

Thriving in Complexity:

How Leading Manufacturers Turn Supply Chain Chaos into Competitive Advantage



Introduction

Complexity is the new normal in manufacturing.

Today's supply chains are more interconnected, more global, and more vulnerable than ever. Tariffs reshape sourcing overnight. Talent shortages strain already overextended teams. Disruptions from strikes, storms, and geopolitical shifts arrive without warning. And AI hype leaves leaders wondering which investments will actually deliver results.

For discrete manufacturers, these challenges create an almost impossible balancing act. Deliver on time to customers, protect margins, and reduce inventory, all while navigating an environment that never sits still. Traditional tools like ERP systems and spreadsheets were built for stability, not volatility. They cannot provide the speed and intelligence supply chains require today.

But complexity does not have to mean chaos. The same forces that make supply chains difficult also create opportunity. Every disruption, every policy change, and every supplier decision is a chance to act smarter and pull ahead of competitors. The real question is whether your organization has the visibility and intelligence to seize that opportunity.

This ebook explores four of the biggest forces reshaping supply chains: tariffs, talent shortages, disruptions, and AI. Inside you will find stories, data, and insights that highlight both the risks of complexity and the opportunities to turn it into a competitive advantage.



Chapter 1: Tariff Pressures and Reshoring

Turning trade headwinds into strategic advantage

The weight of tariffs on manufacturing

Global tariffs and reshoring are no longer abstract policy discussions, they shape day-to-day supply chain decisions that determine cost, lead time, and risk. Financial Times reported that in May 2025, U.S. tariff revenues reached \$24.2 billion, the highest monthly figure on record since 1936. Imports from China fell by 43 percent year over year as manufacturers shifted sourcing patterns.

For supply chain leaders, these changes make it harder to keep production stable while protecting margins. Traditional spreadsheets and legacy ERPs were never built to help teams navigate the pace and scale of today's trade volatility.

Nearly five cents of every U.S. manufacturing dollar now goes to tariff expenses, representing a \$328 billion annual cost.

Source: Market Research

The pain on the factory floor

Every new tariff policy creates ripple effects. Manufacturers often face:

- Rising material costs that shrink margins before products leave the plant
- Supplier changes that disrupt long-standing sourcing strategies
- Increased unpredictability in both cost and lead time
- Inventory swings that tie up working capital or put production at risk

These challenges pile up quickly, leaving teams to manage with partial visibility and little time to respond.

The risk of standing still

Manufacturers typically respond to tariff shocks in one of two ways. Some move too fast, shifting suppliers without fully understanding the trade-offs in quality or total landed cost. Others move too slow, waiting for conditions to settle while profitability erodes.

A recent study from Bain research reported eighty percent of COOs plan to increase onshoring or nearshoring in the next three years, but only 2 percent have made progress. The companies that delay are already losing ground to competitors that act decisively.

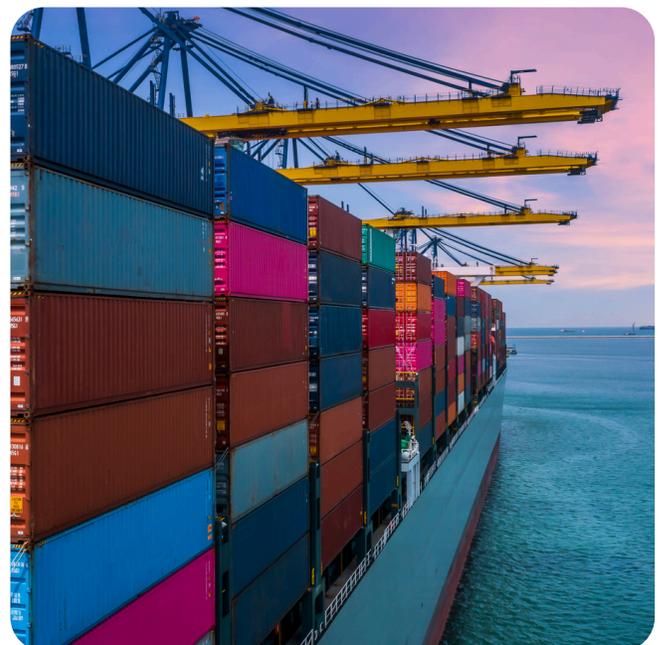
80% of COOs plan to increase onshoring or nearshoring in next 3 years, but only 2% of made progress

Source: Bain Research

Industry lens

McKinsey highlights that navigating tariffs requires a “proactive strategic posture” not just reacting to cost increases but rethinking how trade dynamics reshape competitive advantage and customer demand. For manufacturers, this means tariffs aren’t simply an added expense; they’re a trigger for broader supply chain recalibration.

