

support function but a combat function. Investment in logistics capability—strategic lift, prepositioned stocks, maintenance capacity, supply chain resilience, and the protection of logistics forces—is as essential as investment in combat forces. Wars cannot be won by logistics alone, but they can certainly be lost by its failure. The artery of war must flow, or the body of the army will perish.

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## **MAIN LOGISTICS PROBLEMS: NAVIGATING THE CHALLENGES OF A COMPLEX WORLD**

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Logistics is the circulatory system of the global economy, responsible for the seamless movement of goods from raw material extraction to final consumption. When this system functions smoothly, it is invisible—products appear on shelves, deliveries arrive on time, and businesses operate without interruption. When it falters, the consequences are immediate and severe: empty shelves, frustrated customers, rising costs, and disrupted production lines.

The modern logistics landscape is more complex, more demanding, and more volatile than at any point in history. Globalization has extended supply lines across continents. E-commerce has compressed delivery expectations from days to hours. Technology has created both unprecedented opportunities and novel vulnerabilities. Climate change, geopolitical instability, and demographic shifts add layers of uncertainty that challenge even the most sophisticated logistics operations. This article

identifies and analyzes the main logistics problems facing organizations today, drawing on research and industry data to illuminate both the nature of the challenges and the strategies available to address them.

### *Rising and Volatile Transportation Costs*

*The Problem* Transportation is the single largest cost component in logistics, typically accounting for 40% to 60% of total logistics expenditure (Council of Supply Chain Management Professionals, 2023). Fuel price volatility, driver wage inflation, insurance premium increases, and regulatory compliance costs have combined to place relentless upward pressure on freight rates. In the United States, business logistics costs reached \$2.3 trillion in 2022, representing 9.1% of GDP, a level not seen in decades.

The problem is not merely that costs are high, but that they are unpredictable. Spot market rates can swing dramatically in response to capacity fluctuations, natural disasters, or geopolitical events. For shippers operating on fixed budgets and contracted customer pricing, this volatility creates significant financial risk.

*The Strategic Response* Cost management requires a multi-lever approach. Network optimization studies can identify opportunities to reduce transportation distances and consolidate shipments. Strategic carrier partnerships, built on multi-year commitments and volume guarantees, provide rate stability and capacity assurance. Mode optimization—shifting freight from air to ocean, truck to rail, or parcel to less-than-truckload where service requirements permit—can yield substantial savings without compromising customer commitments.

Technology is a critical enabler. Transportation management systems (TMS) with optimization engines can reduce freight spend by 5% to 15% through improved carrier selection, load consolidation, and continuous moves that minimize empty miles (Langley et al., 2020). Real-time visibility platforms enable proactive exception management, reducing the hidden costs of expedited shipments and service failures.

### *Chronic Capacity Shortages and Labor Scarcity*

*The Problem* The logistics industry faces a structural labor shortage that threatens its ability to meet growing demand. The American Trucking Associations estimates a U.S. driver deficit exceeding 60,000 positions in 2023, with projections indicating the

gap could widen to over 160,000 by 2030 (Costello and Karickhoff, 2023). Similar shortages affect warehousing, where e-commerce growth has created insatiable demand for order pickers and packers in an already tight labor market.

The causes are demographic and cultural. The truck driver workforce is aging, with an average age approaching 50, and the industry has struggled to attract younger workers, women, and minorities. Long hours, extended periods away from home, physically demanding work, and perceptions of the profession as undesirable all contribute to recruitment and retention difficulties.

*The Strategic Response* Addressing labor scarcity demands action on multiple fronts. Compensation and working conditions must improve; industry-leading carriers have raised pay significantly and invested in driver amenities, predictable schedules, and home-time policies. Workforce development requires partnerships with vocational training programs, military transition initiatives, and diversity recruitment campaigns.

