

Advanced AI in Supply Chain, Manufacturing, and Logistics

4 use cases and 3 best practices to get a leg up on the competition

Today's market is fiercely competitive, wildly unpredictable, and unnecessarily complicated. To have any hope of maintaining (or increasing!) margins, supply chain, manufacturing, and logistics companies cannot afford to leave any efficiency stone unturned.

Cost of goods is soaring. Wages are rising. Product demand is at an all-time high.

At a time when the "more-ness" of everything is putting unrelenting pressure on production and delivery, the solution is rooted in less—less time to manufacture, less time to oversee, less time to schedule, less time to ship.

Less is not just more. Less is the key to staying agile, adjusting to the unexpected in real time, and laying the groundwork for sustainable, measurable growth. Advanced AI makes less-is-more a reality.

Artificial Intelligence = Real, Sustainable Optimization

Advanced AI platforms heighten and magnify the benefits delivered by basic AI tools just a few short years ago. And the timing couldn't be better.

In an era where success is increasingly dictated (and defined) by variables outside a company's control, advanced AI technology, applied strategically, is an operational game changer.

The question is: **How can my organization gain the greatest benefits from AI?**

Let's take a closer look at how advanced AI can advance your path to success.

USE CASE 1: Decision Intelligence: Data-Driven Optimization	3
USE CASE 2: Cloud/SaaS: Native, Integrated Applications	5
USE CASE 3: Risk Abatement: Cybersecurity, Compliance, Supplier Management	7
USE CASE 4: Quality Control: Improved Predictive Maintenance	8
3 BEST PRACTICES for Implementing Advanced AI	10



USE CASE 1. Decision Intelligence: Data-Driven Optimization

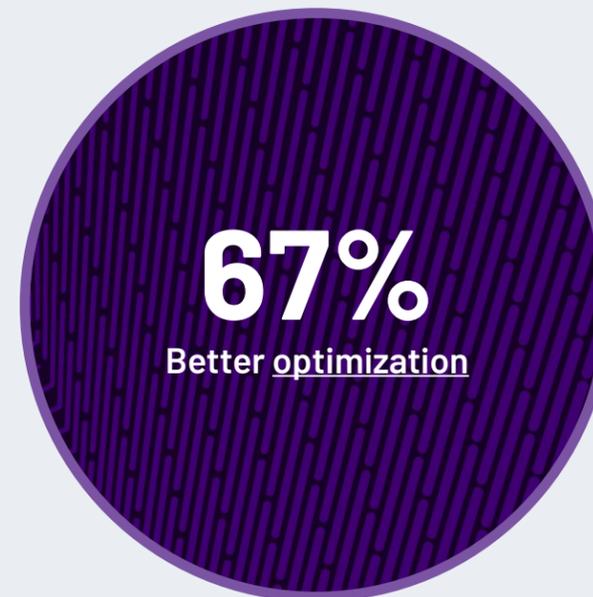
Modern times demand data that works smarter AND harder.

Every decision is under scrutiny. Every decision carries a razor-thin margin for error. Every decision results in a ripple effect impacting performance, productivity, and profit.

Supply chain, manufacturing, and logistics companies must survive and thrive in this reality. It calls for faster, more accurate data analysis and interpretation to inform more precise, business-critical decisions.

Enter AI. Advanced AI tools and platforms have become the de facto game-changer for optimizing every facet of operations, from inventory management and warehouse design to route enhancement and overall supply chain automation.

The AI Advantage Measurable Operational Improvements



Demand Forecasting

Those who can predict the future are better equipped to succeed in the present.

In lieu of a crystal ball, organizations must find better ways to gauge future conditions to make more competitive, cost-balancing decisions today.

Many are turning to AI-powered predictive analytics to transform demand forecasting.

By using AI to generate more precise, data-driven insights based on just-in-time sales information and evolving industry conditions, companies can more acutely anticipate disruptions and visualize demand for weeks and months to come.

The result? Real-time input driving more flexible resource allocation and labor scheduling while significantly reducing incidence of stockouts and excess inventory that can hurt the bottom line.