Key Takeaway: Those that respond by diversifying suppliers, reshoring strategically, or shifting policies in real time are able to protect margins and outpace competitors still scrambling to react.



Case in point: Cirtec Medical

Cirtec Medical, a leading outsource partner for Class II and III medical devices, faced the growing complexity of balancing supply and demand across multiple sites, products, and suppliers. A lack of reliable inventory data meant planners struggled to see shortages in advance, while pandemic-driven uncertainty led to bloated safety stocks and elevated days of inventory. The result was a cycle of reactive problem-solving, misaligned supply and demand, and capital tied up in excess materials.

By adopting APEX's Clear to Build capability, Cirtec unified its data into one reliable view and gave planners visibility into the materials preventing orders from becoming ready to build. Teams could now collaborate around a single source of truth, prioritize orders with confidence, and make data-driven decisions at scale. The impact was significant: Cirtec achieved a 20% reduction in inventory while simultaneously improving customer on-time delivery.

“Got a hunch, buy a bunch was our previous approach, but now we have a data driven strategy to our planning and buying workflow.”

-Tim Binder, Supply Chain Director



Buyers who once managed thousands of parts reactively now focus on the highest-impact shortages, supported by actionable insights and automated reporting.

Today, Cirtec is scaling APEX across 14 sites to extend these results, proving that even in highly complex supply chains, the right platform can reduce excess, prevent shortages, and enable continuous improvement.

Read the full Cirtec case study [here](#).



How APEX helps manufacturers respond

The APEX platform gives supply chain teams the visibility and intelligence needed to respond quickly and strategically.

- **Total cost visibility:** Combines ERP, supplier, and procurement data to show the true landed cost, not just the unit price.
- **Scenario modeling:** Tests the impact of sourcing decisions in real time, helping planners choose the best option for cost and resiliency.
- **Smarter PFEP execution:** Prioritizes the parts most affected by tariffs and recommends backup strategies to protect production.

With APEX, manufacturers are not just reacting to trade policy, they are using each new change as an opportunity to make better sourcing decisions and improve supply chain performance.

Questions for leaders

- 1 Do you have real-time visibility into how tariffs affect your total landed cost?
- 2 Can your teams model “what-if” scenarios to see the trade-offs before making sourcing changes?
- 3 Are your planners and analysts empowered with tools that turn tariff disruptions into competitive advantages?

Tariff pressures and reshoring decisions will continue to reshape global manufacturing. The winners will be those who use these disruptions as a lever for smarter strategy, not just another source of chaos.



Chapter 2: Talent Shortages

Keeping teams effective when headcount cannot keep up

The supply chain talent crunch

The skills gap is not a future problem. It is here. Deloitte estimates U.S. manufacturing will need about 3.8 million new employees between 2024 and 2033. If the skills and applicant gaps are not addressed, roughly 1.9 million of those roles could remain unfilled. That constraint touches planning, buying, supplier collaboration, and production every day.

How it shows up in daily operations.

When teams are understaffed, work slows and risk rises. What should be analytical work turns into manual reporting, and what should be action-based work turns into investigating priorities. Planners split attention across sites. Buyers spend hours reconciling spreadsheets. Leaders have less time to set strategy because they are triaging shortages. Turnover worsens the cycle. New hires inherit outdated workflows and leave before they can make an impact.

Attracting and retaining talent was the top business challenge for manufacturers in early 2024, cited by more than 65% of respondents.

Source: The Manufacturing Institute

Operational impact

Labor pressure is already showing up in performance. In a 2024 survey, more than 80% of manufacturing professionals said labor turnover disrupted production. Disruption leads to slower deliveries, higher costs, and missed commitments. Waiting for hiring to “catch up” is not a plan.

What top talent expects

Great supply chain talent is hard to find, and even harder to keep. The people who can manage complexity and make smart decisions don't want to spend their days buried in spreadsheets or chasing down reports. They want to solve problems and move the business forward.

Younger professionals entering the field are even more clear about what they expect. They've grown up with easy-to-use technology and don't see why their work tools should feel decades behind. If companies can't provide modern systems that match the pace of the job, frustration builds and retention suffers.

How APEX Helps: By turning raw ERP data into clear priorities and recommended actions, APEX takes the grind out of supply planning. Instead of wasting hours pulling and cleaning data, teams can focus on decisions that matter. The work becomes more rewarding and companies build a reputation for giving their people the tools to succeed.

