

**Integrating Artificial
Intelligence in the
Worldwide Air Cargo
Logistics Industry**
BY CHARLES H.W. EDWARDS
and HART BROWN

**Supply Chain Security –
Challenges, Mitigations
and Current Status**

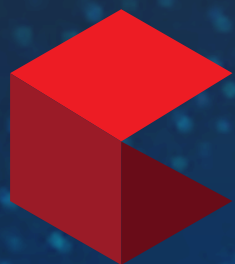
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**AI as a Disruptive
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BY KIM WINTER

**2025 Supply Chain
Outlook: Thriving in a
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and Innovation**

BY MARTIN HUBERT



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Publisher

Peter D G Raven
peter@lscms.org

Editor-In-Chief

Natasia Jerah
natasiajerah@gmail.com

Editor-At-Large

Dr. Raymon Krishnan
raymon@logis.com.sg

Features Editor - Air Freight

Stan Wraight
stan.wraight@sasiworld.com

Features Editor - Japan

Wayne Yoshida
wayne.yoshida@maersk.com

Features Editor - Technology - Americas

Martin Hubert
mhubert@freightgate.com

Features Editor - Sustainability

Marcus LeMaster
marcus.lemaster@se.com

Features Editor - Human Resources & People Development

Kim Winter
kimw@logisticsexecutive.com

Features Editor - Human Resources & People Development

Hariesh Manaadiar
manaadiar@shippingandfreightresource.com

Digital Editor - Graphic

Hisyam Sazali
hisyam@logisym.org

Digital Editor - Marketing

Saran Vivekananth
saran@logisym.org

Marketing

Edmund Lee
elee@lscms.org

Partnerships

Harjeet Chekhire
harjeet@logisym.org

Letters to the Editor

info@logisym.org

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Edmund Lee
elee@lscms.org

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1 Sunview Road
#04-15 EcoTech@Sunview,
Singapore 627615
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FROM THE **EDITOR**
Natasia Jerah

Fifteen years ago, AI felt like a distant dream—progress was slow, and few paid attention.

Then, the iPhone launched, Google dominated search, and Facebook exploded. Data flooded the world, and within two years, AI surged forward. Today, startups like DeepSeek, xAI, and Anthropic are racing to outdo each other, and just days ago, GPT-4.5 arrived.

We can't ignore AI—it's reshaping logistics. But with great power comes risk. As we enter 2025, let's balance AI excitement with protective action:

- Digital Security: AI-driven threat detection (fight AI with AI) to prevent cyberattacks
- Physical Security: Prevent theft using IoT-connected devices & blockchain or GPS tracking
- Education: Upskill employees—learn AI or be outpaced by it

Here's to securing both digital and physical worlds—and to hoping my grandma stops believing Trump is heading to Borneo for Laksa (*#deepfakes*)! Thank you as always to the contributors of the magazine, who have wisely reminded us of both the beauty and the curse of AI.

Natasia Jerah
Editor-In-Chief
CargoNOW

Problems or Opportunities?

As we move further into 2025, global supply chains continue to navigate a dynamic and rapidly changing environment. From evolving technology solutions to shifts in global trade policies, the need for resilience, agility, and innovation has never been greater.

In this March edition of CargoNOW Magazine, we explore key topics shaping the industry—from sustainability initiatives and digital transformation to the ongoing challenges posed by geopolitical tensions and economic uncertainty. Our contributors bring valuable insights, practical strategies, and forward-looking perspectives to help supply chain professionals stay ahead of the curve.

As one of the collaborative platforms of The Logistics & Supply Chain Management Society, the team at LogiSYM remains committed to providing a platform for thought leadership, collaboration, and meaningful dialogue across the global logistics and supply chain community. Whether you're a practitioner, technology provider, academic, or policy expert, your voice matters in shaping the future of our industry.

We look forward to continuing the conversation at our upcoming symposiums, exhibitions, webinars, and roundtables, sharing innovative ideas and fostering connections that drive progress.

Stay informed, stay engaged, and enjoy this edition of CargoNOW Magazine!

Raymon Krishnan, FALA, FCILT, CLP

President

The Logistics & Supply Chain Management





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The background of the entire page is a dark blue, textured surface resembling a globe or a digital network. It is overlaid with various white and light blue icons and lines. Icons include a wrench and screwdriver, a satellite, a Bitcoin symbol, a car with a charging plug, a bar chart, a dollar sign, a recycling symbol, a tractor, and a bio symbol. A large, glowing blue 'AI' is positioned in the upper right quadrant. The title 'Integrating Artificial Intelligence in the Worldwide Air Cargo Logistics Industry' is centered in the middle of the page in a bold, white, sans-serif font. Below the title, the authors' names and titles are listed in a smaller, white, sans-serif font.

AI

Integrating Artificial Intelligence in the Worldwide Air Cargo Logistics Industry

By **Charles H.W. Edwards**, Vice President at **SASI World, Inc.**,
and **Hart Brown**, CEO at **Future Point of View**

The worldwide air cargo logistics industry continues to experience disruptions which change the intersection between the service providers and the consumers, otherwise known as the beneficial cargo owners.

The complexity of cross-border air cargo flows, involving as many as thirty-nine steps, as well as the numerous changes of operations, services, regulations, and processes underscores the need for new tools. Synthetic (AI) and machine intelligence (human-centric robotics) have reached a level that encompasses a set of solutions, such as new reasoning models, AI agents, and 'world' models that can be leveraged to create new services and system solutions. These various solutions are not disrupters, rather they are enablers critical to the smooth function of a very complex system.

The challenge is to understand how synthetic and machine Intelligence and their integration into the worldwide air cargo logistics industry; can benefit cross-border supply chain.

In a 2024 paper, A.P. Moller-Maersk noted that the world economy is in "Industry 5.0," in which synthetic intelligence (AI), the Internet of Things (IoT), and machine intelligence (human-centric robotics) are being integrated with the aim of developing resilient, adaptable, and more efficient production systems. This development is revolutionising supply chain

operations and management leading to better connectivity and flexibility. In just one example, a study of the use of AI in the logistics industry highlighted route optimisation, greenhouse gas emission and management, and transportation management system integration.

When analysing use cases through a technology development lens, it becomes very clear that organisations that make up the worldwide air cargo logistics industry will need to heavily collaborate to establish the necessary reliability, transparency, efficiency, and margin creation, that the business environment is increasingly demanding. There is a massive potential of leveraging synthetic and machine intelligence to solve the growing list of challenges that cause friction between the movement of the consignments and the associated information. Achieving this potential will only be realised when data standards are created and enforced, data flow is enhanced, and a set of AI tools is created that can span across the air cargo logistics ecosystem.

Improved supply chain visibility is a strategic priority for supply chain managers. Managers need to rapidly adapt to frequent disruptions and system changes. In turn the members of the worldwide air cargo logistics industry must respond quickly to avoid the reactionary 'learning by surprise' process and maintain the resilience and sustainability of their operations and services. Instead of waiting for an event to occur, members of the worldwide air cargo logistics industry need to

change their business focus from transactional relationships to long-term collaboration with other members of the worldwide air cargo logistics industry and the beneficial cargo owners. This fundamental change requires the collection of a wide array of data and information, and the application of synthetic intelligence (AI) to identify trends, devise tactical options, and create long-term future-proofed programs.