Autonomous Decision-Making

Manually evaluating data to assess and reassess needs across the supply chain is time consuming, labor intensive, and hampered by an inability to react or adjust as conditions fluctuate.

Organizations have begun embracing agentic AI—specifically Virtual AI agents—to automate routine decisioning tasks.

By handing over the reins to AI technology, suppliers and manufacturers can streamline logistics routes, right-size inventory levels, and simplify routine operational processes - all based on down-to-the-second data and forecasts - so valuable human resources can redirect focus to business-critical initiatives.

Intelligent Simulation

Planning takes trial and error. Trial and error takes... planning.

Coming out ahead despite today's market conditions requires precision and action. For that, there's no time to waste.

To streamline planning and design better processes out of the gate, organizations are leveraging AI with machine learning (and, in some cases, synthetic data) for intelligent simulation.

This "enhanced" version of a traditional simulation model creates more detailed, exact plans that apply to every point along the supply chain, from logistics routes to warehouse layouts to production schedules. For routes, in particular, the integration of geospatial data makes dynamic planning and adjustments possible, strategic, and cost-transformative (traffic congestion alone costs the logistics industry \$74.5 billion/year).

One Final Thought

Supply chain, manufacturing, and logistics companies who integrate advanced AI platforms into existing workflows can achieve true decision intelligence that transforms efficiency, productivity, and ROI.

35%

Companies that use AI-driven inventory systems see a 35% reduction in inventory levels.

7-15%

AI-powered tools can unlock 7-15% additional warehouse capacity without new real estate investment.

38%

38% of logistics companies already use AI.

30%

Logistics companies are achieving up to 30% better transit times and fuel consumption with the use of AI.

USE CASE 2. Cloud/SaaS: Native, Integrated Applications

Legacy should apply to your accomplishments, not your software.

Like a specter of once-advanced technology, legacy enterprise software solutions still haunt modern manufacturing and logistics processes. But a movement is underway to banish this ghost of supply chains past: it's a shift toward cloud-native SaaS applications.

Driven by demands for greater scalability and digital integration, organizations are accelerating cloud-native adoption and looking to capitalize on the promise of more flexible, intuitive capabilities. AI is the perfect addition to this equation.

A Happily Cloud-y Outlook: AI Benefits for SaaS-Cloud Integrations



20/20 Foresight

Putting the power of AI behind cloud-native SaaS applications creates an amplification effect, improving visibility along every point of the supply chain. Organizations can see where shipments are this second, get up-to-the-minute inventory alerts, and get instant snapshots of supplier performance today, this week, last month. It all adds up to proactive planning and the ability to pivot before an unexpected change becomes a resource drain.

Next-Level Logistics

Cloud capabilities magnify the benefits of AI-integrated logistics platforms, creating real-time planning proficiency. From developing weather patterns to current traffic conditions and real-time fuel status, organizations can layer cloud-based SaaS tools onto AI solutions to more nimbly adjust to changing conditions—for faster routes, fewer emissions, and far less transportation costs.

Future-Forward Planning

Growth requires scalability. Scalability requires funds. AI helps cloud-native SaaS platforms do what they do best—support seamless scalability—in an even more cost-effective way. The result maximizes the use of underutilized assets and frees up capital for future investment. Embedding APIs into SaaS workflows delivers the added benefit of creating a more user-friendly tool embraced by more teams across the enterprise.

One Final Thought

Supply chain, manufacturing, and logistics organizations are contending with tight budgets and stalled transformation initiatives. Advanced AI tools can help bridge the gap with existing legacy systems and current tech demands, supporting operations until modernization moves forward.

MAKE MODERNIZATION YOUR LEGACY

Organizations can literally no longer afford the costs associated with outdated infrastructures. In the current climate, even rapid adoption of cloud-native architectures is not enough. Organizations must simultaneously adopt tools that accelerate and augment the benefits of cloud capabilities. AI is what takes digital transformation efforts to the next level, laying the groundwork for truly modern operations that can better withstand supply and manufacturing headwinds now, and well into the coming decades.

