

THE IMPACT OF AI ON FREIGHT PROCUREMENT



PART 1

A 2025 REPORT FROM
BANYAN TECHNOLOGY



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About Banyan Technology:

Banyan Technology is the leading provider of over-the-road (OTR) shipping software, delivering end-to-end, intelligent freight management solutions. Our LIVE Connect® platform's comprehensive suite of AI and BI tools drive efficiency and cost savings through intelligent logistics solutions for Truckload, LTL, Final Mile and Parcel shipping. LIVE Connect serves as our clients' primary transportation management system (TMS) or as an API-driven data connectivity integration for existing operating systems.

LEADING FREIGHT INTO THE AI ERA

Artificial intelligence is not the future of freight — it is the present. It is already transforming how shipments are booked, tracked, and delivered each day. The real story is not about replacing people with technology but about equipping teams with the tools to work smarter, faster, and with greater confidence.

At Banyan Technology, we see AI as a co-pilot. It handles the repetitive so people can focus on strategy, relationships, and solving the challenges that truly move freight forward.

The companies that succeed in this new era will be those that embrace AI not as a gadget or passing trend, but as a natural extension of their operations woven into the way they serve customers.

Part One of our “Impact of AI on Freight Procurement” report explores how AI is becoming embedded in daily operations and redefining how Shippers and 3PLs manage procurement, execution, and decision-making.



This report highlights both the opportunities and the realities of AI in freight today — from procurement and cybersecurity to risk prevention and operational efficiency. The insights are designed to help leaders understand what is possible, what is practical, and where to focus first.

AI in freight will continue to evolve quickly. Our goal at Banyan is to help the industry navigate that journey with clarity, confidence, and the technology needed to stay ahead of the curve.

A handwritten signature in black ink, appearing to read 'B. Smith', with a large, stylized loop at the end.

Brian Smith
CEO, Banyan Technology

BUILDING THE FOUNDATIONS OF FREIGHT

AI is no longer a distant concept in freight. It is already embedded in daily operations, enabling faster decisions, stronger security, and smarter execution. Building on insights from its Tire Tracks podcast mini-series, Banyan Technology created the “Impact of AI on Freight Procurement” report, released in two parts. The report explores how logistics leaders can both establish a solid foundation and capture a competitive edge with AI.

Part One highlights the essential building blocks of AI adoption.

AI as a Co-Pilot in Freight

AI is automating high-volume, repetitive processes like load booking, credential verification, and carrier negotiations — freeing logistics professionals to focus on strategy, relationships, and complex exceptions. Virtual agents can act instantly, integrate with TMS platforms, and even conduct AI-to-AI negotiations, all with transparency and auditability.

Bridging Intelligence and Action

AI turns freight data into actionable

intelligence, improving quoting accuracy, forecasting and market responsiveness. Its scalability makes advanced analytics accessible to both small and enterprise-level operations. The future points toward a connected AI ecosystem, where systems exchange real-time insights to optimize capacity, pricing and performance.

Strengthening Freight Cybersecurity

As cyber threats grow more sophisticated, AI is a frontline defense — enabling real-time threat detection, vulnerability management, and zero-trust frameworks. Its integration with employee training and vendor oversight builds resilience across the supply chain.

In Part Two of the “Impact of AI on Freight Procurement” report, Banyan tackles how to build on that foundation by preventing freight risks at the source, redefining efficiency with AI agents, and showing why early adoption is critical to gaining and sustaining a competitive edge.

AI AS A CO-PILOT IN FREIGHT PROCUREMENT

Unlocking Real-Time Intelligence for Shippers and 3PLs

Artificial intelligence is not on the horizon. It is already embedded in freight operations, reshaping how Shippers and 3PLs manage procurement, communication, documentation and execution. As demand grows for faster and more accurate service, AI is helping teams transition from reactive processes to proactive, data-driven execution.

AI is not about replacing people. It is about refocusing their time on strategy, relationship building and solving high-impact problems while technology handles the repetitive work.

Automate Load Booking. Accelerate Results.

In freight, time is everything. A few minutes can mean a lost deal. Carrier sales teams are often overwhelmed by calls once a load is posted, with each call requiring manual attention and negotiation.



AI-powered virtual agents now manage those calls simultaneously. These agents can verify credentials, negotiate rates and finalize bookings. When integrated with a transportation management system (TMS), they also log interactions and update capacity in real time. The outcome is improved Carrier responsiveness and faster load execution.

This advancement represents a major leap in freight efficiency. AI-powered virtual agents not only eliminate hold times and missed calls, they also ensure every opportunity is captured without delay. By syncing directly with a transportation management system (TMS), these agents close the communication gap, reduce manual data entry and accelerate load execution.