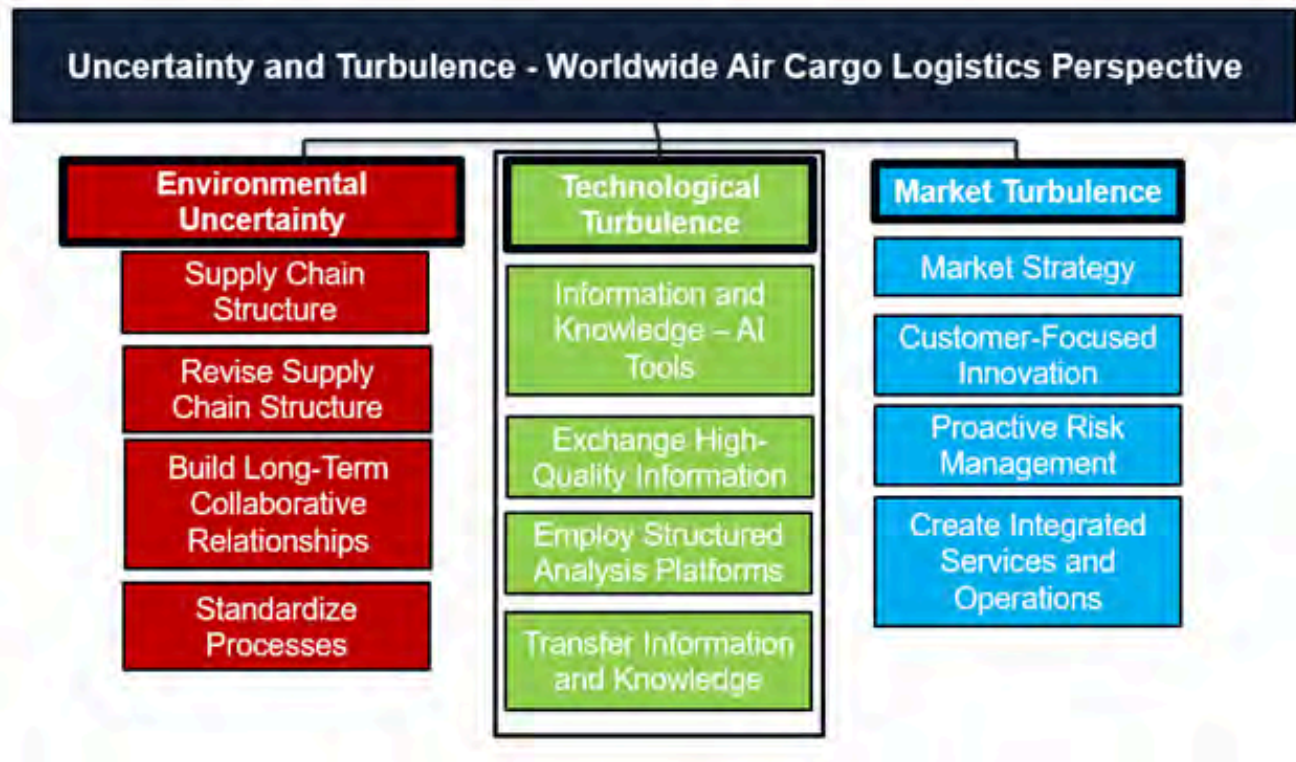


As shown in the following figure, the environmental (business and geopolitical) uncertainty stresses existing supply chains and forces change at increasingly high frequency levels and emphasises a focus on collaborative business relationships. The entry of new competitors and new services, underscore changes in market strategy, creating innovative products that involve higher levels of managed risk and a high level of service—operations coordination.

Facilitating these processes is technological turbulence that is taking place concurrently. The creation of new tools is based on the commitment to collect and share consignment data and information in a controlled and protected environment. Data and information governance is a critical step. With access to appropriate data, intelligent tools can be created in a collaborative environment. The increased volumes and more diverse consignment details will require synthetic

intelligent (AI) tools to assist human managers as they deal with the constant operational changes and create new supply chain structures, market strategies, and new product portfolios. The core process will create innovative short- and long-term solutions. All this change requires that traditional silos be demolished.

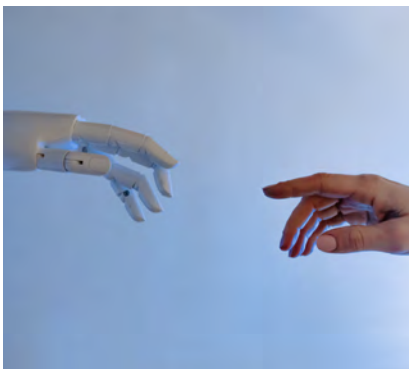
Employing AI to Address Uncertainty and Turbulence



Adapted from J. Schonberger and K. Sundtoff Hald, March/April 2024, "Driving Supply Chain Flexibility in an Uncertain and Volatile World", Supply Chain Management Review, Pgs. 24-31

The critical question becomes how can the worldwide air cargo logistics industry build a collaborative intelligence strategy today?

The process begins with the implementation of a structured engagement program based on trust, respect for each party's roles, and an agreed-upon 'meta' (transformation) strategy for the industry. For long-term success, each participating private enterprise and public organisation must make a commitment to share gains between the companies at the highest level; not just between sales representatives and procurement officers.



The air cargo logistics intelligence strategy must be thought of as creating an industry utility that is conceptualised collaboratively by the industry to meet all the needs of the industry. There are many examples of industries such as banking, commercial construction, insurance, and oil and gas, where data and technology collaboration has formed industry utility standards and services that benefit all the members. When gleaning best practices to guide building an 'Intelligence Digital Utility' for the air cargo logistics industry, the following stand out:

1) Members:

Early collaboration by a core group of small and large companies that represent various parts of the worldwide air cargo logistics supply chain,

2) Facilitators:

A series of tailored think tanks and system workshops to fully develop AI use cases, specify problems to solve, and identify the necessary design elements,

3) Standards Alignment:

A willingness to design and accept the data standards needed for interoperability and collaboration. This will be especially important in training and exploiting new AI tools,

4) Accountability:

Engagement of a core team (combining industry expertise and consultants experienced in building these collaborative systems) to build a design for the digital utility, that leverages system-wide AI solutions,

5) Governance:

Create an organisation that is separate from the members that can act as the unbiased coordinator and deliverer of standards and services, and

6) Quick Wins:

Choose the first three use cases that will provide the most value with the least resistance or friction for delivery.



To fully realise the value of an intelligence strategy in the worldwide air cargo logistics industry, the actions necessary to move forward must begin this year. Given the increased volume of individual consignments, the complexity of supply chains, and the ever-changing rules and regulations, the employment of synthetic intelligence tools to secure supply chains is

becoming a must-have enabler.

A workshop, by invitation, is planned for October 2025 hosted by SASI World and Future Point of View to start the process. The good news is that the opportunity exists to solve these issues in a manner that enhances the ability to improve this complex system of decisions, handoffs,

deliveries, and reduce external impacts. At this level of complexity, improvements going forward are much better done with synthetic and machine intelligence because we have maximised human intelligence to help freight move frictionlessly.

If you are interested in participating in the workshop, please contact Charles Edwards.



ABOUT THE AUTHORS

CHARLES H.W. EDWARDS



Charles Edwards focuses on training, financial modelling, and data analytics. His 50+ year career includes international freight forwarding in Canada and the UAE, creating and operating UPS Airlines, airport management, introducing a composite baggage container, team leader which designed and built one of the world's largest air vehicles, spans ocean freight, rail management, and economic development.

