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June
2026

What the Iran
Ceasefire Means for

**SUPPLY
CHAINS**





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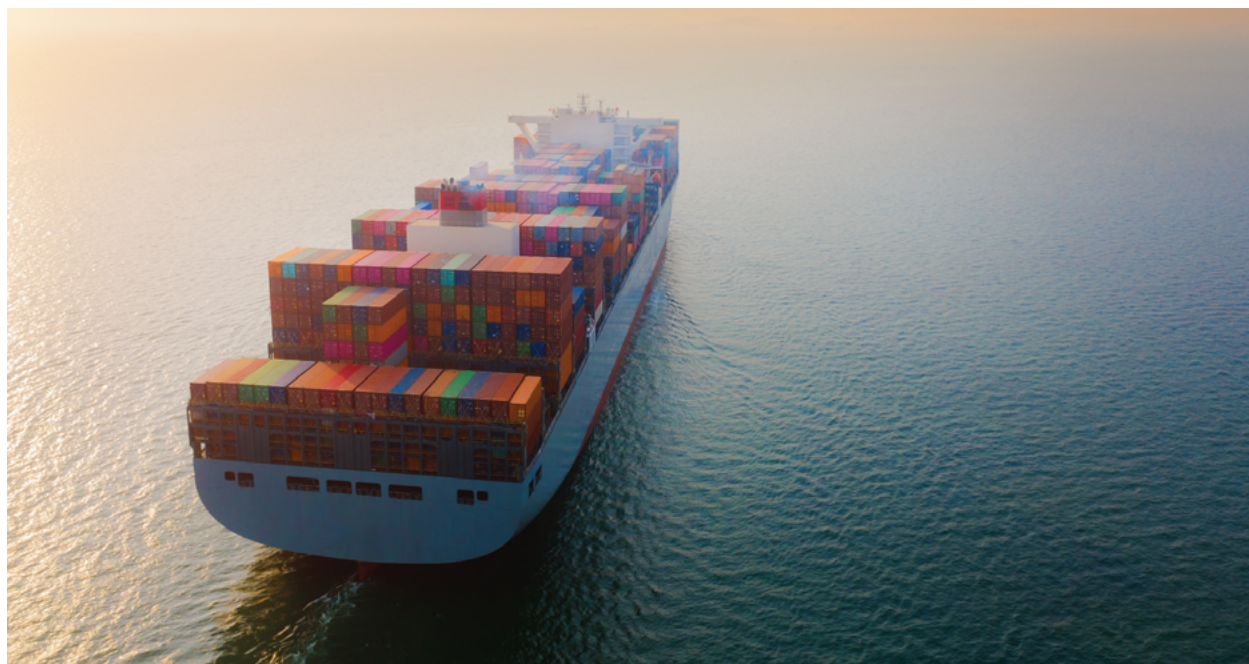
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Securing Real-Time Freight Visibility with Cloud-Based EDI Systems [\(Page 26-27\)](#)

Real-time freight visibility has become essential as supply chains grow more complex. Cloud-based EDI systems help companies connect trading partners and gain timely information needed for better, faster decisions.



What the Iran Ceasefire Means for Supply Chains

After months of uncertainty and disruption, the world's supply chains are ready to shake off the impacts of the War in Iran and start planning for the second half of the year.

Ever since the Iran War broke out at the end of February, the world's supply chains have been thrown into disarray as oil prices escalated, the Strait of Hormuz largely closed to commercial traffic and the U.S. imposed a naval blockade on Iranian ports. With an interim ceasefire agreement now in place, companies can begin shaking off some of that disruption and making firmer plans for the second half of the year.

“For the last few months, manufacturing supply chains have been feeling the pressure following the eruption of conflict between the US and Iran and the subsequent closing of the Strait of Hormuz, which brought further supply chain disruption and escalating energy costs,” Joe Bush writes in *The Manufacturer*. “Now, it appears, light may finally be at the end of the tunnel as it has been announced that the US and Iran have agreed on a framework deal to end the war, which includes the Strait of Hormuz reopening.”

The Agreement's Impact on Supply Chains

The Memorandum of Understanding (MOU) was signed by both countries on June 17, with formal peace talks taking place shortly after that in Switzerland. According to *AP*, the agreement calls for Tehran to dilute its stockpile of highly enriched uranium and waives U.S.-backed sanctions on Iran. The initial deal to end the war went into effect immediately after leaders from both countries signed it.

“The agreement calls for a permanent end to hostilities and starts a 60-day negotiating clock to reach a final deal on the future of Iran's nuclear program, though Trump left the door open to resume attacks,” *AP* reports.

While the final details of the peace deal get sorted out, the world's supply chains will be watching to see how quickly oil begins flowing and commercial shipping resumes through the Strait of Hormuz. A full reopening could ease some of the

strain on energy supplies, for example, while also reducing costly rerouting and bringing more predictability back to freight and production schedules.

The bigger question is how quickly those benefits reach manufacturers, carriers and shippers after nearly four months of disruption. “Companies need to treat this as a window, not a resolution. Uncertainty persists, possibilities for renewed disruption linger and risk models now account for future disruptions,” The Manufacturer cautions. “However, while public statements suggest the strait will be effectively ‘open’ from the moment the deal is signed, others believe that in practice, implementation is conditional and dependent on events that have yet to unfold.”

In “[Hormuz Reopening Would Offer Relief for Asia, but Economic Scars Will Remain](#),” The New York Times explains that the agreement will provide an “immediate reprieve, freeing hundreds of tankers laden with oil, gas, and fuel byproducts to begin making the monthlong journey back to Asian ports.” It says the reopening will offer near-term relief for Asia, the region outside of the Middle East that has borne the brunt of the economic fallout from the war.

Despite the positives, it also says the shock waves of the crisis are “likely to ripple through the end of the year,” or even beyond that. “...industry experts and economists caution

that because trade flows have been disrupted for so long, global markets will need considerable time to normalize,” The New York Times adds, “meaning elevated inflation and supply-chain strains are likely to linger through the end of the year.”

No Price Cuts Yet

Consumers may also have to wait for some relief from the high gas, grocery and airline ticket prices they've been paying for the last few months. According to *ABC News*, even with the oil flowing again from the Middle East, it could take time for consumers to see a difference at local fuel pumps, supermarkets and other places they shop.

“Fighting over the Strait of Hormuz disrupted not only supplies of crude and refined fuel but also the supply chains for fertilizer, food and even footwear,” it adds. “Businesses expect higher costs to linger, which means their customers might need to prepare for that too.”

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Data Center Boom Faces Pushback

States, towns and federal lawmakers take a stand against a data center boom that supports the proliferation of AI, cloud computing and digital services.

Demand for more artificial intelligence (AI), cloud computing and digital services are all driving massive investment in data center development in the U.S. Projects continue to come out of the ground nationwide, with developers targeting markets that can support the scale and infrastructure these facilities require.



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Supply Chain Worker Shortage Looms

A new report predicts that there will be a shortage of more than 1.1 million supply chain workers by 2035.

Just when it felt like supply chains couldn't come under any more pressure or have the room to manage any other challenges, a new Accenture report finds that the sector is going to be short more than 1.1 million workers by 2035. Technology, automation and artificial intelligence (AI) may help pick up some of the slack, but the number is staggering in an industry that requires a human touch, expertise and oversight to run right.