The automation of routine tasks leads to measurable cost savings by lowering labor expenses, minimizing errors and maximizing asset utilization, giving 3PLs and Shippers a tangible edge in a time-sensitive, capacity-driven market.

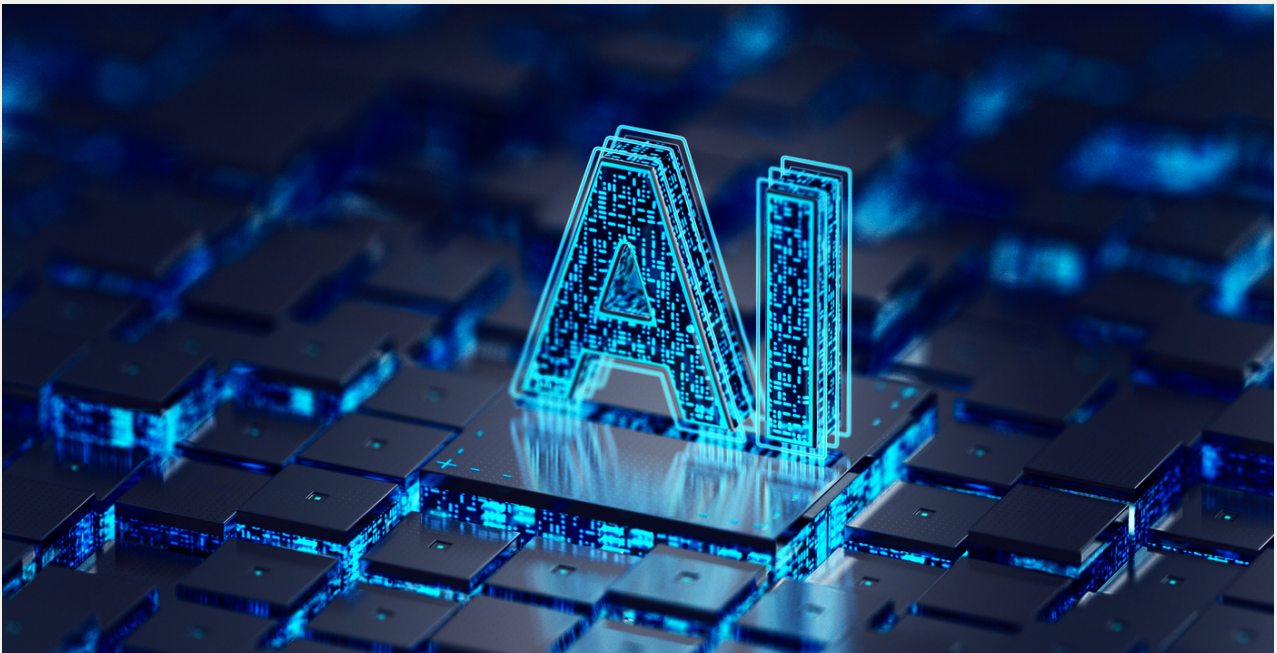
The Future of AI-to-AI Negotiation

As virtual agents become more common on both the broker and Carrier side, freight procurement may evolve into a landscape where AI tools negotiate directly with one another.

These AI-to-AI exchanges eliminate the need for voice or email, instead relying on digital protocols to share information and finalize terms.

“You’ll have a virtual agent representing the broker and another representing the carrier. And at that point, it’s just AI talking to AI,” said Boza.

While this reduces friction and increases efficiency, it also



raises the importance of transparency and auditability. Logs and dashboards play a critical role in monitoring transactions and ensuring that when issues arise, human intervention can occur promptly.

Transparency and auditability are essential in AI-to-AI freight negotiations because they provide the accountability and oversight needed in an automated environment. Without human interaction, it's easy to lose visibility into how decisions are made or why a particular rate was accepted.

Logs and dashboards create a verifiable record of each transaction, helping teams trace actions, resolve disputes and identify anomalies. This not only builds trust in the technology but also ensures

compliance, reduces risk and gives human operators the ability to intervene quickly when needed.

Why Data Is the Foundation

At its core, AI operates on probabilities. Give it enough quality data, and it can outperform humans in tasks like document classification, image recognition and predictive modeling.

"If I gave it 9,000 images of dogs and 1,000 of cats, the model is going to be much better at recognizing dogs. That's data bias," said Boza.

In freight, this translates to models trained on thousands of bills of lading, proof of delivery documents or rate confirmations. But companies just getting started may only have a few hundred samples, so Boza uses a

technique called data augmentation to synthetically generate more training material.