Edwards holds degrees from universities in Canada, England, and the United States, is on the faculty of the UNC at Chapel Hill and is a Scholar Fellow of Sigma Chi Mu Tau international supply chain society. He serves on boards and committees in freight transport research and logistics education.

charles.edwards@sasiworld.com

HART BROWN



Hart Brown is a world-renowned expert on simplifying complex strategies while implementing them in creative and innovative ways during crisis events.

Hart has provided services in over 50 countries to heads of state and executives during the turbulence of government transitions, one of the largest US bankruptcies, major events including the World Cup and the Olympics, and terrorism incidents.

He has been referenced in over 90 publications and news outlets such as Reuters, and is co-author of "Online and Under Attack: What Every Business Needs to Know to Manage Cyber Risk and Win its Cyber War".

hartbrown@fpov.com



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Yale® Launches Cost-Effective Electric Forklift to Address Flexibility and Sustainability Challenges in the Asia Pacific Region

Yale Lift Truck Technologies introduces the Yale® ERP2.0-3.5MXLG electric counterbalance forklift, powered by lithium-ion batteries, to the Asia Pacific market.

Well-suited for a variety of logistics and warehouse operations, this new solution is designed to help businesses

address rising costs and meet sustainability objectives, while providing the reliability and flexibility required for both indoor and outdoor use.

"As businesses face growing pressure to cut emissions and control costs, they need material handling solutions that are both flexible and efficient," says Ben Newey,

Vice President of Sales and Marketing for Asia Pacific, India, and China, Hyster-Yale Materials Handling. "The new series offers a cost-efficient, emission-free option that supports sustainability goals while maintaining top performance and reliability."

THE TOTAL COST OF OWNERSHIP ADVANTAGE

With load capacities ranging from 2 to 3.5 tonnes, this electric series is designed to help businesses minimise capital expenditure and reduce total cost of ownership (TCO). The integration of lithium-ion battery technology eliminates the need for frequent maintenance such as engine servicing, battery replacements, and fuel top-ups, significantly reducing downtime and related expenses.

Lithium-ion batteries also offer more efficient charging than

lead-acid options, delivering more power for no additional energy cost. Compared to traditional internal combustion engine (ICE) trucks, energy costs could potentially be reduced by as much as 50%. The long-lasting lithium-ion battery options come with a five-year warranty, offering further value over time.

EMPOWERING OPERATORS

The latest series from Yale prioritises operator comfort and well-being. The spacious, weatherproof cabin provides a comfortable working

environment, while the quiet electric operation minimises noise pollution. The through-mast visibility is also up to 34% better than some leading competitors, supporting operator confidence. Additionally, the lift trucks are ergonomically designed to help reduce fatigue and improve operator productivity while maintaining familiar controls and features, which provide a smooth transition for operators already accustomed to Yale solutions.



SIMPLY FLEXIBLE

Equipped with large superelastic pneumatic tires, these lift trucks are equally suited for handling outdoor tasks in yards or loading bays, while maintaining excellent manoeuvrability for indoor warehouse operations. High travel and lift speeds allow businesses to move more material in less time, supporting optimal operational efficiency and reducing equipment costs.

MEETING OPERATIONAL DEMANDS

The ERP2.0-3.5MXLG series is designed to keep pace with fast-moving, multi-shift environments. The larger battery capacity provides extended run times, reducing the need for frequent battery changes. With the added benefit of opportunity charging, businesses can charge the forklifts during breaks or shift changes, further maximising uptime. The powerful 154V battery option delivers ICE-like

performance, making it an ideal solution for companies looking to transition away from traditional combustion engine trucks.

SUSTAINABLE PERFORMANCE

With zero exhaust emissions, the lithium-ion-powered forklifts contribute to cleaner air quality. This not only helps businesses reduce their environmental footprint but also improves the health and safety of their workforce. For industries focused on sustainability, such as warehousing and distribution centres, this series is a strong choice.

The new Yale ERP2.0-3.5MXLG electric counterbalance forklifts are now available through local independent Yale dealers across the Asia-Pacific region.

For more information on Yale material handling solutions, please visit <http://www.yale.com/en-sg/asia-pacific>.



Yale Lift Truck Technologies leverages over a century of material handling experience and substantial investment in innovation to bring the most advanced technology-driven lift truck solutions to market. The company offers a full line of award-winning lift trucks, including reach trucks, order pickers, very narrow aisle trucks, pallet jacks and trucks, pallet stackers, tow tractors and counterbalanced forklifts, as well as powerful operator assist solutions, proven robotics, and a wide range of power sources to help customers adapt to today's demanding supply chain. Yale and its independent dealer network support these solutions with comprehensive after-sales service, parts, financing, and training.

Hyster-Yale Materials Handling, Inc. is a wholly owned subsidiary of Hyster-Yale, Inc. (NYSE: HY), which is headquartered in Cleveland, Ohio and operates globally.

Supply Chain Security

Challenges,
Mitigations and
Current Status



By **Hariesh Manaadiar**, Founder at
Shipping and Freight Resource and
Features Editor – OceanFreight at
CargoNOW

Supply chain involves the movement of various types of goods from a diverse pool of suppliers, some local, some international, all aimed at getting the goods to the right place at the right time at the right price to enable manufacturing, production, and consumption.

These goods are sometimes moved at unprecedented speeds across several borders using several modes of transport using both manual and digital means, both of which have their own issues in terms of security.

Supply chain security has been paramount for all stakeholders in the chain. As per the BSI and TT Club Cargo Theft Report 2023, cargo theft continues to pose significant risks to supply chains worldwide with the increasing complexity and sophistication of criminal tactics.

As per the report, Cargo theft happens in various forms, including theft from facilities, hijacking, and theft from vehicles with food and beverages, electronics, and automotive parts being the top commodities targeted in 2023 for their high value and market

demand.

Some of the risk mitigation strategies and enhanced security protocols used by businesses to deter theft and aid in the recovery of stolen goods include investing in advanced security technologies, Artificial Intelligence (AI), GPS tracking, electronic seals, and surveillance systems.

As the modern world evolves digitally, the implementation of these digital technologies also makes them vulnerable to cyber threats and associated security threats.



THE THREAT LANDSCAPE IN SUPPLY CHAINS

Cyber threats are called the “silent saboteurs,” and as per the World Economic Forum’s Global Cybersecurity Outlook survey, cyber threats continue to escalate, with 72% of respondents reporting an increase in cyber risks.

Cyber threats perpetuated by cybercriminals include ransomware attacks, data breaches, deepfakes, and phishing scams, and the increase in supply chain breaches can be seen as a shift in the cybersecurity landscape.

A single cyber attack has the potential to impact operations, create shipment delays, and expose sensitive customer data leading to extortion among other consequences.

AI is a double-edged sword in this case because on one hand, while AI-powered security tools can help in detecting and neutralising threats quicker than humans can, on the other hand, cybercriminals are also using AI to create sophisticated attacks which have the potential to bypass traditional security measures.



PHYSICAL CHALLENGES IN SUPPLY CHAIN SECURITY

Supply chains are also vulnerable to physical security challenges, including cargo theft, counterfeiting, and political instability. The recent trade restrictions and trade wars are also seen as a physical challenge, which some unscrupulous elements may use to circumvent lawful regulations.