—Todd Workman, GM & VP of Global Services, CodeRoad



USE CASE 3. Risk Abatement: Cybersecurity, Compliance, Supplier Management

Ready for fewer risks and greater rewards? So is AI.

As supply chain complexity increases, vulnerability points multiply. At a time when one misstep can cost everything, organizations are stopping at nothing to embrace AI to strengthen and streamline security protocols.

From supplier management to supply chain threat assessment to proactive compliance monitoring, AI offers supply chain, logistics, and manufacturing companies real-time cybersecurity support that leads to real downstream benefits.

Suspicious Pattern Recognition

When it comes to data exposure, every second counts. AI can detect anomalies and inconsistencies that signal a cyber threat well before human surveillance might flag it. The sooner they're identified, the greater the chance of mitigating or preventing a large fraud or system breach scenario—ultimately preserving business continuity and data integrity.

Stringent Compliance Adherence

Manually tracking evolving compliance mandates (and course correcting accordingly) pulls valuable time and manpower away from equally critical tasks. No organization can afford a non-compliance penalty, but in this market operational inefficiency is just as costly. AI streamlines the collection and review of compliance documentation while automatically assessing operational protocols against regulations to identify non-compliance and address regulatory reporting requirements.

Proactive Fraud Detection

Fraud is particularly problematic for companies that operate along the supply chain continuum, especially during distribution and delivery. Most organizations lack the bandwidth to police warehouses and closely monitor every digital transaction. AI platforms can increase the scope and efficacy of theft and fraud detection by automatically scanning for and flagging suspicious transaction patterns, unauthorized reroutes, manipulated shipment data, and other anomalies in real time.

Third-Party Supervision

Third-party providers are arguably the weakest security link along the supply chain, and also the hardest point to protect. Organizations must often take providers at their word (or at their documentation) regarding the security protocols they have in place, many times resulting in severe consequences. AI tools can automatically monitor third-party integrations for vulnerabilities in external connections and devices, detect unapproved data flows, police access privilege violations, and scrutinize external content sharing.

One Final Thought

While no single technology or tool can thwart all security threats, advanced AI solutions serve as an added, embedded layer of protection that drastically reduces breach potential and supports a more predictable revenue-generating operational environment.

IN A RISKY INDUSTRY, REDUCE YOUR CHANCE OF RISKY BUSINESS



The supply chain is now fully digital. With that comes greater risk at every single point within the manufacturing and delivery lifecycle. Legacy systems, and an inability to pivot to meet changing market demands, increase security risk tenfold, if not one hundredfold. AI cannot eliminate risk—no tool, software, or process can. But it can increase your chance of preventing an exposure, and help mitigate a breach more quickly. Given that one security incident can put you out of business, AI is an investment you can't afford to delay."

– Dennis Odishoo, CEO, CodeRoad

180%

In 2023, breaches were initiated by exploiting supply chain vulnerabilities at a 180% higher rate than the year prior.

1,607

Manufacturing experienced 1,607 confirmed data breaches this year as opposed to only 849 last year. 90% of breached organizations were SMBs with fewer than 1,000 employees.

3 years

IBM has ranked manufacturing as the most-attacked industry by cybercriminals for the third year in a row.

60%

AI improves threat detection by 60%. consumption with the use of AI.

67%

Supply chains that use AI reduce risk by more than 67%.

USE CASE 4. Quality Control: Improved Predictive Maintenance

Without quality, quantity becomes irrelevant.

It's said that an ounce of prevention is worth a pound of cure. For supply chain, manufacturing, and logistics organizations, preventative maintenance can be worth a 12-18% cost reduction and 400% ROI.

Though not a definitive "cure" for today's unpredictable market and economic conditions, predictive maintenance (precursor to preventative maintenance that laser-targets needed preemptive fixes) goes a long way toward improving margins and competitive advantage.