Automation offers a partial long-term solution. Autonomous trucking, while still years from widespread deployment, is progressing through trials on long-haul highway routes. Within warehouses, collaborative robots and autonomous mobile robots augment human workers, increasing productivity and reducing physical strain. Research by Gutelius and Theodore (2019) emphasizes that automation tends to change the nature of logistics work rather than eliminate it, shifting job requirements toward technical skills and system oversight.

#### *Inventory Imbalances and Demand Uncertainty*

*The Problem* Inventory management has become extraordinarily difficult in an environment of demand volatility, supply disruption, and extended lead times. The bullwhip effect—where small fluctuations in consumer demand amplify into large swings upstream—remains pervasive despite decades of supply chain research (Lee, Padmanabhan and Whang, 1997). The COVID-19 pandemic triggered the most extreme inventory cycle in modern history: panic buying emptied shelves, supply disruptions prevented replenishment, and the subsequent overcorrection has left many organizations with excess inventory that ties up working capital and risks obsolescence.

Product proliferation compounds the challenge. As companies expand SKU

counts to serve fragmented markets, demand forecasting becomes less accurate, safety stock requirements grow, and the risk of inventory write-offs increases.

*The Strategic Response* Inventory optimization requires moving from forecast-driven push to demand-driven pull. Sharing point-of-sale data and demand forecasts with upstream suppliers reduces the information distortion that causes the bullwhip effect. Postponement strategies delay product differentiation until demand is known, reducing finished goods inventory risk while maintaining responsiveness.

Advanced analytics and artificial intelligence improve demand sensing by incorporating diverse signals—weather, promotions, social media sentiment, economic indicators—that traditional time-series forecasting cannot process. Research on demand-driven supply chains demonstrates that organizations adopting these principles achieve simultaneous improvements in service levels and inventory turns, breaking the historical trade-off between the two (Chase, 2013).

#### *Last-Mile Delivery Complexity and Cost*

*The Problem* The final mile is the most expensive, congested, and operationally challenging segment of logistics. E-commerce growth has shifted delivery profiles from efficient bulk shipments to retail stores toward inefficient small-parcel deliveries to dispersed residential addresses. Failed deliveries—when recipients are unavailable—generate costly redelivery attempts and erode customer satisfaction. Urban congestion, parking scarcity, and increasing access restrictions in city centers compound the difficulty.

Last-mile delivery costs can account for up to 53% of total shipping costs in e-commerce models, making it a critical profitability lever (Joerss et al., 2016). Simultaneously, customer expectations have compressed acceptable delivery windows from days to hours, creating relentless pressure to deliver faster.

*The Strategic Response* Last-mile innovation is one of the most dynamic areas in logistics. Micro-fulfillment centers positioned in urban areas reduce the distance to the customer and enable faster delivery without long-haul transportation. Locker networks and pickup points consolidate deliveries, eliminate failed delivery risk, and reduce per-package costs. Dynamic routing and real-time communication with recipients reduce

failed deliveries and improve first-attempt success rates.

Crowd-sourced delivery platforms leverage independent contractors for flexible capacity, though questions about worker classification and service consistency remain unresolved. Autonomous delivery robots and drones are transitioning from pilots to limited commercial operations for short-distance, lightweight deliveries in controlled environments.

### *Supply Chain Disruptions and Risk Exposure*

*The Problem* Supply chain disruptions have become more frequent and more severe. Research by McKinsey found that companies experience a disruption lasting one month or longer every 3.7 years on average, with the financial impact capable of erasing an entire year's earnings (McKinsey & Company, 2022). Natural disasters, geopolitical conflicts, supplier bankruptcies, cyberattacks, and public health emergencies have all demonstrated their capacity to paralyze logistics networks.

The lean supply chain paradigm, which delivered decades of efficiency gains through inventory reduction and single-sourcing, has revealed dangerous vulnerabilities. Supply chains optimized for cost under stable conditions proved brittle when conditions became unstable. The concentration of critical manufacturing in limited geographic regions created single points of failure that affected entire global industries when those regions went offline.