While surveillance, geofencing, and real-time tracking driven by AI can provide better visibility, it also requires robust cybersecurity measures to prevent hacking or manipulation of the systems used.

ETHICAL AND COMPLIANCE CHALLENGES IN AI ADOPTION

Although AI is a powerful tool, it is not infallible, and one of the main concerns in the adoption and dependence on AI is the potential AI bias and decision-making risks that may be associated with this bias.

As per IBM, “Artificial intelligence (AI) systems use algorithms to discover patterns and insights in data, or to predict output values from a given set of input variables. Biased algorithms can impact these insights and outputs in ways that lead to harmful decisions or actions, promote or perpetuate discrimination and inequality, and erode trust in AI and the institutions that use AI.”

When using AI-powered decision-making in the supply chain, it is important to ensure fairness, transparency, and accountability to avoid supply chain disruptions due to flawed algorithms.



SO WHAT ARE THE MITIGATION MEASURES AGAINST TECHNOLOGY-DRIVEN SECURITY THREATS?



The short answer is AI.

Similar to human-driven mitigation measures that have been used for centuries for human-driven criminal activities, AI-powered risk mitigation measures can help in addressing the supply chain security issues.

AI has in fact brought a new level of sophistication to risk management in supply chains, such as predictive analytics, which has the potential to predict risks (human- or technology-driven). These systems analyse massive amounts of data based on historical events and incidents

including geopolitical developments, weather patterns, criminal incidents, fraud detection, transactional anomalies, and market fluctuations to predict these risks.

STRENGTHENING SUPPLY CHAIN SECURITY

Businesses can also use the below techniques to strengthen their supply chain security:

Enhance supply chain visibility

Use visibility platforms to track and monitor shipments in real-time. These platforms may or may not be powered by AI, but work mostly using IoT devices, GPS, telematics, and other modern technologies. The end-to-end visibility that these platforms provide powered by real-time data analytics helps businesses to make informed decisions about their supply chain and mitigate security risks before they escalate.

Invest in cybersecurity

Businesses should consider investing in cybersecurity solutions which do not depend just on AI but also other threat detection systems available. AI-powered authentication tools and automated response mechanisms are some such investments that are essential to ensure cybersecurity.

Build resilience, not reliance

Supply chain resilience is another key factor to consider so that businesses don't just build reliance on AI and other technologies. Businesses need to develop contingency plans in case these technologies fail or are compromised. Business leaders should ensure that they invest in AI training programs to ensure that employees understand its capabilities and limitations and use it in the right way.



Mix and match

Human oversight of operations still remains a key element in supply chain and businesses should have a good mix and match of human and AI-powered processes to ensure that businesses do not fail totally due to cybersecurity issues. Regular audits, transparency reports and collaboration and interaction with regulatory bodies can also help businesses identify any risks or threats they might not have thought of.

Collaborate

No business can operate in isolation and collaboration among supply chain stakeholders is key to ensuring better security control that align with industry standards. Collaborating with and adopting standards that initiatives such as DCSA, BIMCO, ICC DSI, and the FIT Alliance have created within the global trade, shipping, and logistics space can help shape best practices for the industry to benefit from shared knowledge.

Prevention of fraud and counterfeit

As the proliferation of counterfeit goods and brand fraud continues to pose significant risks to both consumers and brands, targeted security measures can protect consumers and businesses from this scourge.

AI combined with blockchain technology can be used to create immutable records of the origin of a product and track its journey through the value chain making it easier to verify its authenticity.

AI-powered image recognition tools can also be used to analyse products at the various points of its transit to identify discrepancies or symptoms that could indicate counterfeit items. It can flag products that do not match certain key tracking metrics etc which allows businesses to take corrective action.

CONCLUSION

AI is transforming the world we live in at an unprecedented rate, bringing great opportunities to improve efficiency, transparency, and risk management. But it also introduces new vulnerabilities that businesses need to be prepared for.

AI is here to stay and is evolving at a fast pace, and it is a given that its role in the supply chain and its security is set to grow. The challenge is not just about adopting AI, but in doing so in a responsible, secure, and strategic manner.

The key to moving forward in this domain lies in taking a balanced approach of

leveraging the strengths and benefits that AI offers while implementing robust safeguards against its risks. Businesses need to invest in cybersecurity, governance, and proactive risk management so that they are better equipped to navigate security threats if it does happen.



ABOUT THE AUTHOR

HARIESH MANAADIAR



Hariesh Manaadiar is a subject matter expert in the field of shipping, freight, logistics and trade active in the industry for over 35 years. Hariesh shares his knowledge and experience through his *Shipping and Freight Resource* which he founded in 2008. He has a *Masters in Shipping and Logistics*, is a *Fellow of the Institute of Chartered Shipbrokers*, qualified in *Digital Trade Strategy and Digital Supply Chain Management* and holds a *Diploma from the London School of Journalism*.

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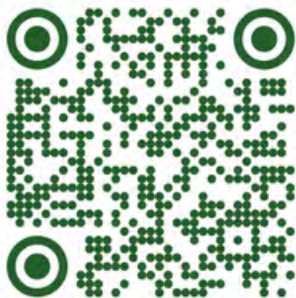
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AI as a Disruptive Technology in the Current Supply Chain Security Environment

By **Kim Winter**, Founder & Group Managing Director of
Logistics Executive Group

Artificial Intelligence (AI) has rapidly evolved from a futuristic concept into a fundamental force driving innovation across industries.

One of the most significant areas where AI is making a

transformative impact is supply chain management. In an era where supply chain security is a critical concern for global trade, AI is emerging as a disruptive technology that not only enhances operational efficiency but also fortifies

security measures against potential threats.

This article explores how AI is reshaping supply chain security, delving into its capabilities, challenges, and insights from industry experts.

THE EVOLVING LANDSCAPE OF SUPPLY CHAIN SECURITY



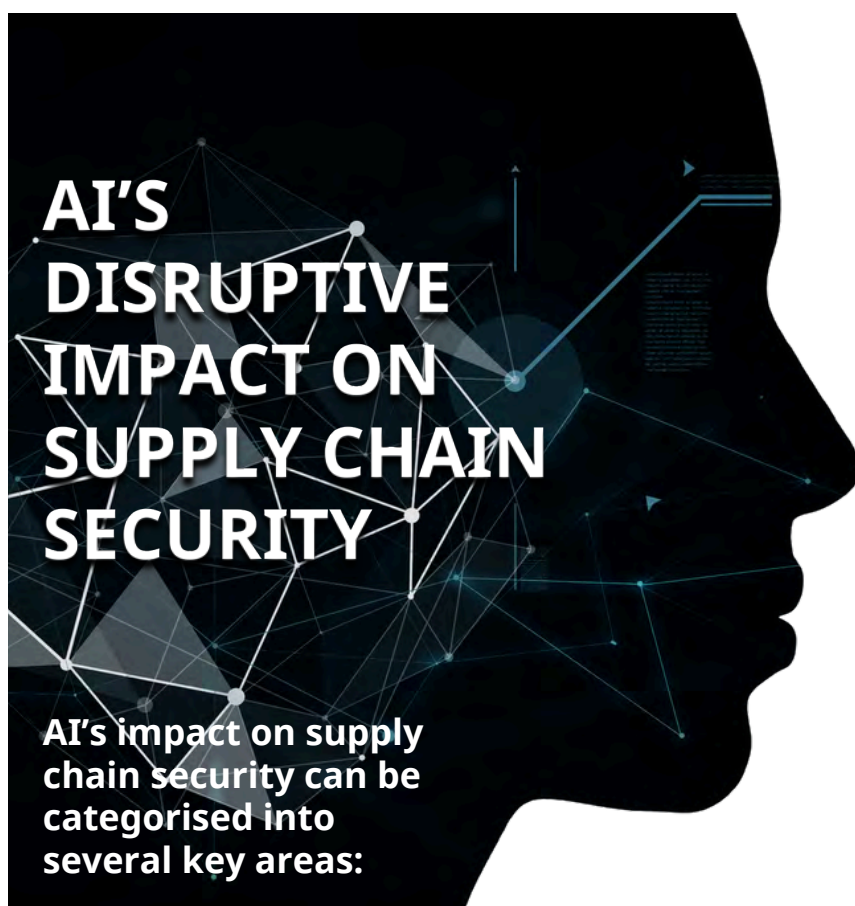
Modern supply chains are highly interconnected, spanning multiple countries and involving numerous stakeholders, including suppliers, manufacturers, logistics providers, distributors, and retailers. While this complexity allows for efficiency and scalability, it also introduces vulnerabilities that can be exploited by cyber threats, fraud, theft, and unforeseen disruptions such as geopolitical instability, pandemics, and natural disasters.

