking, which allows the company to realize five times greater storage density than non-automated storage solutions.

Result

The installation was completed on schedule in 11 months with minimal disruption of day-to-day operations. After the implementation, the company received many benefits, including: drastic improvements in employee retention due to increased efficiencies and reduction of physical picking tasks; increased throughput, with 80% of picking labor transitioned to more productive value-added tasks; the ability to fulfill tens of thousands of order lines on a daily basis; more efficient navigation of seasonal peaks; and the ability to access any SKU in the facility within two minutes. Due to increased efficiencies, the company was also able to expand its B2B offering to include next-day shipping and extend its order cut-off times for customers.

CONCLUSION

AI adoption and interest is at historic levels, with 84% of survey respondents now reporting plans to adopt artificial intelligence technologies within the next five years. As a forward-looking leader, one of your key challenges is to understand and plan how your organization can most benefit from AI tools (and how quickly to implement them).

GenAI has the potential to be a powerful tool for improving supply chain resiliency and enhancing worker productivity, satisfaction, and retention. It can be used to rapidly adjust training methods; empower teams to develop new skills; and increase the capabilities, and performance of individual workers through collaboration with a suite of AI helpers. AI can also help leaders make dramatically better, faster, more confident decisions by rapidly gathering and analyzing diverse data sets and then generating advice that is highly relevant and actionable.

Yet AI technology alone is of limited value. Adopting an approach to AI that is technology-driven, human-centric, and collaborative is crucial to long-term supply chain success—boosting productivity and empowering workers to achieve higher levels of performance and innovation than ever before.

Want to Learn More?
Jobs of Tomorrow Docuseries
Deloitte AI Institute
Deloitte GenAI

It's important to create nurturing workplace that trains and empowers your team to embrace cutting-edge technologies

- John Paxton, CEO of MHI

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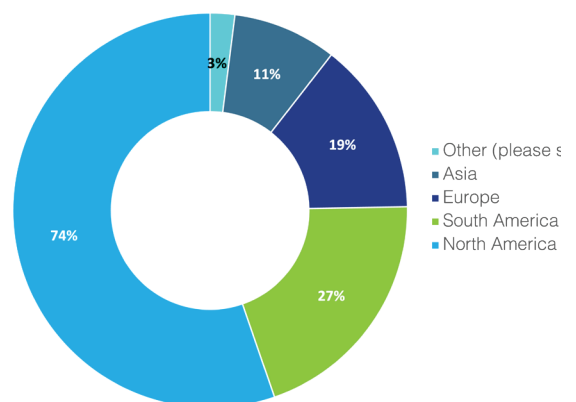
ABOUT THE REPORT

The 2024 MHI Annual Industry Report is our eleventh annual study of emerging disruptive technologies and innovations that are transforming supply chains around the world. The findings are primarily based on an in-depth global survey conducted in late 2023, which involved 1,675 supply chain professionals from a wide range of company types and industries.

Half of the participants are executives with the role of CEO, Vice President, General Manager, or Department Head. Participating companies range in size from small to large, with 57% reporting annual sales in excess of $100 million, and 6% reporting annual sales of $10 billion or more.

COMPANY SIZE BY REVENUE (USD)

6%
11%
9%
16%
13%
18%
27%

- Greater than $10 billion
- $1 billion to $10 billion
- $500 million to $1 billion
- $100 million to $500 million
- $50 million to $100 million
- $10 million to $50 million
- Less than $10 million
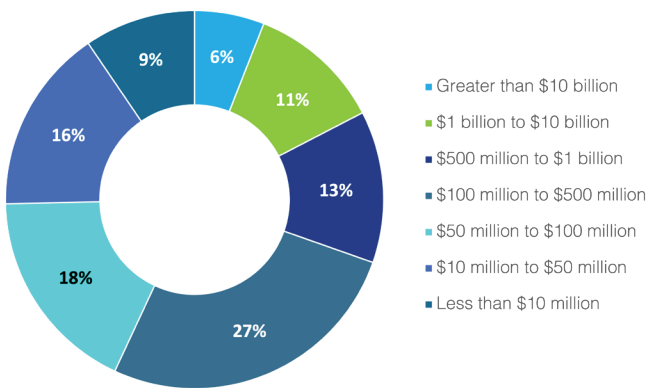
RESPONDER PROFILE BY GEOGRAPHY