But even with today's digital tools, accurately and continually assessing the health of vital equipment can be challenging. AI takes maintenance to the next level.

Two Sides of Predictive Maintenance



WITHOUT AI

Faster asset end of life

More expensive repairs for more severe breakdowns

Unplanned downtime eats away at profit

Anticipated 20% loss in asset life

Cost to replace far exceeds cost of up-front maintenance



WITH AI

Asset longevity

Cost-effective upkeep

Uninterrupted operations for greater ROI

Reduces downtime by 50%

Cuts breakdowns by 70%

Lowers maintenance costs by 25%



Investing in deep learning AI systems has become table stakes for manufacturing quality control (QC). The benefits are both immediate and undeniable.

Downtime to Dollar Signs

By detecting deviations and defects early, AI transforms maintenance forecasting accuracy and makes it easier to fold routine repairs into existing planned downtime. This minimizes costly work stoppages while ensuring organizations can address potential issues before they become severe, expensive failures.

Resourcing Reimagined

Proper resource allocation is vital to success, whether that's the people who run the business or the machine parts that power production. With AI, organizations can eliminate unnecessary human inspections, automate technician assignments, and determine when spare parts are on hand (vs. need to be ordered). Fewer labor hours and right-sized inventory = greater budgeting and output efficiency.

Once an Asset, Always an Asset

Given today's cost of goods and materials, operating equipment represents a substantial monetary investment. It must function seamlessly for years to come. With the help of AI, organizations can make sure machinery operates within ideal parameters—and quickly identify stress points—to reduce wear and prolong lifespan while simultaneously reducing the safety issues.

One Final Thought

Modern machines and technology platforms require more intricate parts that are more prone to malfunctions. With the high cost of parts and services, an investment in advanced AI will not only pay for itself, but ultimately protect downstream revenue.



3 BEST PRACTICES FOR IMPLEMENTING ADVANCED AI

Achieve better overall automation. That's the promise of advanced AI.

From warehouse automation that uses intelligent sorting and packing, to customer service automation that offers virtual assistants for routine inquiries and shipment tracking, to workforce management that proactively addresses labor shortages: the promise of AI transformation is now a reality.

To garner the greatest benefits from an AI platform, organizations must ensure they are holistically ready to implement and support it. This means thorough preparation is required well before any AI tools are adopted. Due diligence and investment upfront can make or break success down the line.

With this in mind, the following best practices can help you maximize the rewards you reap from an AI integration:



1. Maintain clean, accurate data

You may have heard of the phrase “garbage in, garbage out.” This unequivocally applies to the quality of the data you feed into your AI platform. Take the time prior to rollout to ensure all internal data sources and sets are accurate and available. This includes integrating both historical and real-time data from suppliers, logistics providers, partners, and customers. It's one of the top ways you can support AI technology in generating the best possible output and insights.



2. Make sure talent has the right skills

AI tools are evolving at lightning speed. The teams you build to support AI adoption and innovation must have the modern skills required to keep pace. This means being able to understand, design, implement, integrate, and upgrade AI solutions across every facet of operations. It also means having the tangential skills needed to achieve success AI implantation within the supply chain and logistics ecosystem. A dedicated recruiting partner with expertise in securing niche AI talent can help you thrive where competitors fall behind.



3. Update your infrastructure

AI tools require modern interfaces, seamless integration, and ample processing power. If your infrastructure lacks the capacity, connectivity, bandwidth, speed, and storage necessary to support advanced workload demands, any AI investment you make will flounder at best, fail at worst—and in either case, have a detrimental impact on workflows and downstream success.

CodeRoad's dedicated expertise and proven history in supply chain, logistics, and manufacturing translate to the right talent with the right skills to accomplish AI transformation the right way for you. [Reach out](#) to let us know how we can support your enterprise AI efforts.

CodeRoad delivers end-to-end software engineering solutions to fuel your business growth and AI adoption.

Whether you need staff augmentation, a dedicated team, or to outsource a portion or the full software development lifecycle of an application, our nearshore technology services are ready to support your success.