Traditionally, businesses have relied on manual oversight, historical data, and static security protocols to manage these risks. However, these conventional methods often fail to provide real-time intelligence and proactive mitigation strategies. AI is disrupting this status quo by introducing predictive analytics, real-time monitoring, and automated decision-making, enabling companies to identify and neutralise security threats before they escalate into major disruptions.

AI's ability to analyse vast amounts of structured and unstructured data allows it to detect patterns and anomalies that human operators might miss. For instance, AI-powered systems can monitor supplier reliability, flagging potential risks such as financial instability, production delays, or compliance violations.

According to Kim Winter, "AI is fundamentally altering the way organisations approach supply chain security. It provides not just automation but intelligence—helping companies foresee risks, streamline operations, and enhance overall resilience."





1. PREDICTIVE ANALYTICS AND RISK MANAGEMENT

One of AI's most powerful applications is predictive analytics, which enables organisations to anticipate potential disruptions. AI-powered models analyse historical data, weather patterns, economic conditions, political instability, and social trends to forecast possible risks.

For example, machine learning algorithms can predict supply shortages based on global economic trends, alerting procurement teams to find alternative sources before an actual disruption occurs. Similarly, AI-powered risk assessment tools can evaluate supplier reliability, reducing dependency on high-risk vendors.

2. REAL-TIME MONITORING AND INCIDENT RESPONSE

AI-powered Internet of Things (IoT) sensors and surveillance systems are transforming security measures by offering real-time tracking and monitoring of shipments, warehouses, and production facilities. These systems can:

- **Detect unauthorised access to sensitive areas.**
- **Monitor temperature-sensitive goods (such as pharmaceuticals and perishable foods) to ensure compliance with storage requirements.**
- **Send instant alerts when cargo is tampered with or diverted from its intended route.**

Additionally, AI-powered anomaly detection helps businesses identify fraudulent activities such as document forgery, payment fraud, or counterfeit goods entering the supply chain. Automated systems can flag unusual transaction patterns, preventing financial losses and reputational damage.

3. ENHANCED TRANSPARENCY THROUGH BLOCKCHAIN AND AI INTEGRATION

AI combined with blockchain technology is bringing unprecedented transparency to supply chains. Blockchain creates a tamper-proof digital ledger, ensuring that every transaction and movement within the supply chain is recorded and verifiable.

By integrating AI with blockchain, companies can automate contract verification, track product authenticity, and enhance supplier compliance monitoring. For industries such as pharmaceuticals and luxury goods, where counterfeit products pose a significant risk, this integration is crucial.

According to Kim Winter, "The convergence of AI and blockchain is revolutionising transparency in global supply chains. AI ensures data integrity, while blockchain secures that data, preventing manipulation or unauthorised access."

4. AUTOMATION OF SECURITY PROTOCOLS

AI-powered cybersecurity systems protect supply chain networks from cyber threats such as ransomware attacks, phishing attempts, and data breaches. Automated AI-powered security protocols can:

- **Identify suspicious network activities and block potential cyberattacks before they cause damage.**
- **Encrypt sensitive supply chain data to prevent unauthorised access.**
- **Automate compliance reporting, ensuring adherence to global security regulations.**

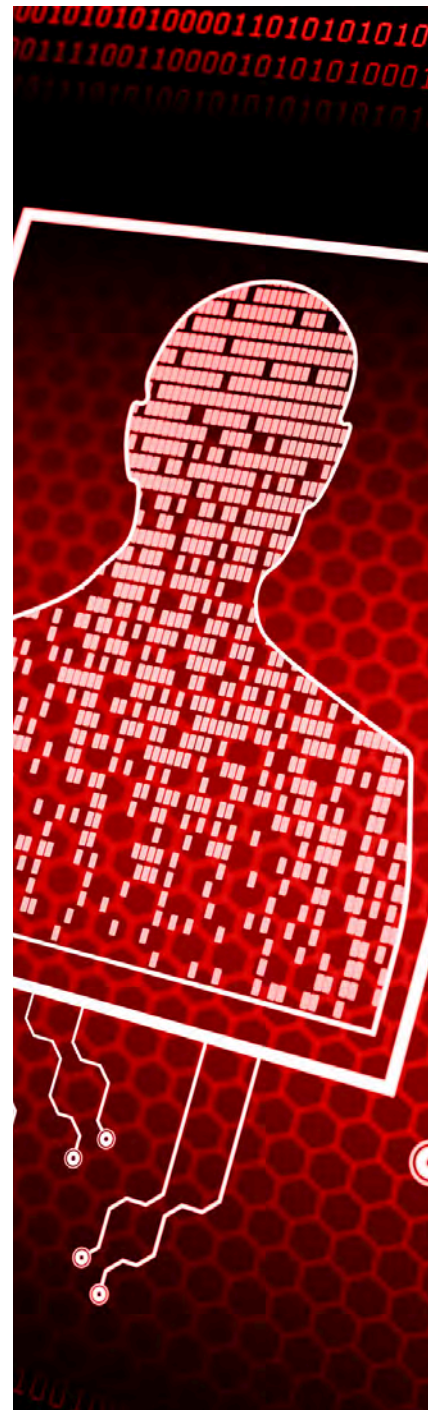
With the rise of cyber-physical threats, where digital attacks have real-world consequences (e.g., halting manufacturing lines or disrupting transportation networks), AI-powered cyber resilience strategies have become essential.

5. SUPPLY CHAIN OPTIMISATION TO REDUCE SECURITY VULNERABILITIES

AI's predictive capabilities extend beyond security; they also enhance overall operational efficiency, which indirectly strengthens security by reducing waste, delays, and vulnerabilities.

For instance, AI-powered demand forecasting ensures

that warehouses and retail outlets maintain optimal stock levels, minimising overstocking or stockouts that can lead to theft, loss, or illicit trading. Similarly, AI-powered route optimisation for freight and logistics reduces transit times and minimises exposure to security threats such as hijacking or cargo theft.