3%
11%
19%
74%
27%

- Other (please s
- Asia
- Europe
- South America
- North America

RESPONDER'S ROLE

3%
11%
17%
19%
32%
19%

- CEO or President
- VP or SVP
- Director
- General Manager/Dept. Head
- Manager or Engineer
- Other
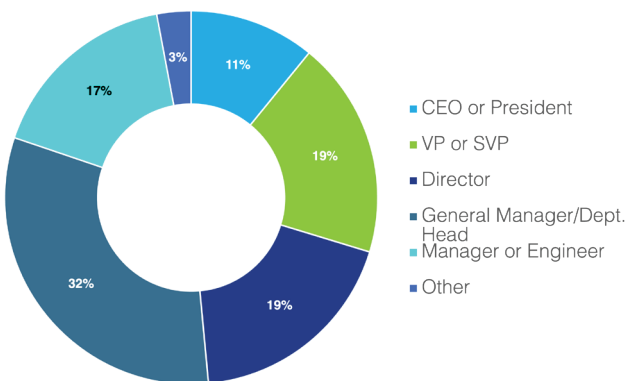
RESPONDER'S COMPANY TYPE

2%
10%
34%
21%
33%

- Manufacturer
- Distributor
- Service Provider
- Consultant
- Other

RESPONDER'S INDUSTRY

Industry	Percentage
Automotive	18%
Consulting or other Professional and Technical Services	16%
Consumer Packaged Goods (excluding food/ beverage)	13%
Equipment and Related Software and Services	11%
Food and Beverage	8%
Retail	7%
Technology, Telecom and Media	6%
Education	5%
Transportation (incl. 3PL, etc.)	4%
Warehousing (incl. contract warehousing, etc.)	4%
Life Sciences	4%
Other (please specify)	2%
Wholesale	2%

INVESTMENT IN PRODUCTS AND SERVICES OVER NEXT THREE YEARS

Product/Service	Percentage
Artificial intelligence/machine learning	35%
Advanced analytics	28%
Automatic guided vehicle systems	23%
Augmented reality, virtual reality, and wearables	19%
Automated storage/retrieval systems	19%
Attachments - overhead & lifting equipment	18%
Additive manufacturing (3D Printing)	18%
Autonomous mobile robots/drones	18%
Attachments - trucks & mobile equipment	17%
Cloud computing & storage	16%
Blockchain/distributed ledger technologies	16%
Computer hardware and/or software	16%
Automatic identification products/sensors	15%
Batteries/chargers/motors/fuel & power systems	15%
Sustainable facility solutions	14%
Hydraulic & electrical components/controls	14%
Carousels	14%
Controls & controlling devices	13%
Industrial Internet of Things	12%
Cleaning systems & equipment	12%

REPORT SPONSOR

SIEMENS

Siemens helps OEMs and end customers access the advantages of digitalization with our end-to-end portfolio for key warehouse technologies. Equipping AGVs, conveyors and automated storage systems with seamlessly integrated automation is just one part of our offering. The digital twin enables optimization in the virtual world before findings are implemented in the real world, enabling a new world of possibilities.

Acknowledgments

About MHI

MHI is an international trade association that has represented the material handling, logistics and supply chain industry since 1945. MHI members include manufacturers of material handling equipment including warehousing and logistics, systems integrators, third-party logistics providers, consultants and publishers. MHI offers education, networking and solution sourcing for their members, their customers and the industry through programming and events. The association sponsors the ProMat and MODEX exhibitions to showcase the products and services of its member companies and to educate manufacturing and supply chain professionals.

The Warehousing Education and Research Council (WERC) is a division of MHI and is the only professional organization focused on logistics management and its role in the supply chain. Through membership in WERC, seasoned practitioners and those new to the industry master best practices and establish valuable professional relationships. Since being founded in 1977, WERC has maintained a strategic vision to continuously offer resources that help distribution practitioners and suppliers stay on top in our dynamic, variable field. These include national, regional, local and online educational events; performance metrics for benchmarking; practical research; expert insights; and multiple opportunities for peer-to-peer knowledge exchange.

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