“Machine learning is all about big data. But if you don’t have it, you’re not out of luck,” said Boza. “We can use AI to generate new, synthetic samples that mimic your real data.”

Data augmentation is important because it levels the playing field for companies without massive data sets. AI models thrive on large volumes of quality data, but many Shippers and 3PLs may only have limited historical records.

By generating synthetic samples that mimic real-world data, data augmentation fills those gaps, enabling effective training without waiting to accumulate years of information.

This approach accelerates AI adoption, reduces barriers to entry and allows smaller or newer organizations to gain meaningful insights and automation from the start.

Exception Handling:

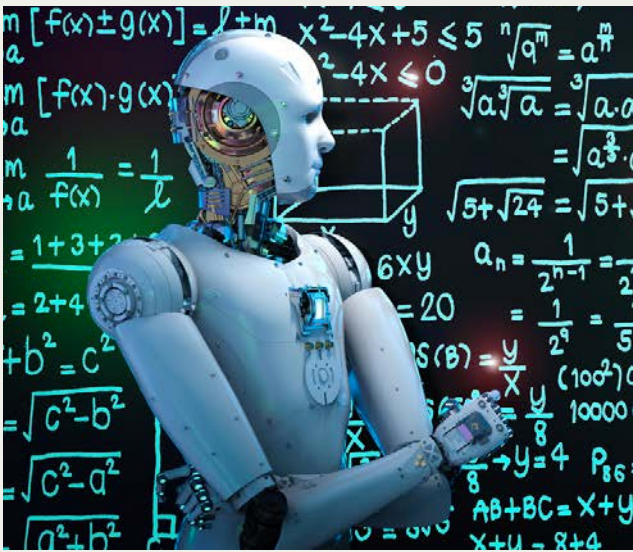
Where Humans Still Matter

AI excels at repetitive, rules-based tasks. But exceptions still occur, including miscommunications, errors or edge cases, and human oversight

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essential for managing those scenarios effectively. Some AI systems now include conversation scoring tools that evaluate sentiment, tone and emotional context to identify calls or exchanges that may be going off track. These signals can trigger human review before small issues escalate.

The key is not to rely on AI alone but to build a system where people manage the exceptions while AI handles the rest.



“You don’t want to turn your back on the system,” said Boza. “AI should handle the repetitive stuff, but humans are still needed for exception handling and oversight.”

While AI is powerful in handling routine tasks, it lacks the nuance and judgment required in complex or sensitive situations. Exceptions — like miscommunications or unusual requests — can quickly disrupt operations if not caught early. By integrating tools like conversation scoring and sentiment analysis, companies can proactively flag potential issues for human review.

This hybrid approach ensures that AI increases efficiency without compromising quality or customer experience. It reinforces that AI should augment, not replace, human insight, keeping people in control where it matters most.