Accenture does the math in its new report, *Turning the supply chain talent shortage into strength*. The bottom line: demand across core supply chain occupations in the U.S. will rise by 1.34 million roles by 2035 (19% growth), but the labor force will only add roughly 221,000 workers (just 3.2% growth). That leaves a gap of over 1.1 million.

"Supply chains in the US are facing a serious labor shortage, which threatens the efforts to reshore supply and production," Tracey Countryman, global lead, supply chain and engineering at Accenture, says in the report. "Companies can tackle this challenge with AI and other technologies, but only if they reshape their workflows and roles within it."

Accenture says several forces are driving the demand, including economic expansion, nearshoring, agentic commerce, delivery compression, supply base diversification and rising compliance complexity. "Simply hiring more workers is not enough; the math doesn't work," it says. "Reshoring efforts, AI-driven commerce, faster delivery expectations and rising regulatory requirements are all accelerating demand for supply chain talent at once."

Can't Keep up With Industry Growth

Warehousing, logistics, transportation and everything else that goes into running a supply chain hasn't historically been a big draw for recent grads, professionals or even career-changers. The global pandemic altered that, bringing supply chain up onto the radar screen of individuals, professional organizations (ASCM, CSCMP, ISM, etc.) and educational institutions, many of which have since rolled out new supply chain-related programs and certifications or refreshed existing ones.

Still, the industry is growing at a clip that's outpacing those programs—right at a time when roughly **11,000 Baby Boomers**

reach retirement age every day. That combination, along with various other factors, is leaving a gap in the supply chain sector that can't always be filled through the usual means (i.e., posting an opening on LinkedIn and expecting the right candidate to come along).

The good news is that technology is helping to even out the imbalance a bit. For example, Accenture simulated how technology adoption could flip the script: In one scenario, the 1.1-million worker shortfall turns into a surplus of approximately 360,000, but that's only if 75% of the existing supply chain workforce adopts agentic AI, autonomous vehicles, drones and exoskeletons.

3 Ways Tech Can Help Close the Gap

As some industries use AI in place of people, supply chain organizations face a different problem: not enough workers to fill open jobs. Accenture recommends that supply chain executives use technology to reduce routine work, rethink job responsibilities and prepare employees for new duties.

- **Target routine work first.** Identify the repetitive tasks consuming employees' time, such as inventory tracking, record updates, shipping documentation and shipment scheduling, then determine where technology can take over. Accenture says this can help operations handle higher volumes without hiring at the same rate while employees concentrate on exceptions, customer problems and decisions that require judgment.
- **Redefine roles as tasks change.** Decide which responsibilities employees will take on as technology absorbs more administrative work, including system oversight, exception management, data validation and decision-making. Review each occupation separately, Accenture recommends, because office-based jobs may change substantially while roles requiring physical presence or judgment may not.
- **Train employees for the new work.** Focus less on systems that AI and automation can handle (e.g., entering and updating information in enterprise resource planning [ERP] systems, recordkeeping and workflow coordination) and help employees learn how to manage more value-added projects. For example, show them how to review AI output, validate data, manage exceptions and intervene when automated systems fall short.

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Potential Supply Chain Implications of the Iran Conflict

Exploring the immediate and long-term implications of the Middle East conflict on the world's supply chains.

Major geopolitical events almost always ripple through global supply networks, and the escalating conflict involving Iran is already raising concerns across multiple fronts. From potential disruptions to shipping routes in the Strait of Hormuz to tighter airspace restrictions and rising energy prices, the U.S. and Israel's attack on Iran could affect transportation, manufacturing and procurement channels worldwide.

The situation remains fluid and the long-term implications are still unclear. In the meantime, supply chain teams are already looking for pressure points that could emerge if the conflict expands or drags on. Here are several areas companies should be paying attention to.



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Cybersecurity Enters the AI Era

AI is helping cybercriminals move faster, but companies are also using it to strengthen cyber defenses.

Cybersecurity breaches continue to escalate, fueled in part by more sophisticated attacks and the growing use of artificial intelligence (AI). Hackers can now create more convincing phishing emails, scan for weaknesses and test systems faster than they could 10 years ago, giving organizations less time to detect and respond to threats.

The Nitrogen Ransomware Group's attack on Foxconn is one of the latest breaches to hit close to home for electronics buyers and supply chain managers. According to Cyber Magazine, the Taiwanese electronics manufacturing giant, whose customers include Apple, Google, NVIDIA and Sony, was targeted in a ransomware attack that allegedly involved eight terabytes of data spanning more than 11 million files.

The ransomware group claimed the stolen files include confidential customer data, projects and drawings tied to major technology companies. Foxconn has not confirmed those claims, but it did acknowledge that some of its North Ameri-

can factories suffered a cyberattack. According to the publication, the company's "cybersecurity team activated its response process and took steps to maintain production and delivery as affected factories resumed normal operations."

Cybercrime Gets More Expensive

The attack on Foxconn is one example of a cybersecurity problem that continues to grow in both scale and cost. [Cybersecurity Ventures](#) projected global cybercrime costs would reach \$10.5 trillion annually by 2025, up from \$3 trillion in 2015. As ransomware attacks, data theft and supply chain breaches continue to proliferate, [IBM](#) says the average breach cost is now \$10.22 million for U.S. companies and \$4.44 million globally.

AI is fanning the fire by helping cybercriminals automate phishing campaigns, create more convincing fake messages and identify vulnerabilities faster than they could just a few years ago. [Panda Security](#) says:

- Reported cybercriminal losses have doubled between 2022 and 2025, a growth spurred by AI.
- 99% of organizations have sensitive data dangerously exposed to unsanctioned AI tools.
- Among data breaches involving AI attacks (16% of breaches), 37% used phishing and 35% used deepfakes.
- 82.6% of cybersecurity professionals are concerned about the increasing sophistication of AI-powered phishing attacks.

"We've entered a new era of cybersecurity, as both defenders and attackers leverage artificial intelligence, creating what experts describe as an 'AI arms race,'" Panda says. "Hackers can weaponize AI to generate highly personalized messages that mimic the writing style of trusted contacts or organizations."

At the other end of the spectrum, AI is also helping companies defend themselves against cyberattacks and more proactively monitor, identify and thwart potential cybersecurity issues. For example, Panda says AI helps maintain 99% accuracy while also saving companies an average of \$1.9 million in breach costs.

Using AI to Police AI

With AI agents able to autonomously perform reconnaissance, exploit vulnerabilities and move laterally across networks—and all without any human intervention—[SentinelOne](#) says companies are switching to agentic AI models that can handle everything from triage to 24/7 monitoring to automated incident response.

So the same tools that attackers are using can also help companies defend themselves. Instead of waiting for IT teams to chase down every alert manually, for example, agentic AI can help spot unusual activity, prioritize the most urgent issues and put basic controls in place faster.

SentinelOne says IT departments are also using agents to map AI usage across the organization and enforce data boundaries across endpoints. The goal is to find out whether employees are feeding sensitive data into public AI tools. The agents can "block unauthorized tools at the network level," it says, "while offering approved, sandboxed versions that sanitize data before it leaves the corporate environment."

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6 Ways to Close the AI Confidence Gap

New insights from Accenture signal a real need to get employees on board with and involved in more AI initiatives and conversations.