CHALLENGES IN AI ADOPTION FOR SUPPLY CHAIN SECURITY

Despite its many benefits, implementing AI in supply chain security is not without challenges:

1. DATA PRIVACY AND SECURITY RISKS

AI systems require access to vast amounts of data, raising concerns about data privacy, ethical use, and compliance with global regulations such as GDPR and CCPA. Companies must ensure that data handling practices align with international standards to prevent leaks, breaches, or misuse.

2. INTEGRATION WITH LEGACY SYSTEMS

Many companies still rely on outdated legacy systems that lack compatibility with AI-powered technologies. Transitioning to AI-powered solutions requires significant investment in IT infrastructure, system upgrades, and training.

3. SKILLS SHORTAGE AND WORKFORCE READINESS

There is a growing demand for AI and data analytics expertise in supply chain management. However, a shortage of skilled professionals remains a significant barrier to AI adoption. Companies must invest in upskilling their workforce or collaborate with AI technology partners.



4. ETHICAL AND REGULATORY CONSIDERATIONS

AI-powered decision-making must be transparent, unbiased, and aligned with ethical principles. Regulatory bodies are still catching up with the rapid advancements in AI, meaning companies must navigate an evolving legal landscape when implementing AI-powered security measures.

THE FUTURE OF AI IN SUPPLY CHAIN SECURITY

AI's role in supply chain security is set to expand further as technologies evolve, data becomes more sophisticated, and businesses continue to prioritise resilience and efficiency.

Companies that adopt AI proactively rather than reactively will be better positioned to withstand future disruptions.

Kim Winter underscores this point, stating, "The future of supply chain management lies in intelligent automation and AI-powered decision-making. Businesses that leverage these capabilities effectively will secure their operations, drive efficiency, and gain a competitive advantage."

Going forward, organisations should focus on:

- **Developing AI-powered security frameworks that align with industry best practices.**
- **Enhancing collaboration between AI providers, cybersecurity experts, and logistics professionals.**
- **Investing in AI-powered cybersecurity solutions to mitigate evolving cyber threats.**
- **Ensuring transparency and ethical use of AI in supply chain decision-making.**

CONCLUSION

AI is not just a technological enhancement; it is a strategic enabler of supply chain security. By leveraging predictive analytics, real-time monitoring, blockchain integration, and automated security protocols, AI empowers businesses to anticipate threats, protect assets, and optimize operations.

While challenges such as data security, integration complexities, and regulatory concerns remain, the long-term benefits of AI in securing supply chains far outweigh the obstacles. Organizations that invest in AI today will future-proof their operations, build resilience, and stay ahead of evolving security threats.

As Kim Winter aptly puts it: "AI is not the future—it's the present. The companies that master AI in supply chain security will lead the industry, while those that resist will struggle to keep up in an increasingly complex world."

By embracing AI's disruptive potential, businesses can strengthen supply chain security, enhance efficiency,

and drive long-term success in the global marketplace.

ABOUT THE AUTHOR

KIM WINTER



Kim Winter delivers 40 years of executive leadership experience spanning Executive Search and Recruitment, Executive Coaching, Career Transition, Corporate Advisory, Consulting & M&A, across the Supply Chain, Logistics, 3PL, e-commerce, Cold Chain, FMCG, Retail, Maritime, Aviation, Government, Resources & Industrial sectors. He is the host of the Logistics Executive TV vodcasts platform, is a regular contributor to industry media, a professional Master of Ceremonies and is frequently invited to chair / moderate international events. Kim is the co-founder & Chairman of the not-for-profit humanitarian organization Oasis Africa (www.oasisafrica.org.au) providing sustainable 'Freedom from Poverty through Education' to over 8000 mainly orphaned children in East Africa's slums.

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2025 Supply Chain Outlook

Thriving in a Landscape of Volatility and Innovation

By **Martin Hubert**, Chief Executive Officer at **Freightgate**

The supply chain industry stands on the cusp of transformative change.

As businesses navigate an era marked by market volatility, evolving consumer demands, and rapid technological advancements, the strategies they employ today will define their success tomorrow. The year 2025 promises to be a pivotal moment for logistics and supply chain management, with dynamic rate engines, artificial intelligence (AI), and diversified carrier portfolios emerging as game-changers. Here's an in-depth look at these trends and how they're shaping the future of global logistics.

ADAPTING TO VOLATILITY WITH DYNAMIC RATE ENGINES

In a world where disruptions—from pandemics to geopolitical events—have become the norm, managing freight rates has never been more complex. Retailers and importers are increasingly diversifying their carrier portfolios to mitigate risks, ensuring that service disruptions or capacity constraints with one provider don't paralyse their operations.

Dynamic rate engines are emerging as critical tools in this scenario. These systems enable real-time comparison and adjustment between contract and spot rates,

ensuring businesses can capitalise on market opportunities and avoid overpaying for logistics services.

To fully leverage dynamic rate engines, businesses need to focus on implementing advanced platforms that integrate rate management with their transportation systems. Training logistics teams to analyse and act on real-time rate data is equally essential, ensuring they can make the most informed decisions quickly. Additionally, fostering strong partnerships with freight forwarders and technology providers can help streamline the integration of these tools and maximise their potential.



THE EVOLVING LANDSCAPE OF RATE VOLATILITY AND SPOT MARKET TRENDS

Rate volatility continues to challenge the logistics landscape. In 2024, rate levels for specific origin-destination (O/D) pairs saw swings of up to 43.5%, underscoring the unpredictable nature of the freight market. Experts anticipate that 2025 will bring even greater fluctuations, with rate variances expected to exceed 2024 levels by at least 20%. This unprecedented volatility calls for advanced analytics and real-time decision-making to mitigate risk and capitalise on market opportunities.

Compounding this complexity, the nature of spot rates is evolving. Public spot rates are increasingly becoming a thing of the past as carriers shift toward requiring customer-specific authentication for accessing spot rate APIs.

This shift is prompting businesses to rethink their strategies and adopt out-of-the-box solutions to maintain access to competitive pricing.