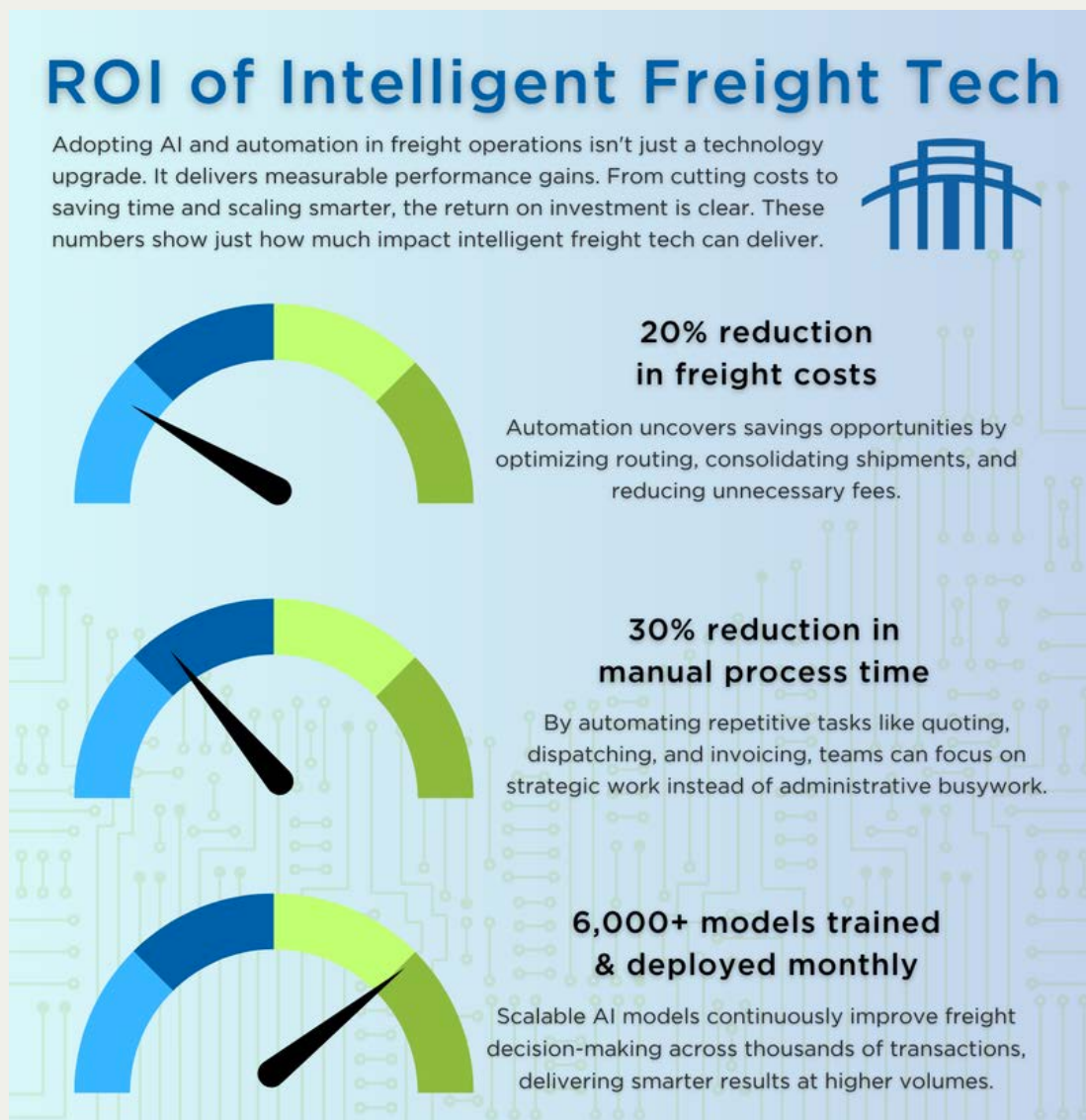
Accuracy vs. Perfection

AI can often exceed human accuracy in specific tasks, especially in structured environments like document classification or load matching. However, perfection is not the goal. Striving for 100 percent accuracy can lead to diminishing returns by consuming time and resources that could be better spent optimizing overall performance.

In logistics, where speed and consistency matter, a model that reliably delivers in the mid to high 90 percent accuracy range is typically more than sufficient when supported by safety checks and human oversight.

Establishing clear benchmarks or key performance indicators (KPIs) ensures that AI implementation stays aligned with business goals.

It shifts the focus from chasing flawless outcomes to delivering meaningful results, such as reduced error rates, faster response times and improved operational visibility. Ultimately, success should be defined by how well AI supports risk management, decision-making and customer service, not by theoretical perfection.



The Real Value: Reclaiming Time

Beyond cost savings and operational efficiency, the most valuable return on AI in freight procurement is time. AI enables Shippers and 3PLs to focus on high-value work such as strategy, problem solving and relationship building, rather than being buried in repetitive tasks.

By automating load matching, documentation, tracking and other routine functions, teams gain the capacity to think ahead instead of constantly reacting.