The pace of change in business isn't just picking up—it's compounding on itself. What took a year to unfold in 2023 now happens in a quarter, and leaders know they're facing more disruption this year than they saw last year. The question isn't whether things will keep accelerating, but whether organizations can actually handle it.



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Supply Chain Connect provides supply chain and purchasing professionals with essential news, information and analysis about the technology and business trends that impact the global supply chain industry.

Riding the Next Upcycle: Mouser Electronics on AI, Data Centers and Demand

Mouser Electronics president Jeff Newell explains how data centers, shifting lead times and new customer expectations—as well as the technologies being deployed to meet those expectations—are powering the next upcycle in electronic component distribution.

Green Stock, Real Returns: Sustainability as a Growth Engine in Electronics Supply Chain

Don Akery, CEO of Waldom Electronics, explains how the electronic component distribution market has swung into a powerful new upcycle—and how AI, smaller MOQs and a Green Stock model are reshaping inventory, sustainability and growth across the industry.

Supply, Demand & Human Emotion: The Real Drivers of Component Cycles

DigiKey CEO Dave Doherty breaks down how supply, demand and human behavior are shaping the electronic component distribution market's recovery, and how AI, automation and digital platforms are redefining what winning looks like for distributors.

The Pancake Effect: The Impact of Bulk Orders on Electronics Supply Chains

Avnet's Dayna Badhorn details a new electronics distribution paradigm, covering the “pancake effect” of excess inventory, the rise of data centers and how AI and digital tools are reshaping supply chain visibility.

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The Link Between Material Handling Ergonomics and Facility



By addressing hidden ergonomic threats, facilities can increase throughput, reduce turnover and boost productivity.

In physically demanding industries, ergonomics is essential for health and safety. While management often focuses on lifting techniques, a bigger threat may be lurking in their vehicle maintenance logs. Deferred maintenance creates harsh working conditions that sabotage throughput, which is why the ergonomics of material handling equipment is so important.

The Hidden Cost of Poor Ergonomics

Poor material handling ergonomics carries financial impacts well understood across the supply chain. Workers' compensation claims pile up, absenteeism rises and turnover rates climb. These costs compound quickly when operators work in physically demanding conditions without adequate support.

Overexertion remains a persistent challenge in warehouses and distribution centers. It ranks as the **second most common injury type**, contributing to lost workdays and reduced operational efficiency. When staff push through physical discomfort, the damage accumulates over time. Manageable fatigue evolves into chronic strain that eventually forces them off the floor.

Eventually, a compensation claim forces an employer to address what they should have prevented months earlier. By that point, they have already absorbed the costs of reduced productivity, temporary staffing and claim processing.

Ergonomics Is More Than Safe Lifting

Proper lifting techniques and antifatigue mats are important for workers' well-being. However, they address only the most visible aspects of physical strain in material handling operations. The daily repetitive strain caused by poorly maintained equipment often goes unrecognized until productivity drops or someone makes an injury claim.

Employees spend entire shifts aboard forklifts and other material handling vehicles. When that equipment isn't functioning optimally, every movement requires additional physical compensation.

During a typical shift at a high-volume distribution center, a forklift operator might make hundreds of steering corrections. When a worn steering system demands an extra 5 pounds of force per turn, they're forced to generate thousands of pounds of additional force per shift.

Even a poorly padded seat can have far-reaching consequences. Failed seat suspension turns every floor imperfection into a jolt transmitted directly through the operator's spine. Given that approximately **40% of truck drivers** suffer from chronic back problems, this issue is often overlooked.

The impact of strain accumulates quickly. What starts as mild discomfort in the shoulders and forearms progresses to chronic pain. The cumulative physical toll is considerable, yet it often goes unaddressed until something or someone breaks down.

Deferred Maintenance Sabotages UPH

Deferring maintenance on capital equipment like forklifts creates technical debt that increases the likelihood of sudden equipment failure. The financial argument for preventive maintenance is straightforward. What gets overlooked is how this creates a physically punishing environment.

The ergonomics of material handling equipment deteriorate immediately when vehicles aren't maintained. For instance, **tire wear and deformation** affect stability and load balance, forcing drivers to work harder to maintain control, especially under load. They compensate by gripping the steering wheel more tightly and making more frequent corrections.

Hydraulic system degradation creates similar problems. When lift and tilt functions respond sluggishly, operators compensate by repositioning loads multiple times instead of once. Each maneuver requires additional time and effort. An extra few seconds per lift cycle add up quickly, destroying throughput targets while exhausting the workforce.

Vibrations transform smooth operation into a constant physical challenge. Workers experience whole-body vibrations transmitted through the seat and steering column. Muscle tension increases as they brace against it. This happens while they're still expected to maintain the facility's target units per hour (UPH).

The long-term consequences extend well beyond a single shift's reduced output. A punishing environment **accelerates morale loss and exacerbates turnover** in an already competitive hiring market. A facility's reputation among potential hires suffers when word spreads about poor working conditions.

Prioritizing Maintenance and Repairs

Preventive maintenance is a core ergonomic strategy, as it **keeps vehicles functioning properly** while reducing warehouse operator fatigue. Instead of running vehicles until failure forces intervention, management should maintain them to preserve optimal operating characteristics.

Management should implement daily pre-shift inspections. A simple checklist covering steering responsiveness, seat comfort, hydraulic function and visibility takes mere minutes and identifies problems before they escalate. When operators report issues, leaders can establish a same-day triage process to assess severity and schedule repairs.

They should also track which vehicles receive repeated complaints. These patterns reveal systemic maintenance gaps. A forklift might perform flawlessly until operating conditions or usage patterns change.

When organizations track operator comfort alongside maintenance records, the connection between material handling ergonomics and fleet upkeep becomes undeniable. Facilities implementing operator-informed maintenance protocols can see improvements in both equipment reliability and workforce satisfaction.

Boosting Throughput and Retention

When staff work with well-maintained equipment, they can sustain higher productivity levels throughout their shifts. Physical strain remains, but it stays within manageable parameters. Warehouse operator fatigue reduces considerably rather than consistently accumulating.