Industry lens

Deloitte's most recent [workforce research](#) is blunt. Manufacturers face both a skills gap and an applicant gap. Digital proficiency is becoming a baseline requirement, and companies that modernize the work experience are better positioned to attract and keep talent. The study also notes that as investment in U.S. manufacturing grows, the talent shortfall could limit the industry's ability to capture that growth unless productivity tools rise to meet it.



Case in point: Spirit Aerosystems

Spirit AeroSystems, a leading aerospace manufacturer, was facing persistent staffing and workload challenges. Manual reporting and shortage management consumed planners' time, leaving little capacity for strategic work. The burden on teams not only slowed execution but also made it harder to attract and retain top supply chain talent.

By implementing LeanDNA's APEX platform, Spirit equipped its people with real-time visibility and clear recommendations for action. Teams no longer spent hours piecing together data; instead, they focused on the highest-impact decisions. Within the first year, Spirit reduced shortages by 16% and improved on-time delivery by 20%, giving employees a modern, data-driven environment where they could be more effective and engaged.

Read the full case study [here](#).

"If your supply chain professionals are not working efficiently, then you're wasting money, frankly."

- Dustin Dunn, Inventory and Technology Leader of Global Supply Chain



How APEX helps manufacturers respond

- Multiplies analyst productivity. APEX automates data prep and flags the next best action so teams spend less time gathering and more time doing.
- Shortens ramp time. Standardized workbenches and a single source of truth help new hires become effective faster.
- Keeps experts focused. Clear priorities, recommendations for high-impact actions, and supplier collaboration tools reduce firefighting and protect production.
- Makes your tech stack a talent magnet. Modern, intuitive tools improve the day-to-day experience, which supports retention.

Questions for leaders

- 1 Are your best people solving problems, or formatting reports?
- 2 How long does it take a new planner or buyer to ramp to full impact?
- 3 If a key team member left next month, would standardized workflows and guided actions keep output steady?



Chapter 3: Disruptions

Shifting from chaos to control

The reality of disruptions

Strikes, storms, pandemics, and geopolitical shifts have become part of the everyday rhythm of supply chains. In 2024, global supply chain disruptions surged 38 percent, with natural disasters, labor unrest, and leadership transitions among the most common triggers. What was once considered “exceptional” is now constant, and the costs of being unprepared grow with every incident.

For discrete manufacturers, these disruptions are felt most on the factory floor: production lines stall, customer commitments slip, and expenses climb. Traditional planning systems were never designed to keep pace with this volatility. By the time the effects surface in ERP reports, the damage is already done.

When disruptions hit, teams face familiar challenges:

- Shortages stall production or force expensive expedites
- Communication breaks down with suppliers who may not share timely updates
- Inventory swings tie up cash in the wrong parts while critical materials run dry
- Leaders are left without a clear view of how big the risk really is

Most teams end up working overtime to piece together data, but rarely solving the root issue.

Industry lens

Recent data from McKinsey reveals that 60% of supply chain leaders now report having comprehensive visibility into their tier-one suppliers, a significant improvement from just two years ago. Yet only 25% say their board regularly discusses supply chain risks ([source](#)). This gap underscores a critical divide: some companies are building resilient, visible networks, while others remain reactive and in the dark. Resilient manufacturers don't wait until production lines stall - they act early, using data signals to prevent disruptions before they spread.

Case in point: Modine

Modine, a global leader in thermal management, knows that supply chain disruptions don't wait for convenient timing. Manual, site-by-site reporting left the company vulnerable to shortages, supplier delays, and reactive responses whenever volatility struck. Without a unified view, leaders lacked the real-time insights they needed to stay ahead of risks.

By adopting LeanDNA's APEX platform, Modine standardized workflows, surfaced the right actions across sites, and provided clear dashboards for leaders and frontline employees. The results were transformative: plants using APEX reported a 40% reduction in material shortages, a 50% reduction in supplier past dues, and a 10% reduction in inventory within six months. What once felt like disruption-driven chaos became a system of proactive, coordinated action.

Read the full case study [here](#).

"LeanDNA seamlessly integrates with our ERP system and facilitates enhanced supply chain decision making at multiple levels of the organization. It not only provides summary dashboards and intelligence to leadership, but it also empowers front-line employees with superior information and diminishes their workload."