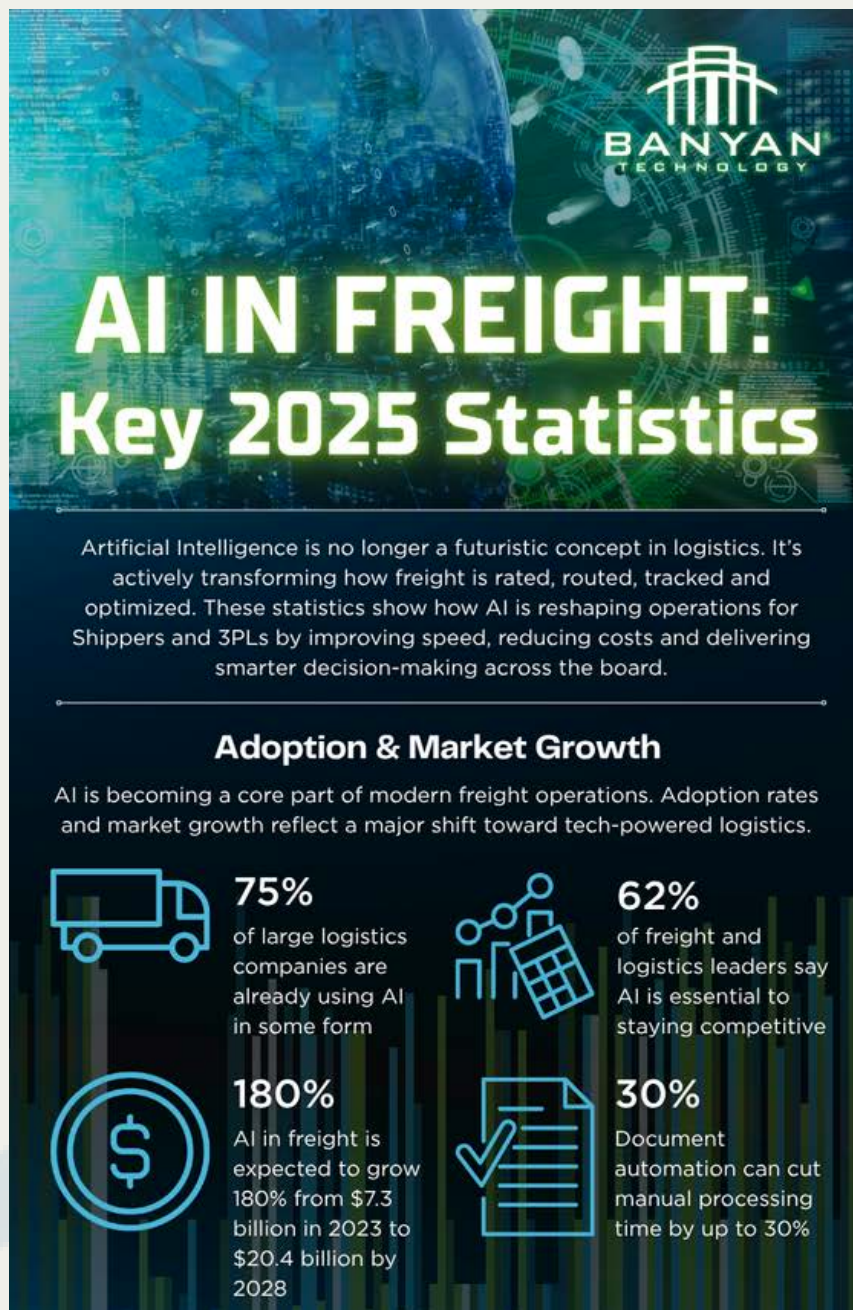
This shift is not about replacing people. It is about empowering teams to do more with less, scale faster and respond intelligently. Freed from manual processes, logistics professionals can drive innovation, improve service levels and uncover new revenue opportunities.

In an industry where responsiveness defines success, the ability to redirect time toward meaningful work is a true competitive advantage.

BRIDGING INTELLIGENCE AND ACTION ACROSS THE SUPPLY CHAIN

As artificial intelligence rapidly moves from buzzword to the backbone of modern freight operations, Shippers and 3PLs are adjusting their strategies for managing uncertainty, volatility and rising expectations. AI, particularly machine learning, is no longer a luxury, it is a necessity for achieving operational efficiency, visibility and intelligent decision-making.

For Shippers and 3PLs navigating today's unpredictable freight environment this shift to AI is a response to real operational pressures. Manual processes and outdated systems leave businesses vulnerable to pricing errors, missed opportunities and inefficient workflows. AI offers a practical solution by bringing speed, precision and adaptability to everyday decisions.



Whether it's quoting faster, forecasting with more confidence or reducing human error, AI empowers logistics professionals to stay ahead of market swings and customer demands. Embracing this technology now means building resilience and gaining a strategic edge in a highly competitive landscape.

The Value of Intelligent Data

Data powers every decision in freight, but it loses value quickly if it is not accurate, clean or timely. Machine learning addresses this challenge by constantly evaluating and updating the models it uses, ensuring that predictions remain relevant. The key is not just having data, it's having data that evolves.

Matt Harding, Chief Technology Officer at Greenscreens.ai, has seen firsthand how essential this evolution is for maintaining accuracy and relevance in pricing models. "There's a half-life to every piece of data you put in... so you constantly have to grind through the data, and make sure it's high quality as you're building these models," he said.

Freight AI systems are designed to filter out noise, correct inconsistencies and surface insights that reflect the current market. This means brokers can trust the rates they quote are grounded in reality, not outdated spreadsheets. AI helps teams identify shifts in pricing trends, adjust bids accordingly and move with the market instead of behind it. For brokers aiming to stay agile and competitive, data intelligence is the first and most important tool in their arsenal.

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Scalability for Every Business

Whether you are a growing business or a well-established enterprise, AI can scale to fit your strategy. For smaller firms, it means unlocking pricing intelligence and automation that was once only available to large players.

For enterprises, it means integrating with sophisticated systems to deliver performance insights across vast operations.