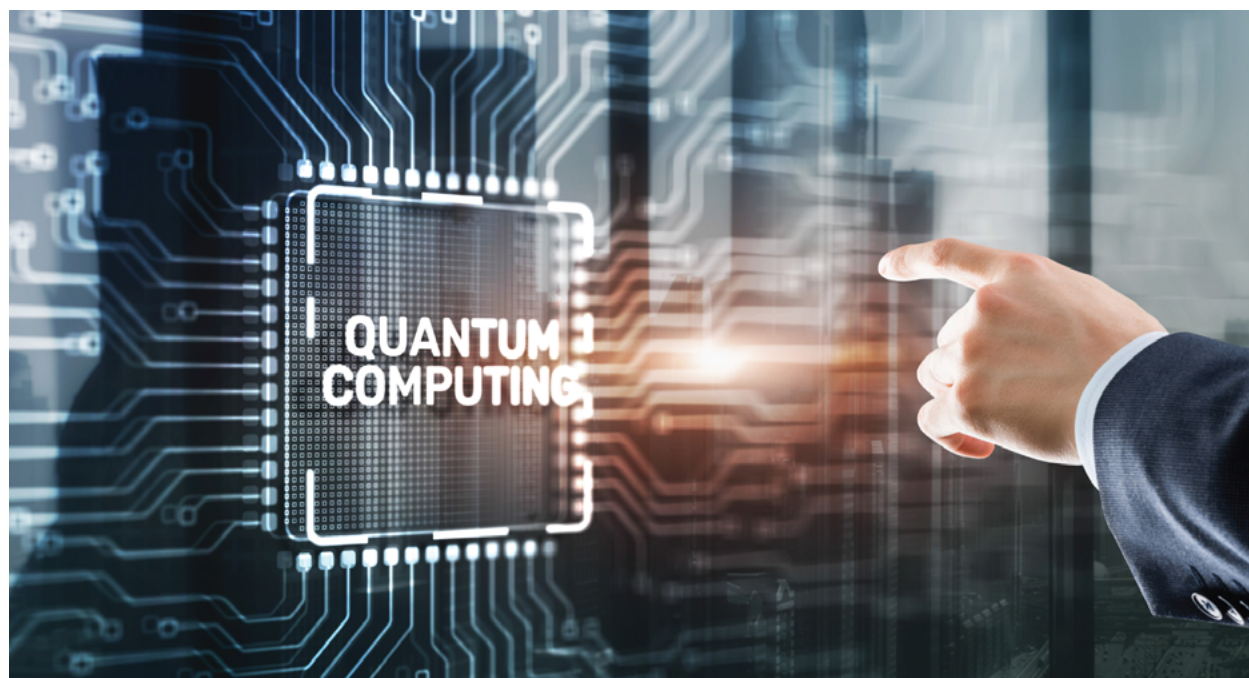
Retention benefits compound over time. Throughput metrics stabilize because employees maintain consistent performance from hour one through hour eight. Moreover, those who aren't battling poorly maintained equipment view their positions as sustainable long-term careers rather than temporary stops.

Training investments pay larger dividends when experienced operators stay rather than cycling through to less-demanding environments. Someone with years of experience tends to move more efficiently than a new hire. Losing that institutional knowledge to preventable ergonomic problems represents a significant hidden cost.

Ultimately, recognizing the link between equipment maintenance and ergonomics creates a more resilient, productive workforce. Also, the facility becomes known as a place where management understands the real demands of material handling work and takes action to support operator well-being. That reputation translates into a competitive advantage.

Integrate Material Handling Ergonomics

A maintenance-first approach to material handling equipment ergonomics leads to efficiency gains and warehouse operator fatigue reduction. This investment protects UPH targets while reducing the turnover that disrupts operational continuity. The ergonomic benefits materialize immediately, while the financial gains accumulate over time.



Why Uncle Sam is Betting Big on Quantum Computing

Federal quantum investments could strengthen domestic technology, support manufacturing and help solve complex supply chain problems.

Quantum computing used to sound like the stuff of sci-fi movies, not supply chain planning. But the technology is moving out of the far-off-future category as governments invest in its potential to solve problems with too many variables for today's computers to handle efficiently. For supply chains, that could eventually mean better ways to model risk, test routing options, improve materials development and protect sensitive data.

According to [IBM](#), quantum computing is an emergent field of computer science and engineering that harnesses the unique qualities of quantum mechanics to solve problems beyond the ability of even the most powerful classical computers. It incorporates a range of disciplines, including quantum hardware and quantum algorithms.

“While still in development, quantum technology will soon be able to solve complex problems that classical supercomputers can't solve (or can't solve fast enough),” says IBM, which

notes that quantum computers can “solve certain problems in minutes or hours that would otherwise take conventional machines millennia to complete.”

A Quicker Way to Test Hard Problems

Going a step further, [McKinsey](#) says quantum computers “are poised to take computing to a whole new level,” and that they can potentially solve very complex statistical problems that are well beyond the limits of today's computers, and across a range of industries and applications.

Here's how they do it: Classical computing that powers your laptop and smartphone is built on bits. A bit is a unit of information that can store either a zero or a one. By contrast, quantum computing is built on quantum bits, or qubits, which can store both zeros and ones. Qubits can represent any combination of both zero and one simultaneously; this is called superposition, and it is a basic feature of any quantum state.

“When a classical computer uses multiple variables to solve a problem, it must conduct a new calculation every time one of those variables changes,” McKinsey explains. “Each calculation is a single path to a single result. Quantum computers, on the other hand, can explore many paths in parallel through superposition.”

So in a nutshell, quantum computing gives researchers a faster way to test many possible answers to a hard problem. In supply chain terms, that could mean comparing more routes, suppliers, demand scenarios or material options in less time. That's why governments see it as more than a science project. It could become a powerful tool for logistics, manufacturing, cybersecurity and other areas where speed and complexity now drive major business decisions.

Why Washington is Investing Now

The U.S. government appears to be going all in on quantum computing, with the Department of Commerce signing letters of intent with nine different companies in May. The department plans to award over \$2 billion in federal incentives to those firms under the CHIPS and Science Act.

According to the [National Institute of Standards and Technology \(NIST\)](#), the funds will support a portfolio of quantum companies, including two domestic quantum foundry companies and seven quantum computing companies to accelerate solving the most critical technology challenges in the race to develop utility scale, fault-tolerant quantum computers.

“Quantum computing has significant implications for national defense, advanced materials and biopharmaceutical discovery, financial modeling, and energy systems,” NIST said in its funding announcement. “A strong domestic quantum ecosystem is essential for U.S. national security, technological resilience and long-term strategic leadership.”

The Department of Commerce is proposing incentives for two quantum foundries (GlobalFoundries and IBM) to help establish and accelerate foundational domestic manufacturing capacity for the quantum sector.

- GlobalFoundries will receive \$375 million in planned funding to establish a secure, domestic quantum foundry for leading architectures and multiple modalities (superconducting, trapped ion, photonic, topological and silicon spin) used in large-scale quantum computers.

- IBM will receive \$1 billion in planned funding to establish a new quantum foundry subsidiary for quantum-grade superconducting wafers by building on its U.S. leadership in superconducting quantum wafer fabrication technology.

Quantinuum is one of the companies set to receive the federal funding, which it will use to develop large-scale, fault-tolerant trapped-ion quantum computers.

“Quantum computing has the potential to unlock new possibilities across science, industry, and national priorities for decades to come,” said Dr. Rajeeb Hazra, President and CEO, in a [press release](#). “This collaboration with the Department of Commerce is designed to help Quantinuum's path to large-scale, fault-tolerant trapped-ion systems while strengthening the U.S. innovation and manufacturing ecosystem.”

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The Unseen Dangers of Integrating AI Into Physical Warehouse Systems

As warehouses adopt physical AI for speed and efficiency, poor implementation can introduce hidden safety, security and operational risks, disrupting supply chain performance.

As you integrate artificial intelligence into warehouse operations through robotic systems, autonomous vehicles, predictive inventory tools and AI-driven routing, automation can help improve efficiency and address labor and demand pressures across your supply chain.

However, because physical AI interacts directly with equipment, inventory and people, mistakes can lead to operational disruptions, damaged goods, safety incidents and cybersecurity risks. For supply chain professionals, the challenge is no longer whether to adopt AI, but how to implement it responsibly with the right safeguards in place.