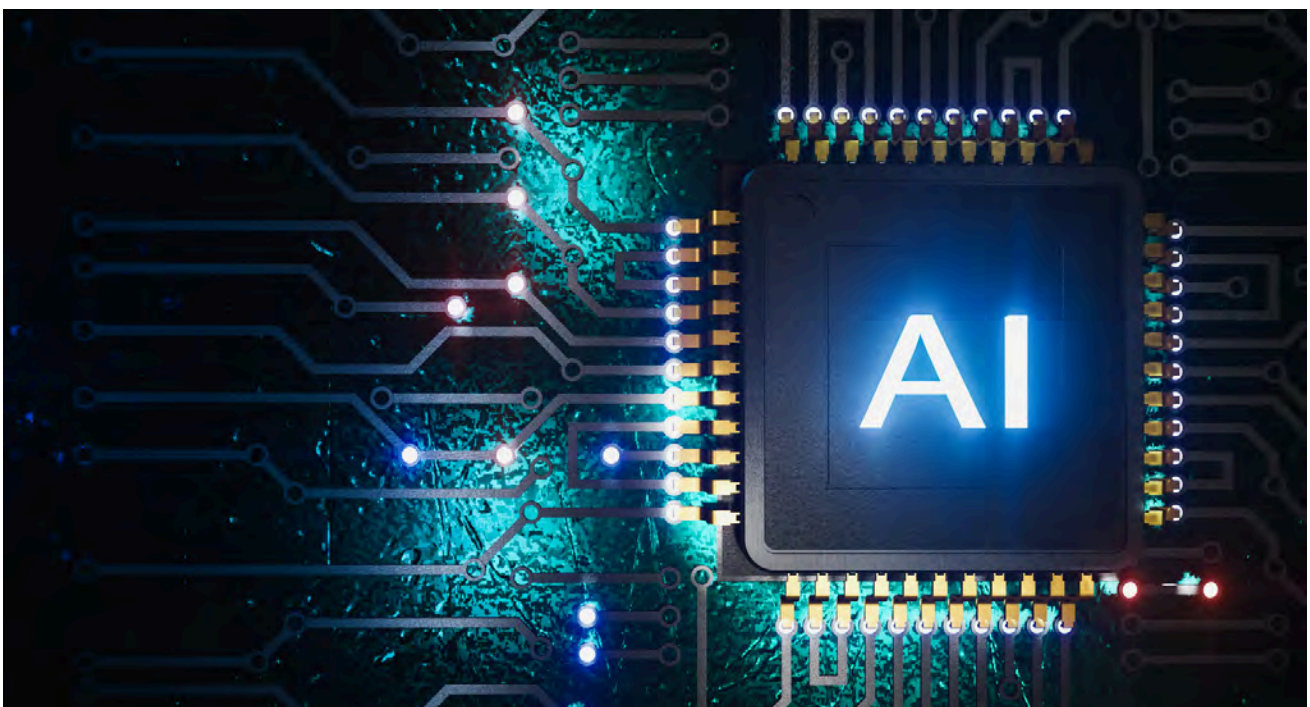
To adapt, companies need a flexible and future-ready tech stack capable of integrating seamlessly with evolving carrier technologies and API requirements. Systems with built-in adaptability will ensure businesses can navigate these changes efficiently, preserving supply chain resilience in a rapidly transforming market.

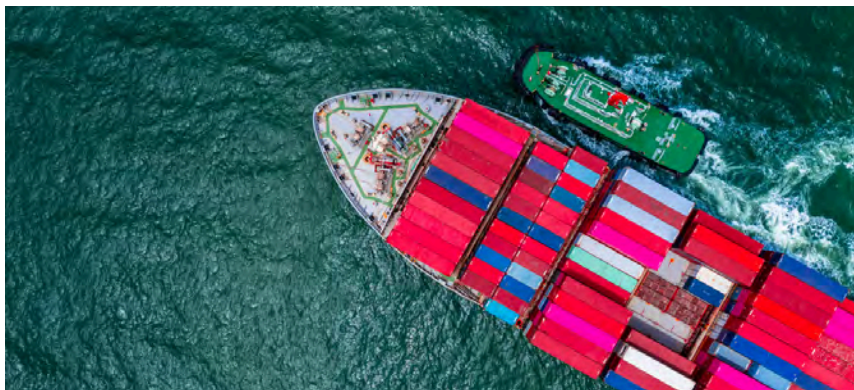
AI: A CATALYST FOR SUPPLY CHAIN TRANSFORMATION

Artificial intelligence (AI) is no longer a futuristic concept in supply chain management—it's a necessity. From predictive analytics to demand forecasting to enhanced compliance, AI is driving smarter decisions and

transforming logistics operations.

AI's power lies in its ability to enhance predictive capabilities, automate routine operations, and improve customer experiences. Businesses aiming to harness these benefits should start small, focusing on areas like demand forecasting or warehouse optimisation, which offer quick and measurable returns. Ensuring seamless integration of AI systems with existing platforms, such as TMS and ERP, is crucial to creating a unified logistics network. Lastly, prioritising employee training will empower teams to fully understand and utilise AI tools, fostering collaboration between technical and operational teams to achieve better results.





NAVIGATING COMPLEXITY WITH DIVERSIFIED CARRIER PORTFOLIOS

Diversification is no longer optional in the face of market unpredictability. Leading retailers are expanding their carrier networks to reduce dependency and enhance reliability. For instance, some companies are combining global and regional carriers with niche providers to create a flexible, resilient logistics framework.

To adapt, businesses should begin by conducting regular evaluations of their carriers, using KPIs such as reliability, cost-effectiveness, and service quality. Building strategic relationships with a variety of carriers—including global, regional, and niche providers—ensures better service coverage and flexibility in response to disruptions. Furthermore, adopting advanced routing and rate management systems enables businesses to dynamically optimise carrier selection, ensuring the best balance between cost efficiency and service quality for every shipment. The capability to seamlessly compare all-inclusive contract rates with spot rates and dynamically

assembled routing options significantly enhances supply chain resilience, empowering companies to adapt swiftly to changing market conditions.

STREAMLINING COMPLIANCE WITH AUTOMATION

As global trade grows increasingly complex, the need for accurate classification and compliance is critical. Regulations vary widely across regions, and errors can lead to costly delays or penalties. Automated systems powered by AI offer a solution, streamlining these processes and ensuring adherence to regulatory requirements.

Businesses can stay ahead in compliance by adopting AI-driven tools designed to handle classification and regulatory requirements across jurisdictions. Regular audits of compliance practices will help companies identify and address gaps, ensuring processes remain robust and up to date. Partnering with trade consultants and compliance experts further enhances adaptability, keeping businesses informed of changing regulations and equipped to handle challenges proactively.

THE FUTURE OF ROUTING: DYNAMIC ENGINES TO THE RESCUE

Routing cargo efficiently is an ongoing challenge, especially as global supply chains face persistent delays and bottlenecks. Dynamic routing engines offer a powerful solution, enabling businesses to make real-time adjustments to shipping routes based on factors like congestion, cost, and transit time.

Adapting to these new routing technologies requires businesses to integrate routing engines with their rate management platforms, creating a seamless system for cost-efficient and flexible decision-making. Real-time tracking through IoT devices ensures that data feeding into the routing engines remains accurate and actionable. Finally, businesses should develop proactive workflows for handling exceptions and disruptions, enabling quick responses to unforeseen challenges while maintaining operational continuity.





BUILDING RESILIENCE FOR 2025 AND BEYOND

The 2025 supply chain outlook highlights a clear path forward: businesses must embrace technological innovation and adapt to a volatile environment with agility. By leveraging dynamic rate engines, integrating AI, and diversifying carrier networks, companies can build resilient supply chains capable of thriving in the face of uncertainty.

Freightgate, a leader in supply chain technology, offers the tools and expertise to help