AI does not require massive infrastructure or technical teams. Instead, it complements existing workflows and adapts to your tech environment. The added benefit is institutional knowledge retention. AI captures pricing logic and decision patterns, minimizing the impact of employee turnover. That tribal knowledge becomes part of your business strategy, stored, scalable and ready to support onboarding, training and operational consistency.

The Next Frontier: AI Talking to AI

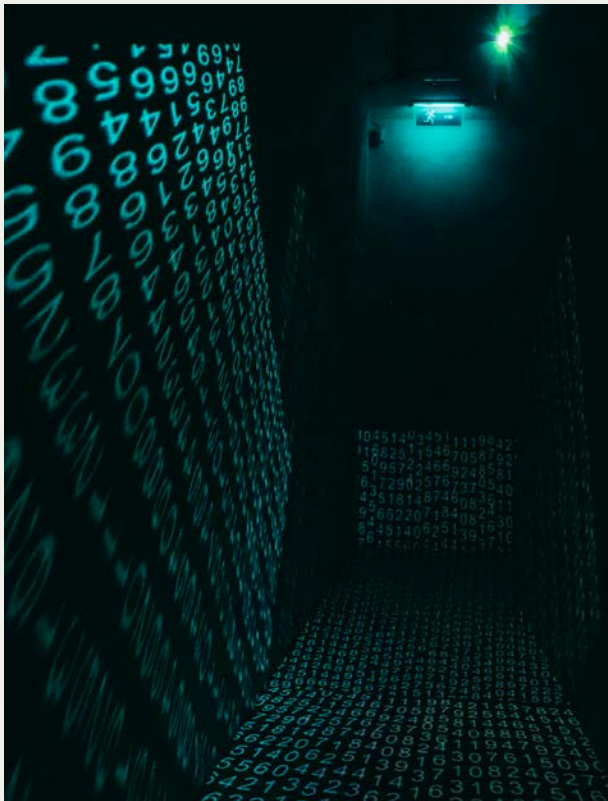
As more freight stakeholders adopt AI, we move toward a more connected ecosystem. Shippers, 3PLs and Carriers can begin sharing insights and predictions through integrated systems. This next

evolution is not about centralization, it is about orchestration.

AI systems will increasingly exchange signals, forecasting demand surges, identifying capacity shortages and aligning pricing strategies. This real-time collaboration across the supply chain helps all parties make faster, more informed decisions. It also opens the door to solving long-standing inefficiencies, from misaligned lane commitments to underutilized capacity.

Accuracy, Transparency and Trust

AI-driven freight tools must be accurate, but they also have to be accountable. The best systems



benchmark their predictions, flag anomalies and allow users to audit performance with clear metrics. This level of visibility builds trust and reduces reliance on gut instincts or guesswork.

Greenscreens uses predictive models that are evaluated with transparent metrics such as Mean Absolute Percent Error (MAPE), which compares estimated rates to actual booked costs. According to Harding, the company sets a 10% MAPE threshold for accuracy, though more than half of the data typically falls below 5%, reflecting strong model performance.

Shippers and 3PLs benefit from knowing how AI generates its predictions and when to rely on them.

Transparency into model performance encourages broader adoption and ensures teams use the tools with confidence. Over time, as models continue learning from new data, the cycle of improvement becomes automatic, compounding value with every transaction.

Where AI is Headed

AI in freight is transitioning from a functional tool to a strategic asset. As it integrates with more parts of the supply chain, its potential to orchestrate complex workflows and forecast with accuracy continues to grow.

While full automation remains a distant horizon, what's already clear is that AI enhances human capability. It enables faster onboarding, helps new team members make intelligent decisions quickly and gives leaders the data-driven insights they need to adapt.

Still, AI will not replace the human element, it will empower it. Sales teams, pricing analysts and operations staff will gain deeper insights faster. Decisions will be data-backed, not assumption-driven.

The freight businesses that thrive will be those that blend intelligent technology with expert execution.

HOW AI IS TRANSFORMING FREIGHT CYBERSECURITY

Cyberattacks in the freight industry are no longer what they used to be. Today's threats are faster, smarter and more scalable. Generative AI makes it easier for bad actors to automate attacks, craft nearly perfect phishing emails and exploit weak points in systems that were once considered too obscure to be of interest. Fortunately, the same technology is also helping carriers, brokers and shippers fight back with powerful new defenses.

"Cyber is a team sport," says Joe Ohr, Chief Operating Officer at the National Motor Freight and Traffic Association (NMFTA). "Whether you run five tractors or 50,000, you win only when everyone plays together."

Alongside Director of Cybersecurity Artie Crawford, Ohr is helping lead the charge to strengthen cybersecurity across over-the-road (OTR) shipping through education, research and AI-driven strategy.