The Rise of Physical AI in Warehousing

Physical AI refers to AI systems that interact with and control physical equipment and processes. In warehouse environments, this includes technologies such as:

- Autonomous mobile robots

- Robotic picking and packing systems
- AI-powered conveyor systems
- Automated guided vehicles
- Smart inventory tracking systems
- AI-driven demand forecasting tied directly to warehouse execution
- Computer vision systems for quality inspection and safety monitoring

These technologies are increasingly integrated into broader supply chain operations, with AI now influencing inbound logistics, inventory allocation, labor scheduling, transportation coordination and order fulfillment. Industry forecasts also predict **major advances in physical AI** and robotics in 2026, particularly in warehouse automation and real-time workflow optimization.

At the same time, global AI adoption in manufacturing is projected to **increase productivity by more than 40%** over the next decade, accelerating automation across interconnected

warehouse environments. However, as supply chains become more autonomous, organizations also face greater exposure to operational disruptions, system failures and automated decision-making risks.

How Automation Can Amplify Small Errors

One of the biggest dangers of AI-driven warehouse automation is the speed at which small mistakes can escalate. Traditional warehouse errors are often localized and corrected manually. However, AI systems operate at machine speed and scale. A flawed algorithm, an incorrect dataset or a poorly calibrated sensor can rapidly propagate errors throughout the operation.

For example, an AI inventory management system may incorrectly prioritize certain products due to biased historical demand data. If integrated with automated picking systems and replenishment workflows, the error could trigger:

- Incorrect inventory positioning
- Overstocking of low-demand products
- Stockouts of high-priority items
- Shipping delays
- Increased transportation costs
- Production interruptions downstream

Because AI systems continuously optimize based on incoming data, they can reinforce their own mistakes when safeguards are lacking. In highly automated warehouses, this can worsen operational inefficiencies and delay human intervention until disruptions become severe.

How Algorithmic Bias Creates Operational Distortions

Algorithmic bias can significantly impact warehouse operations when AI systems learn from historical data that reflects outdated demand patterns, inefficiencies or uneven conditions. This can lead to skewed decision-making across key functions.

For example, systems may over-prioritize legacy products over emerging demand, misallocate labor due to incomplete productivity data, or choose inefficient routing paths based on simulation-driven assumptions rather than real-world conditions.

These biases can gradually degrade performance while remaining difficult to detect, making continuous monitoring and data validation essential to ensure AI decisions stay aligned with actual operational realities.

Safety Risks in Human-Robot Environments

Physical AI in warehouses introduces safety risks as humans

and autonomous systems increasingly work side by side. Hazards include misidentified obstacles, unexpected robotic movements, sensor failures and AI systems prioritizing efficiency over safe spacing. Because warehouse environments are highly dynamic, even advanced systems can fail in edge cases not seen during training.

According to the Occupational Safety and Health Administration, **workplace robot hazards** can stem from human error, unauthorized access, control system failures and mechanical or environmental conditions. These risks are often intensified by overreliance on automation, making human oversight and layered safeguards such as barriers, redundant sensors, emergency shutdown systems and audit procedures essential for safe operation.

Expanded Cybersecurity Threats with Connected Automation

As warehouse systems become more interconnected, cybersecurity risks increase significantly. AI-driven supply chain operations rely on networks of devices, sensors, robotics systems and software platforms, each of which **expands the potential attack surface**.

A successful cyberattack against AI-enabled warehouse infrastructure could result in operational shutdowns, inventory corruption, shipping disruptions, manipulated routing instructions, disabled robotic systems, compromised safety controls, data breaches and financial losses from delayed or misrouted orders.

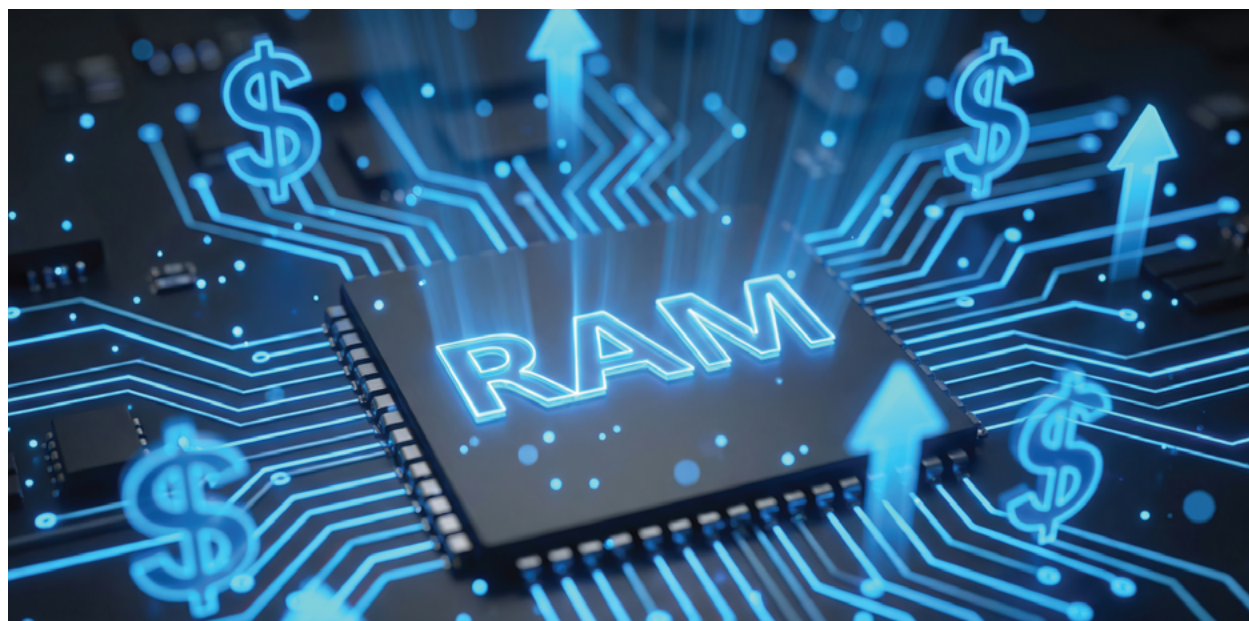
In physical AI environments, these disruptions can quickly translate into real operational and safety impacts. Key safeguards include network segmentation between systems, strict access controls, continuous monitoring for anomalies, regular patching and contingency procedures for manual operations.

Over-Automation and Infrastructure Challenges

Excessive reliance on AI can reduce operational flexibility, as highly automated warehouse systems are often optimized for predictable conditions and may struggle with disruptions like demand spikes, supplier delays or inventory issues. In contrast, human workers are better equipped to adapt and make contextual decisions during unexpected events.

Common risks of over-automation include rigid scheduling systems, difficulty handling irregular workflows and operational breakdowns during connectivity outages, especially when cloud-dependent systems are involved.

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Memory Chip Shortage Drives Up Electronics Prices

DRAM chips are getting harder to find and more expensive as AI data centers consume more of the global memory supply.

The laws of supply and demand are once again hard at work in the global electronic component space, where DRAM memory chips are the latest product to get hit by the scarcity bug. This, in turn, has pushed up prices while making it more difficult for companies to get the chips they need to make cars, smartphones, consumer electronics, medical devices and telecom equipment.

Blame the AI data center boom for creating much of the problem. Goldman Sachs expects U.S. data center capacity additions to climb from 6.4 gigawatts in 2024 to 13.6 gigawatts in 2026 and 36.3 gigawatts in 2027. Those facilities need a lot of memory, including the high-bandwidth memory used in AI accelerators. It says that demand is pushing DRAM wafer capacity toward AI servers and away from the standard memory chips that many manufacturers use.