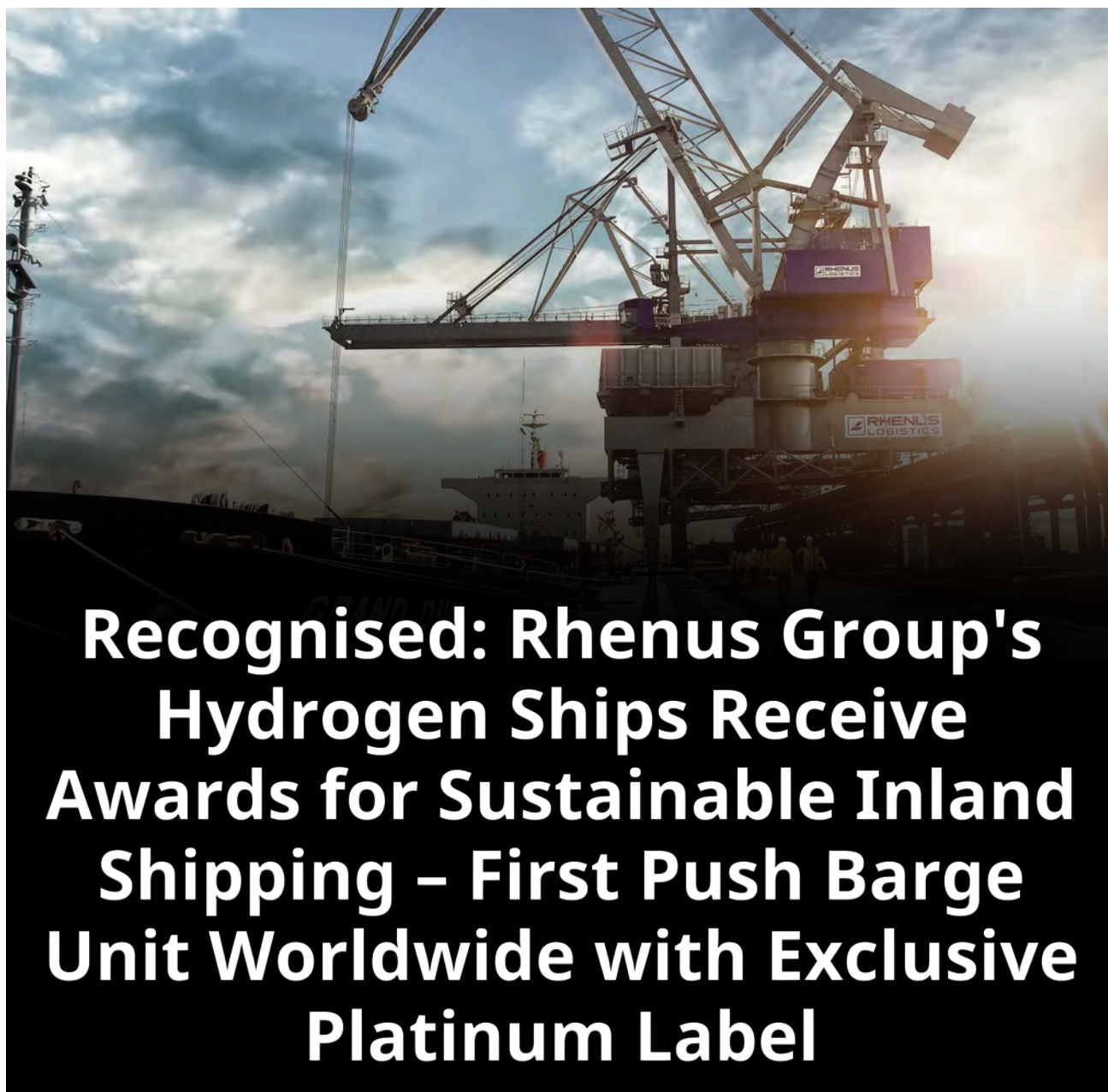
businesses navigate these complexities. From dynamic rate engines to routing optimisation and compliance management, Freightgate's innovative solutions empower companies to optimise operations, reduce costs, and enhance decision-making. As we approach this transformative year, the message is clear—those who invest in adaptability and innovation will not only survive but thrive in the future of logistics.

ABOUT THE AUTHOR MARTIN HUBERT



Martin Hubert was born in Germany, he sold his first program at age 16 and then went on and studied computer science. While at the university, he started a software company selling custom software solutions. After graduating with a Master and MBA, he did a short engagement in New York, NY, at a freight company whose president later offered him a job as Director of IT. In 1994, his independent internet quest began by founding a company that focused on providing track and trace capability through establishing EDI capabilities with carriers. He and the team spun off Freightgate in 2000 with a vision to provide a focused platform that improves life for logistics companies and shippers.

He is driven by a passion for innovation and never-ending improvements. Leading a team that strives to provide innovative logistics solutions, fostering global collaboration and productivity, while building a highly configurable platform with a global-by-design philosophy. Martin will continue to deploy technology to find smarter ways to solve today's and tomorrow's supply chain challenges.



Recognised: Rhenus Group's Hydrogen Ships Receive Awards for Sustainable Inland Shipping – First Push Barge Unit Worldwide with Exclusive Platinum Label

Rhenus is celebrating another breakthrough in sustainable shipping: the first of the company's three barges with hydrogen and battery-electric propulsion not only received the Platinum Label for environmentally friendly shipping, but was also awarded the Innovation Award for Inland Navigation by the Allianz ESA 2024 in September for sustainable concepts.

After a successful testing phase, it has been confirmed that the ship meets all construction and safety requirements and is therefore ready to start regular operations on European waterways.

The 'Mannheim I+II,' the Rhenus Group's first inland vessel with hydrogen and battery-electric propulsion, is the first push barge combination in the world to

receive the exclusive platinum label. This award has so far only been given to 19 European inland waterway vessels and underlines the outstanding innovative strength and commitment of the Rhenus Group to a sustainable future in shipping. In addition, the ship has been awarded the Green Award in the Gold category—proof of compliance with the highest environmental standards.

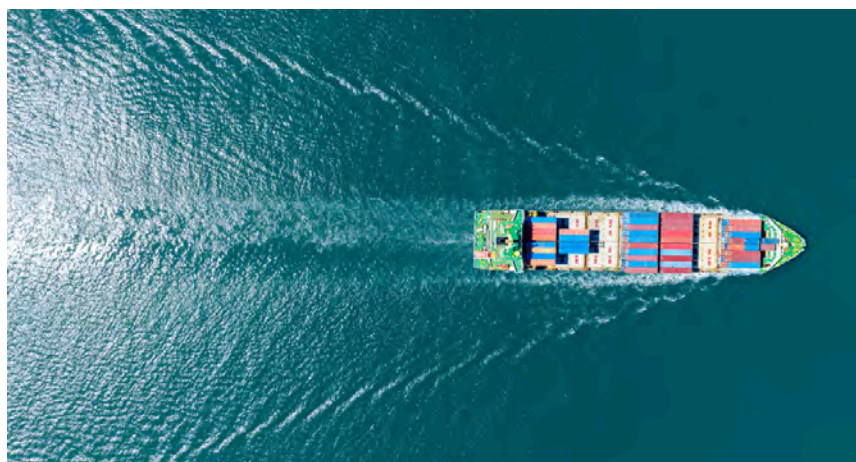
In September 2024, the Rhenus Group and its subsidiaries Rhenus PartnerShip and Contargo received an award for sustainable concepts in shipbuilding and trimodal transport. This award recognises the groundbreaking technology and the contribution to more environmentally friendly shipping in inland transport.

The 'Mannheim I+II' has successfully passed the road test after undergoing extensive trials. For example, zigzag and crash-stop manoeuvres were carried out to ensure the vessel's stability and safety. At the same time, several push barges were towed to determine the maximum tonnage of the push barge combination that the vessel is allowed to transport.

The test phase was carried out in close collaboration with the expert from Lloyd's Register, Office Rotterdam, to also meet the requirements for the approval of dangerous goods for container transport. The ship has now received a provisional certificate of registry and has started its first voyage with several containers towards the end of 2024.



The Rhenus Group is one of the leading logistics specialists with global business operations and annual turnover amounting to EUR 7.5 billion. 40,000 employees work at 1,320 business sites in more than 70 countries and develop innovative solutions along the complete supply chain. Whether providing transport, warehousing, customs clearance or value-added services, the family-owned business pools its operations in various business units where the needs of customers are the major focus at all times.





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