Why Freight Operations Are More Vulnerable to AI-Driven Cyberattacks

The freight industry has become a consistent target for a new generation of cyberattacks that are faster and more sophisticated than ever before. These threats include ransomware-as-a-service (RaaS), which gives virtually anyone the tools to launch an attack, as well as highly convincing business email compromise (BEC) scams and large-scale automated data scraping campaigns.

Cyber is a team sport. Whether you run five tractors or 50,000, you win only when everyone plays together.

Many of these tactics are enhanced by artificial intelligence, which allows attackers to work at a scale and speed that traditional defenses struggle to match.



Artie Crawford, Director of Cybersecurity at the NMFTA, describes this modern approach as a “shotgun-style” attack. Instead of selecting a specific target, cybercriminals cast a wide net across hundreds or even thousands of organizations. Once they identify a weak spot -- often through a phishing email, misconfigured system, or vulnerable device -- they begin digging deeper.

Their goal is to access valuable data, such as employee records, fleet credentials, financial information, or anything that can be exploited or sold.

In some cases, attackers even target in-cab driver systems or shop equipment to compromise additional devices or disrupt daily operations.

The freight industry’s vulnerability is compounded by uneven adoption of cybersecurity practices. Many fleets continue to believe they are too small to be worth targeting or assume their outdated systems somehow make them invisible to cybercriminals. This creates a dangerous false sense of security. In truth, smaller companies often lack formal IT departments, have limited security training, and operate with minimal system monitoring. These gaps make them an ideal target, not because of the value of their freight, but because they are easier to breach.

Legacy systems also create serious risks. Devices like older shop laptops, diagnostic tools, or trailer sensors frequently run on outdated

operating systems that no longer receive security patches. These devices are often connected directly to internal networks without proper segmentation or monitoring. As a result, a single compromised endpoint can become the entry point for a much larger attack.

Crawford stresses that companies need to stop thinking of cybersecurity as a concern only for large fleets. Risk is not determined by company size but by how well systems and people are protected. The rise of connected freight technology has blurred the lines between IT, operations and infrastructure. Even basic tools -- like ELDs, mobile dispatch apps, and Wi-Fi-connected routers -- can become attack surfaces if left unsecured.

The takeaway is clear. Every organization, regardless of size, needs to take cybersecurity seriously. In today's environment, any device that sends or receives data is a potential target, and every team member -- from IT to drivers - - needs to be part of the defense.

How AI Can Strengthen Freight Cybersecurity

AI is not just fueling cyberattacks, it is also powering some of the most



advanced defenses available to the freight industry. With the ability to analyze massive amounts of data and detect unusual activity in real time, AI gives companies the tools to spot threats faster and respond before they escalate. However, its value depends on how it is applied. Below are several ways AI can strengthen cybersecurity in freight operations:

- **Real-time threat detection:**

AI and machine learning can flag unusual login attempts, unauthorized access to sensitive files or behavior that falls outside of a user's typical patterns. This kind of intelligent pattern recognition allows teams to identify threats early and act quickly to contain them.

- **Zero Trust Architecture:**

AI can support a Zero Trust framework by continuously verifying

users and devices, not just at login, but throughout every interaction. This minimizes lateral movement if a breach occurs and ensures only authorized users have access to critical systems.

- **Smarter employee training:**

AI-powered phishing simulations and micro-learning modules can be customized to each employee's behavior. This creates more effective training experiences and better prepares staff to spot and report suspicious activity.

- **Proactive vulnerability management:**

AI tools can scan for outdated APIs, inactive endpoints and unmonitored mobile systems, especially in areas like trailer sensors or ELDs that may not receive regular security checks. By flagging gaps early, AI helps teams close vulnerabilities before attackers can exploit them.

- **Driver-focused security:**

Trucks function as mobile offices, yet drivers are often left out of cybersecurity efforts. Joe Ohr and Artie Crawford emphasize the need for inclusive training. One long-time driver, after just one session, began questioning whether it was safe to check personal email on his phone, proof that the right education can spark meaningful change.

STRENGTHENING CYBERSECURITY



**Real-Time
Threat Detection**



**Zero-Trust
Architecture**



**Smarter
Employee
Training**



**Proactive
Vulnerability
Management**



**Driver-Focused
Security**

The key takeaway is that AI can dramatically improve cybersecurity readiness, but it should not operate in a vacuum.

To be truly effective, AI must be integrated into a broader framework that includes human oversight, training and strong organizational policies. When every user and endpoint is part of the solution, freight companies can build a more secure and resilient operation.