Companies are feeling the pinch and buyers are talking about it. Reuters recently reported that automakers, retailers, electronics firms and telecom groups all say the shortage is driving up costs and threatening supply chains. TrendForce

also expects conventional DRAM contract prices to jump 90% to 95% in the first quarter of 2026 from the prior quarter, citing the AI boom.

Industries are Speaking Up

Short for dynamic random-access memory, DRAM is the semiconductor-based memory used in most computers, servers and consumer electronics. According to IBM (where DRAM was invented in 1966), the global DRAM market is expected to surpass \$100 billion by this year. “More significantly,” it adds, “DRAM has become a foundational component of information technology and helped reshape the way we work, entertain ourselves, conduct business and educate our children.”

That foundational component is getting both pricey and scarce right now. Last week, a cross-sector coalition of trade associations representing broadband providers, medical device manufacturers, automobile manufacturers, and national retailers sent a letter to Treasury Secretary Scott

Bessent and Commerce Secretary Howard Lutnick expressing concern about “an urgent imbalance in the market for memory chips that could lead to significant and sustained near-term price increases for American households and disrupt critical U.S. supply chains.”

The associations include NCTA—The Internet & Television Association, ACA Connects, the Medical Device Manufacturers Association and the Alliance for Automotive Innovation, among others. Their letter focuses on data center consumption of available memory chip capacity and says, “The result has been an unprecedented surge in the price of memory chips and reduced supply of these chips for manufacturing and consumer-facing industries. While recent developments in AI offer the promise of generational technological advances and are important for U.S. tech leadership, we must also ensure other key industries are not negatively impacted by this disruption in the marketplace.”

The groups say the real-world impacts of these trends have already begun to show themselves and threaten to deteriorate rapidly if the situation is not remedied. These include (but aren’t limited to) price increases for a broad range of everyday consumer electronics and information technology products; significantly higher costs for building, maintaining and upgrading the nation’s Internet and telecommunications infrastructure; and impacts on the production and availability of automobiles, medical devices and other manufactured goods.

What’s Next?

There may not be a short-term fix for the DRAM problem. In its first-quarter 2026 memory price outlook, TrendForce raised its conventional DRAM contract price forecast to a 90% to 95% increase from the prior quarter, citing persistent AI and data center demand. The firm also said PC DRAM prices were expected to at least double quarter over quarter, with cloud service providers, server OEMs and PC OEMs all facing supply gaps.

This quarter, the firm expects conventional DRAM contract prices to rise another 58% to 63%, with tight supply still supporting higher prices. It also expects NAND Flash contract prices to rise 70% to 75%, driven by AI and data center demand.

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The Unseen Dangers of Integrating AI Into Physical Warehouse Systems, (Continued from page 17)

At the same time, organizations often underestimate the ongoing maintenance required for physical AI, including sensor calibration, model retraining, software updates and hardware servicing. Integration with legacy systems can also create data inconsistencies and workflow fragmentation, while long-term concerns such as vendor lock-in, upgrade costs and increased energy demand for infrastructure can erode expected efficiency gains.

Deployment Planning and Risk-Aware Implementation

Successful physical AI deployment in warehouses requires structured planning. Disruptions often occur when systems are scaled too quickly without proper testing or risk assessment. Phased pilots should be used to evaluate performance under real conditions. Key considerations include:

- Pre-deployment risk assessments
- Mapping system dependencies across warehouse systems
- Defining human override and escalation protocols
- Testing edge cases and disruption scenarios
- Ensuring integration with legacy systems

Without this foundation, even advanced AI can destabilize warehouse operations.

Responsible AI Integration with Human Oversight

Effective physical AI deployment in warehouses still depends on human oversight to validate decisions, manage exceptions and intervene during unexpected situations. While automation improves efficiency, humans remain essential for ensuring safety, accountability and operational resilience.

Best practices include maintaining human-in-the-loop controls, conducting continuous system audits, testing AI under real-world and edge-case scenarios, ensuring transparent decision-making and training staff to work effectively alongside automated systems.

Building Resilient Warehouses

Physical AI can improve warehouse efficiency and supply chain performance, but automation alone is not enough to ensure long-term success. Without strong safety measures, cybersecurity protections and operational oversight, AI-driven systems can introduce risks that disrupt operations rather than optimize them.

To reduce these risks, professionals should prioritize phased deployment, continuous monitoring and human oversight to ensure warehouse systems remain flexible, secure and reliable under real-world conditions.



Supply Chain AI Shifts From Planning Tool to Decision Support

As supply chain AI moves from dashboards to decision support, companies are learning that they need better data, stronger workflows and human review.

As more supply chain technology providers embed AI functionality into their platforms, the technology is moving deeper into the space. Some recent high-profile announcements point to just how quickly the conversation is shifting from copilots and dashboards to systems that can plan, test scenarios and act.

But it's not as easy as it looks. AI holds a lot of promise, and supply chain teams are already using it at a higher rate than many other business functions. The harder part is figuring out how to move beyond narrow use cases and use AI to support better decisions across planning, operations, finance and commercial teams.

Supply chain operators, logistics companies and transportation providers are putting those advances front and center. That is a lot different from earlier technology cycles, when major planning, routing or execution wins were kept close to the vest (or, highlighted later in customer case studies).

Putting AI Gains Front and Center

Last week, C.H. Robinson Worldwide announced that it had built the first AI technology designed to operate a shipper's global supply chain while continuously assessing and improving its performance. According to [Seeking Alpha](#), the company's Lean AI Engineer can assess an entire supply chain in 25 to 30 minutes and come up with potential improvements before performance is impacted.

"That compares favorably to other supply chain assessments that typically take up to four weeks and look backward at what has happened instead of what should happen," the publication notes. Seeking Alpha says the technology is autonomously handling 92% of 4PL shipments globally across trucking, ocean, air and rail. Lean AI Planner uses hundreds of interconnected AI agents to manage shipments, and then feeds the data back to a system that develops smarter refinements.

In another example, [Optilogic just introduced Ada](#), an agentic AI system that supports better supply chain modeling, analysis and redesign. The company says Ada shifts supply chain teams from manually building models and reacting to change to, "evaluating scenarios and accelerating decisions at enterprise scale."

"Historically, design was slow and inaccessible," said CEO Don Hicks, in a [press release](#). "That's not anyone's fault. Technology just hadn't risen to the challenge yet." Now Ada can handle the technical work, while supply chain teams manage the strategy, validate every output and make the final call.

Amazon Brazil was one of 40 early adopters of the new tech. "Optilogic helps us build supply chain resilience," said Felipe Moraes, head of supply chain and integration, "by providing artificial intelligence and optimization tools to enhance our future."

5 Tips for Optimizing Agentic AI in Supply Chains

Companies continue to invest in the fast-growing AI in supply chain market, which [MarketsandMarkets](#) expects to grow from \$13.93 billion in 2025 to \$50.41 billion by 2032, with a 20.1% CAGR.