*The Strategic Response* Resilience has become a board-level priority. Supply chain mapping beyond tier-one suppliers reveals hidden dependencies and concentrations of risk. Supplier diversification, while carrying higher procurement costs, eliminates single-point-of-failure exposure. Regionalization and near-shoring shorten supply lines and reduce vulnerability to long-distance logistics disruptions.

Buffer strategies have evolved from simple safety stock toward more sophisticated approaches. Strategic inventory positioning places buffers at decoupling points where demand and supply uncertainty meet. Multi-sourcing strategies maintain relationships with backup suppliers who can scale up quickly when primary sources fail. Research by Pettit, Fiksel and Croxton (2010) on supply chain resilience emphasizes that the goal is not merely resistance to disruption but the capacity for rapid

recovery.

### *Technology Integration and Data Fragmentation*

*The Problem* Logistics generates vast quantities of data, but much of it remains siloed within functional systems that do not communicate effectively. Warehouse management systems, transportation management systems, enterprise resource planning platforms, and customer-facing systems often operate on separate databases with incompatible data formats. The result is fragmented visibility, delayed decision-making, and manual workarounds that consume time and introduce errors.

Legacy technology infrastructure compounds the challenge. Many logistics organizations operate on systems implemented over decades, creating complex and brittle architectures that resist integration and slow innovation. Research on logistics information systems identifies data integration as the primary barrier to achieving the end-to-end visibility that advanced analytics and automation require (Barratt and Oke, 2007).

*The Strategic Response* Cloud-based platforms reduce integration complexity by providing standardized architectures and application programming interfaces that enable real-time data exchange. Control towers aggregate data from disparate systems into unified dashboards, enabling proactive exception management and cross-functional coordination.

Digital twins—virtual replicas of physical supply chain networks—enable simulation and optimization in a risk-free environment, allowing organizations to stress-test their logistics networks against various disruption scenarios. Investment in data governance, master data management, and cybersecurity is a prerequisite for these advanced capabilities to deliver on their promise.

### *Sustainability and Environmental Compliance*

*The Problem* Logistics is a significant contributor to greenhouse gas emissions, accounting for approximately 8% of global CO<sub>2</sub> emissions, with road freight representing the largest share (International Transport Forum, 2023). Urban logistics generates not only carbon emissions but local air pollution, noise, and congestion. Packaging waste, particularly from e-commerce, has reached crisis proportions in many

regions.

Regulatory pressures are intensifying rapidly. Emission standards for heavy trucks, low-emission zones in cities, carbon pricing mechanisms, extended producer responsibility for packaging, and mandatory sustainability reporting are reshaping the operating environment. Companies that fail to address logistics sustainability face not only regulatory risk but reputational damage and potential exclusion from customers' sustainable procurement requirements.

*The Strategic Response* Fleet electrification is the most prominent sustainability strategy, with major logistics operators committing to zero-emission delivery fleets. For long-haul trucking, where electrification remains technically challenging, alternative fuels—hydrogen, biofuels, and renewable natural gas—provide lower-carbon options.

Efficiency improvements remain the most cost-effective near-term strategy. Load consolidation, route optimization, modal shift from road to rail, reduced empty miles, and driver eco-training all reduce both carbon emissions and operating costs—a rare alignment of environmental and commercial incentives. Circular logistics models, including reusable packaging, product recovery, and recycling logistics, address both waste reduction and resource efficiency objectives.

#### *Reverse Logistics Complexity*

*The Problem* Product returns have become a massive logistics burden, particularly in e-commerce where return rates average 15% to 30% compared to 8% to 10% for brick-and-mortar retail (Statista, 2023). Each returned item must be transported, received, inspected, sorted, and dispositioned—processes that are often more labor-intensive and less automated than forward logistics.

The environmental and financial costs are substantial. Returns transportation adds to carbon footprints without generating revenue. Many returned products cannot be resold as new, leading to markdowns, liquidation, or disposal. Reverse logistics networks are often poorly optimized compared to forward networks, creating inefficiencies and delays.