- James Dawsey, Sr. SIOP & Demand Management Leader





How APEX helps manufacturers respond

APEX equips teams to see, prioritize, and act before disruptions spiral out of control:

- Real-time risk signals: Surfaces shortages, supplier delays, and at-risk parts before production is impacted
- Supplier collaboration: Provides a shared workspace so suppliers and buyers work from the same priorities with supplier compliance visibility.
- Prioritized actions: Focuses teams on the most critical shortages with recommended actions to take, preventing wasted effort and missed signals

Questions for leaders

- 1 How quickly can your teams see the impact of a disruption across sites and suppliers?
- 2 Do you know which shortages to prioritize when everything feels urgent?
- 3 Are you relying on manual data pulls or analysis?

Disruptions are no longer exceptions; they are the rule. The manufacturers that win are those who turn every unexpected shock into an opportunity to demonstrate resilience and deliver with confidence.

Chapter 4: AI Confusion

Separating hype from real results

The noise around AI

Artificial intelligence has become one of the most talked about topics in manufacturing. Every vendor claims to have it, and every executive feels pressure to “do something with AI.” Yet inside many factories, the promise of AI feels more like a burden than a breakthrough. Pilots drag on without scaling, generic tools provide answers without context (and worse, hallucinations), and teams are left wondering whether the technology will ever solve real problems on the shop floor.

For planners and buyers, this confusion creates risk. Time is wasted testing tools that can't connect to the realities of ERP data or factory execution. Leaders grow frustrated with costly initiatives that never show a return. And the people on the front lines are left stuck in

spreadsheets, making the same manual decisions they always have while “AI projects” play out in the background.

68% of companies use AI in their supply chains, but only 16% have scaled it beyond pilots, revealing a major gap between testing and true adoption.

Source: *McKinsey's State of AI survey (2025)*.

The risk of standing still

The danger isn't only wasted effort, it's falling behind. Competitors that deploy AI successfully gain faster decision cycles, tighter control of inventory, and resilience against disruption. Those that stall see shortages pile up, excess balloon, and talent walk out the door because they don't want to be buried in excel spreadsheets every day. For supply chain leaders, hesitating on AI isn't a neutral choice, it's a risk that compounds every day.

Case in point: Johnson Controls.

Johnson Controls, a world leader in creating safe, healthy, and sustainable spaces, faced mounting complexity managing thousands of suppliers across its operations. Teams were spending countless hours pulling spreadsheets and chasing data, making it nearly impossible to act fast when shortages or excess inventory appeared.

By adopting LeanDNA's APEX platform, Johnson Controls shifted from firefighting to proactive execution. AI-driven insights surfaced the most critical actions for buyers and planners in real time, cutting through noise and guiding teams toward the decisions that mattered most. Instead of being buried in manual work, supply chain staff focused on high-impact tasks that protected production and margins.

The result:

- Improved visibility across sites
- Faster decision-making
- Measurable reductions in shortages and excess inventory

Johnson Controls expertly demonstrated how AI, when embedded directly into day-to-day workflows, can transform supply chain complexity into confident execution.

Read the full case study [here](#).

“It’s difficult to notice or remember these supply chain fluctuations on an individual level, but when you shift your reliance to a trusted platform, you become more aware of these trends and can act on them faster and better. LeanDNA helps us plan and anticipate the supply chain issues to come.”

Mandeep Sahota, Vice President of Operations



How APEX helps manufacturers cut through the noise

- Factory-first focus: Purpose-built supply planning AI, trained on materials requirements, lead times, and production constraints.
- Actionable insights: Moves beyond data dumps to prescriptive recommendations planners can execute immediately.
- Fast ROI: Proves value in weeks, not years, so leaders see measurable results quickly.

Questions for leaders.

- 1 Are your AI initiatives producing measurable results on the factory floor?
- 2 Can your planners act on AI recommendations today, or are they stuck waiting for pilots to finish?
- 3 Do you have visibility across sites that shows where action matters most?

AI will continue to dominate industry headlines. The manufacturers that win won't be the ones chasing buzzwords, but the ones using AI to drive real, repeatable outcomes that transform daily execution.



From complexity to clarity

Supply chain complexity is not going away. If anything, it is accelerating. The winners will not be those who wait for stability to return, but those who learn to operate with speed and clarity in a volatile world.

LeanDNA's APEX platform was designed for this moment. Built for manufacturing, APEX unites people, inventory, and sites into one intelligent platform. It delivers real-time visibility, prescribes the best actions, and enables teams to execute with confidence. The result: fewer shortages, lower excess, stronger delivery performance, and faster financial impact.

It's time to view supply planning as a source of strength rather than a cost of doing business. Ready to see how APEX helps leading manufacturers thrive in complexity? Schedule a walkthrough today.

[See APEX in action](#)