For best results, [BCG](#) says companies using AI agents (the kind of AI that can take actions) should start by upgrading the parts of supply chain management they already depend on. Connect those areas first, it says, before automating larger pieces of the operation. BCG also tells companies to:

- 1. Start with the data that drives decisions.** Find the gaps that slow planning, replenishment, routing or inventory decisions, then use AI to help close those first.
- 2. Pick high-value decisions first.** Look for areas where teams keep weighing cost, service, inventory and timing across multiple systems.
- 3. Build the workflow around the recommendation.** Decide how AI recommendations get reviewed, who approves them and when people step in.
- 4. Buy the platform, customize the agents.** Use the base platform and tailor the agents around the company's supply chain needs.
- 5. Make the reasoning visible.** Make sure teams can see the data, assumptions and tradeoffs behind each recommendation.

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5 Reasons to Automate Your Supply Chain

Supply chain disruption, labor shortages and volatile demand are pushing companies to automate operations and replace legacy systems.

Supply chain, logistics and fulfillment automation is a hot topic right now as organizations work to make their global networks more efficient, responsive and effective. Key drivers include issues like tariff uncertainty, supply chain disruption and customer demands that are changing by the day. Geopolitical events, skilled labor shortages and other forces are also pushing more organizations to experiment with automation at different nodes in the supply chain.



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Supply Chains Under Pressure

Global disruptions, tariff worries and rising costs are pushing companies back into stockpiling mode.

The war in the Middle East, ongoing tariff concerns, component shortages, rising input costs and other factors are keeping supply chain managers up at night in 2026. And just when one problem is solved, multiple others seem to jump right in behind it. Supply networks are forced to navigate this complexity while also dealing with outside factors like inflation, economic uncertainty and changing customer behaviors.

It's a lot to deal with, and the stress is showing up in the numbers. The Global Supply Chain Pressure Index (GSCPI) eased very slightly in May, but remains at its highest reading since July 2022.

“Supply chain disruptions have become a major challenge for the global economy since the start of the COVID-19 pandemic,” the Federal Reserve Bank of New York says in its report. “Assessing the intensity of these issues has also posed a challenge, as conventional measures tend to focus on specific dimensions of global supply chains.”

Pandemic Constraints Reemerge

The GSCPI integrates transportation cost data and manufacturing indicators to provide a gauge of global supply chain conditions. The index fell to 1.77 in May, down from 1.82 in April. According to [Trading Economics](#), the GSCPI averaged 0.00 points from 1997 until 2026. It reached an all-time high of 4.45 points in December 2021 and a record low of -1.58 points in May 2023. “The [GSCPI] is expected to be 0.50 points by the end of this quarter,” the company adds.

[Reuters](#) says the U.S.-backed war with Iran and resulting shutdown of the vital Strait of Hormuz waterway have “sharply impeded the flow of oil and other goods critical to the global economy. The disrupted supply chains hark back to similar conditions during the COVID-19 pandemic, which helped set the stage for a massive surge in inflation that has not been fully contained.”

The publication says the New York Fed data echoes other findings. The Institute for Supply Management’s factory sector survey recently noted rising challenges for factory operators in getting the inputs they need, as well as rising prices tied to the war. “One of the things that worries me.. is the supply chain disruptions” tied to the conflict, New York Fed President John Williams said. “That’s the thing that really hit us and most countries in the world very hard during the pandemic.”

Pushing Companies Into Stockpiling Mode

[gCaptain](#) has also been tracking the global supply chain pressure cooker and says the supply chain issues that surfaced during the pandemic are reemerging. “While the indexes are still far from their COVID highs, they reflect disruptions to global trade from the Iran war that bear some similarities to what happened back then,” it explains. “Logistics captures the movement of goods between suppliers, factories and final consumers, and accounts for an estimated 10% of world GDP, underscoring its important role in the global economy.”

In “[Global Supply Chain Pressure Is Rising Again: Why Companies Are Stockpiling Before the Next Crisis](#),” source-to-pay solution provider C1 India Pvt Ltd. says this growing uncer-

tainty is pushing companies back into “stockpiling mode,” a strategy that took hold during the pandemic years. They’re stockpiling because they think prices for raw materials and finished goods could rise further in the coming months.

“To protect themselves from higher future costs, companies are buying products in bulk today,” the company adds. Companies are also trying to avoid the severe semiconductor, medicine, electronics and other shortages they experienced during the pandemic. At the same time, global trade routes are becoming increasingly unstable due to ongoing trade conflicts, regional wars and general political instability.

“These issues are creating additional pressure on international logistics,” C1 India points out. Other signs of growing supply chain pressure include more demand for warehouse space, longer supplier lead times and higher logistics costs. “These trends clearly indicate that businesses are preparing for possible future instability,” it adds.

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U.S. Manufacturing Sector Continues to Expand

The latest ISM report shows U.S. manufacturing grew again in May, even as costs and uncertainty kept rising.

External forces be darned, the U.S. manufacturing sector is chugging along and registering consistent, month-over-month expansion according to at least one leading indicator. The latest *ISM Manufacturing PMI Report* says economic activity in the manufacturing sector expanded in May for the fifth consecutive month.

According to ISM, the PMI registered 54% in May, 1.3 percentage points higher than in April and its highest reading since May 2022 (55.9%). The overall economy continued to expand for the 19th month in a row. A Manufacturing PMI above 47.5%, over a period of time, generally indicates an expansion of the overall economy.

Some of the key findings from May:

- The New Orders Index expanded for the fifth consecutive month after four straight readings in contraction, registering 56.8%—up 2.7 percentage points compared to April’s figure of 54.1%.

- The May reading of the Production Index (54.3%) is 0.9 percentage point higher than April’s reading of 53.4%.
- The Prices Index remained in expansion (or “increasing” territory), registering 82.1%, a 2.5-percentage point decrease from April’s reading of 84.6%.
- The Backlog of Orders Index registered 52.2%, up 0.8 percentage point compared to the 51.4% recorded in April.
- The Employment Index registered 48.6%, up 2.2 percentage points from April’s figure of 46.4%.

In the report, ISM Chair Susan Spence says the Supplier Deliveries Index indicated “slowing performance for the sixth month in a row after one month in ‘faster’ territory.” She also says the Inventories Index registered 49.9%, up 0.9 percentage point compared to April’s reading of 49%.

“In May, U.S. manufacturing activity remained in expansion territory, growing at a faster pace compared to the month before. Of the five subindexes that make up the PMI, the New Orders index indicated faster growth compared to the previous month, the Supplier Deliveries index stayed the same, the Production Index grew at a faster rate, and the Employment and Inventories indexes remained in contraction, though both improved,” Spence adds.

Just One Industry Contracted

Sixteen manufacturing industries reported growth in May, including textile mills; nonmetallic mineral products; electrical equipment, appliances & components; computer & electronic products; transportation equipment; chemical products; and fabricated metal products. The wood products sector was the only one that contracted.

The monthly index always turns up some interesting comments from the companies that responded to the survey. Someone from a transportation equipment manufacturer said the “impact of the Iran conflict starting to directly and negatively impact supply chain [costs]. Oil and related commodities are escalating in price.”

One machinery manufacturer said the Middle East conflict is triggering shipment delays and uncertainties. “Elevated gas prices and inflation will surely impact our purchases. However, over the last quarter, we’ve seen increased demand that was unexpected.” And a chemical products maker highlighted the impact of rising fuel costs on the company and its customers.

“As with all companies, we have felt the effects of fuel-related inflation and general market uncertainty due to overall economic variability and geopolitical events that have impacted such markets as construction, automotive and agriculture, as well as the general industrial sector.”