*The Strategic Response* Prevention is the most cost-effective strategy. Improved product descriptions, sizing accuracy tools, and customer reviews reduce returns driven

by inaccurate expectations. Quality improvement at source reduces defect-driven returns.

For returns that cannot be prevented, efficient reverse logistics processes are essential. Centralized returns centers with specialized processing capabilities, partnerships with secondary-market and liquidation channels, and technology for rapid inspection and grading all improve recovery value. Research on consumer returns behavior confirms that a frictionless returns experience increases purchase likelihood, making reverse logistics a customer acquisition investment as well as an operational necessity (Janakiraman, Syrdal and Freling, 2016).

### *Geopolitical Instability and Trade Disruption*

*The Problem* Logistics networks span a geopolitically turbulent world. Trade disputes, sanctions regimes, armed conflicts, and protectionist policies disrupt established trade lanes and create compliance burdens. The war in Ukraine, tensions in the South China Sea, instability in the Middle East, and the fragmentation of global trading relationships all inject uncertainty into logistics planning.

Customs and border procedures add friction to cross-border logistics. Post-Brexit trade between the United Kingdom and European Union has demonstrated how regulatory divergence creates paperwork burdens, delays, and costs that previously did not exist. Companies operating global supply chains must navigate a labyrinth of trade agreements, tariffs, export controls, and sanctions compliance.

*The Strategic Response* Supply chain diversification is the primary geopolitical risk mitigation strategy. The "China plus one" approach—maintaining Chinese sourcing while developing alternative supply bases—has gained traction as companies seek to reduce dependence on single countries. Near-shoring and friend-shoring locate supply sources in geopolitically aligned countries to reduce risk exposure.

Customs expertise and trade compliance capabilities have become essential logistics functions. Automated customs clearance systems, free trade agreement utilization programs, and proactive engagement with customs authorities reduce border delays and compliance risks. Scenario planning capabilities that model the logistics implications of various geopolitical developments enable faster response when

disruptions occur.

*Conclusion: Problems as Catalysts for Progress* The main logistics problems of the present era are interconnected challenges that demand integrated solutions. Rising costs, labor shortages, inventory volatility, last-mile complexity, disruption risk, technology fragmentation, sustainability pressures, reverse logistics burdens, and geopolitical instability do not exist in isolation. They interact, compound, and sometimes conflict. The solution to one problem—increasing inventory to buffer against disruption—may exacerbate another—rising carrying costs and obsolescence risk.

Navigating this complexity requires leadership that combines operational excellence with strategic foresight. It requires investment in both technology and people, in both efficiency and resilience, and in both competition and collaboration. The problems are real and formidable, but they are also catalysts for the innovation that separates logistics leaders from logistics laggards. In a world of accelerating change, the capacity to solve logistics problems is not merely an operational competency—it is a strategic advantage that defines organizational success.

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## **GLOBAL LOGISTICS PROBLEMS: NAVIGATING A WORLD IN TURMOIL**

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Global logistics is the connective tissue of the world economy. It spans oceans and continents, links thousands of suppliers to millions of consumers, and enables the international trade that has lifted billions from poverty and transformed how humanity lives and works. Yet the very scale and complexity that make global logistics so powerful also make it profoundly vulnerable. When disruptions occur—and they are occurring with unprecedented frequency—they cascade across borders, industries, and economies with speed and severity that can paralyze commerce and destabilize societies.

The past five years have delivered a relentless barrage of shocks to global logistics networks. A pandemic that closed factories and ports. A container ship wedged across the Suez Canal. A war in Europe's breadbasket. Attacks on commercial shipping in the Red Sea. Trade disputes between the world's largest economies. Climate-driven extreme weather events disrupting transport corridors. Each event, examined in isolation, appears as an unfortunate contingency. Viewed collectively, they represent a new normal of systemic fragility that demands a fundamental reassessment of how global logistics is designed, managed, and governed.