HIDDEN RISKS OF AI IN CYBERSECURITY AND HOW TO COUNTER THEM

While AI brings powerful capabilities to freight cybersecurity, it also introduces new and evolving risks. The same technology that helps detect threats can be used to launch them faster, smarter and at a much larger scale. To use AI effectively, freight and logistics companies need to understand where it can fall short, and how to build safeguards that turn risk into resilience. Below are some of the most pressing AI-related cybersecurity threats and how to address them head-on.



RISK

AI-generated phishing emails look polished, personalized and highly convincing, making them harder to detect than traditional scams. Even experienced professionals may be fooled by fake HR notices, payment updates or system alerts.

SOLUTION

Use AI-powered email filters to analyze sender behavior, language patterns and historical context. Reinforce these defenses with regular phishing simulations and employee training that encourages users to pause and verify unexpected requests.



RISK

Deepfake voice and video tools allow attackers to impersonate executives, tricking staff into making urgent decisions like password resets or financial transfers.

SOLUTION

Require multi-factor authentication for all high-risk actions. Train employees to confirm sensitive requests through a separate communication channel, especially if they seem out of the ordinary.



RISK

AI tools have blind spots and biases. If a system is not trained to recognize freight-specific activity -- such as unusual trailer movements, out-of-route driving or tampered ELD data -- it may miss real threats.

SOLUTION

Train AI models on transportation-specific data. Include inputs from your TMS, telematics, shipment tracking and operations platforms. Continuously test and refine models to ensure they detect industry-relevant risks.



RISK

Overreliance on AI can create a false sense of security. Teams may assume the system will catch everything and become less proactive about audits, monitoring and manual review.

SOLUTION

Maintain a human-in-the-loop process. Regularly review alerts and analytics with your IT and security teams. Establish clear protocols for incident response and enforce routine policy updates to match evolving threats.



RISK

AI increases the size of your attack surface. More AI tools mean more APIs, cloud platforms and system connections, all of which need to be secured. Unmonitored or outdated APIs can become easy access points for attackers.

SOLUTION

Conduct a full audit of your system integrations. Deactivate unused APIs, apply strict access controls, and use automated scanning tools to identify exposed or vulnerable endpoints. Build security into every new integration from the start.





The API Trap and Vendor Oversight

As digital transformation continues, more freight companies are connecting through APIs to brokers, TMS systems and data tools. This creates efficiency but also introduces new risks. Old APIs are often left active and unmonitored, providing a potential path for attackers. Ohr stresses the importance of retiring outdated integrations, enforcing authentication standards and monitoring traffic patterns for signs of trouble.

Carriers also need to vet vendors more thoroughly. “During the RFP process, cybersecurity needs to be a top priority,” Ohr advises. “Your vendors are your partners, especially during a cyber event.” A strong

vendor relationship includes transparency, rapid response plans and ongoing collaboration around system security.

Fighting AI with AI

The freight industry can also turn AI into a defensive asset. AI-powered email filters, for instance, can analyze writing patterns to detect messages that look machine-generated. Systems can also flag emails from senders who don’t normally communicate with the recipient, prompting an extra layer of review.

AI is also being used to simulate deepfake attacks, like phone calls that sound like executives asking for

urgent action. These simulations can help train employees to spot and report suspicious behavior. The more familiar your team becomes with real-world attack methods, the more prepared they'll be to respond.

What Should You Do?

Crawford recommends starting with vendor conversations. Ask what security measures are in place, how AI is used and what the company's response plan is in the event of a breach. Just as important, involve your entire organization in cybersecurity awareness, not just the IT department. NMFTA offers a range of free tools and educational resources, including the Road to Resilience framework, at www.nmfta.org/cyber.

Cybersecurity is no longer a tech-side concern. It's a business-critical issue for the entire supply chain. As AI reshapes both threats and defenses, the companies that succeed will be the ones who make security a shared responsibility.

"AI is not the solution for everything," says Ohr. "Take it slow. Do your research. But most importantly, make cybersecurity a core part of your company culture -- just like safety."

With the right mindset, partners and

AI is not the solution for everything. Take it slow. Do your research. But most importantly, make cybersecurity a core part of your company culture -- just like safety.

technology, the freight industry can move forward with confidence, and stay one step ahead of whatever comes next.

Ohr and Crawford both emphasize that cybersecurity must become part of company culture. "Cyber has to become part of your company's DNA," says Ohr. "It's got to be like safety -- something everyone owns." In the past, cybersecurity was often viewed as the IT department's responsibility. Today, it has to include everyone -- from drivers to maintenance teams and leadership.

Look for Part Two of the "Impact of AI on Freight Procurement" report, where Banyan explores how to turn this foundation into a competitive edge through risk prevention, AI-driven efficiency, and the advantages of early adoption.



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