Looking ahead, another manufacturer says the current atmosphere is one of “extreme uncertainty and concern for the future,” both in terms of price stability and longer-term supply continuity related to the Iran conflict and Strait of Hormuz closure. “We have a lot of negotiations in process related to requested price increases, some related to oil prices and some still fallout from the 2025 tariff/geopolitical climate.”

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U.S. Manufacturing Growth Hits a New High for the Year

The U.S. manufacturing sector grows at the fastest clip since August 2022 even as tariff, supply chain disruptions and geopolitical headwinds prevail.

It’s been more than three-and-a-half years since the U.S. manufacturing sector posted the kind of growth it saw in March, according to the latest Institute of Supply Management Manufacturing PMI report. That’s good news for a sector that hasn’t seen this kind of growth since August 2022, and that is now solidly in growth territory after its third month in a row of positive results.



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Securing Real-Time Freight Visibility with Cloud-Based EDI Systems

Real-time freight visibility has become essential as supply chains grow more complex. Cloud-based EDI systems help companies connect trading partners and gain timely information needed for better, faster decisions.

Global supply chains generate large amounts of data every day, yet many companies may still struggle to accurately track and predict shipping schedules. This uncertainty affects operations across the board, from production scheduling delays to strained customer relationships.

Electronic data interchange (EDI) has long supported B2B communication, and modern cloud-based platforms are enabling real-time visibility that helps reduce delays and improve coordination.

The Business Impact of Poor Freight Visibility

The consequences of poor visibility extend beyond delayed shipments. A lack of accurate freight information affects financial performance, operational efficiency and customer relationships. Estimates show that less than 20% of shippers and logistics providers use supply chain visibility technology, revealing a potential lack of solution adoption. When supply chain teams spend more time searching for answers than acting on them, costs rise and trust begins to erode.

Rising Operational Costs and Financial Penalties

Every shipment delay carries a potential financial cost. When companies cannot accurately monitor freight movements, they often discover problems too late and incur additional costs. Carrier detention and demurrage charges can accumulate when containers sit idle at ports or distribution centers. Retailers may also impose compliance penalties for missed delivery windows, while manufacturers face production disruptions from delayed materials.

Labor costs also increase when employees spend hours calling carriers and manually reconciling shipment information. These activities consume resources without creating value.

The broader market environment has amplified these challenges. Supply chain disruptions can increase production and shipping costs, placing additional pressure on margins across industries. For example, rerouting due to the Red Sea crisis can

add up to 17 days to the original transit time, costing an extra \$1 million on fuel per trip.

Eroding Customer Trust and Damaged Partnerships

B2B customers increasingly expect accurate shipment updates and reliable estimated arrival times. When disruptions occur, they also need proactive communication. If companies cannot provide dependable information, customers may lose trust in the relationship.

A supplier that repeatedly delivers inconsistent shipment updates may find it harder to secure future business. Retail partners that depend on precise inventory timing may seek alternatives when communication becomes unreliable. Even strong relationships may struggle when stakeholders work with conflicting or inaccurate information.

Limitations of Legacy EDI Systems

Research shows that 44% of companies lack automated processes for sharing data with supply chain partners. While legacy platforms may continue to exchange documents successfully, they often lack the flexibility and connectivity required to support modern logistics operations.

Fragmented Data and Manual Errors

Many legacy EDI environments rely on custom integrations and manual workflows that isolate critical systems from one another. Transportation management systems, warehouse platforms, ERP applications and carrier portals often operate independently. As data moves between systems, employees need to intervene to verify information or manually update records, which can create errors and delays. Without a unified data environment, companies may struggle to establish a consistent view of freight activity across their networks.

Poor Scalability with New Partners

Modern supply chains evolve over time. Companies may add new suppliers, carriers, distributors and fulfillment providers to grow or enter new markets. Legacy EDI systems may struggle to keep up with these transitions.

Traditional onboarding typically requires extensive documentation, custom development, testing and partner-specific configurations. Each new connection comes with additional work for IT and operations teams. This lengthy onboarding process can delay new business opportunities and slow responses to market changes. Companies that prioritize agility need a faster way to connect and exchange information with trading partners.

Cloud-Based EDI Supply Chain Integration

Cloud-based EDI platforms address these challenges by creating a centralized environment for partner communication and data exchange. Companies can connect through a shared platform that standardizes data and automates communication workflows. As a result, the new system can reduce administrative overhead while improving access to real-time information.

Unifying Data for Faster Partner Onboarding

Cloud EDI platforms act as a central hub for supply chain communications. Purchase orders, shipment notifications, inventory updates and transportation documents flow through a single platform instead of on multiple disconnected systems. All parties concerned, including carriers, retailers, suppliers and logistics providers, can access the same shipment information and improve coordination.

This centralized structure also accelerates partner onboarding. Prebuilt integrations and workflows allow companies to connect with new trading partners much faster than traditional EDI implementations.

Automating Translation for Global EDI Standards

Global logistics operations depend on multiple EDI standards. The U.S. primarily uses ANSI ASC X12 standards, while many European organizations rely on EDIFACT standards. These differences can create integration challenges when companies exchange information across regions.

Cloud-based EDI systems automatically translate data between formats, eliminating much of the manual effort historically associated with international EDI communications. Automated translation allows trading partners to exchange information seamlessly while reducing errors.

Gaining a Competitive Advantage with Real-Time Freight Visibility

Real-time freight visibility delivers measurable business value when companies can act on the information they receive. Access to timely, accurate data improves decision-making across transportation, inventory management and customer service tasks.

Improving Agility and Disruption Response

Disruptions like port congestion, weather events, labor shortages and equipment issues often develop gradually before causing larger operational problems. Real-time freight visibility helps logistics teams identify these developments earlier and evaluate their potential impact.

Since companies have accurate shipment data available throughout the transportation journey, they can adjust inventory allocations, reroute freight, communicate with customers and coordinate contingency plans before issues escalate. This proactive decision-making helps reduce disruption-related costs while maintaining service during unexpected events.

Enhancing Collaboration with Carriers and Partners

Effective collaboration depends on shared information. When carriers, suppliers, distributors and retailers operate from the same shipment data, conversations become more productive, and teams resolve issues faster. They spend less time validating information and more time coordinating solutions.

Research shows that the right resources across various stakeholders are crucial for maintaining real-time visibility. When teams have the right tools, they are better able to collaborate and share information. Greater transparency supports stronger partnerships and helps supply chain participants align around their common goals.

Enabling Proactive and Data-Driven Decisions

The data generated through modern EDI supply chain integration platforms provides insight into carrier performance, route efficiency, inventory movement and service reliability. Companies can use this information to improve forecasting accuracy and optimize transportation strategies.

As platforms collect more data, companies can uncover recurring trends and plan operations more accurately and with greater confidence.

Future-Proofing with Modern EDI in Logistics

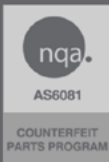
Supply chains continue to face uncertainty from changing market demands, geopolitical events or transportation disruptions. Companies need systems that provide accurate information and enable faster decision-making.

Cloud-based EDI platforms help meet those demands by connecting key stakeholders and automating data exchange across the supply chain. Organizations that invest in modern EDI capabilities position themselves to respond faster to disruptions and operate more efficiently, even in complex logistics environments.

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