

GLOBAL TRENDS AND SHIFTS IN THE LOGISTICS SECTOR

ALC

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INTRODUCTION

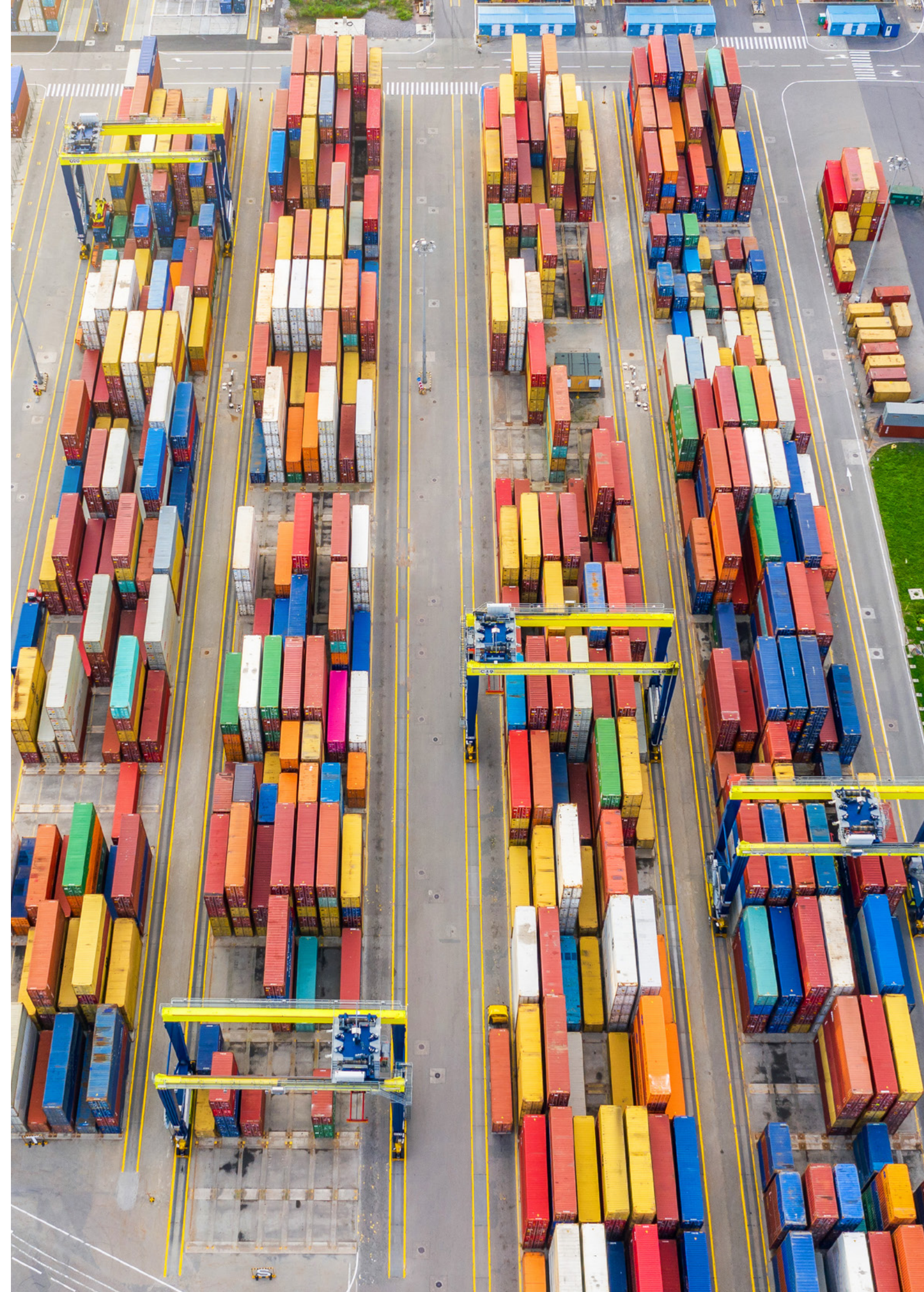
Global logistics is undergoing a structural reset. The sector has long been organized around efficiency, scale and global cost optimization, but this model is increasingly exposed to a more unstable environment. Trade tensions, geopolitical disruptions, climate-related constraints and changing demand patterns are making logistics systems more difficult to plan, operate and secure.

This shift is not simply the result of temporary crises. It reflects a deeper reconfiguration of global supply chains, where concentration risks, long-distance dependencies and static network designs are being reassessed. Globalization is not disappearing, but its logistics architecture is evolving toward more diversified sourcing bases, regional corridors and integrated logistics ecosystems.

Transformation is materializing through both digital and physical changes. On the digital side, AI, advanced analytics, IoT, digital twins and freight platforms are improving visibility, forecasting and operational coordination. On the physical side, nearshoring, mega hubs, multimodal ecosystems and green corridors are reshaping the geography of logistics flows.

At the same time, sustainability is becoming embedded into logistics strategy. Decarbonization increasingly affects fleet choices, infrastructure planning, corridor development and customer requirements. As a result, logistics transformation is no longer limited to operational efficiency, but increasingly involves resilience, environmental performance and system-wide coordination.

This paper analyzes the forces reshaping global logistics, the ways in which transformation is materializing, and the lessons emerging from early movers. Its central perspective is that the next phase of logistics will be defined by the ability to connect infrastructure, technology, data, governance and market demand into coherent and adaptable systems.



THE FORCES RESHAPING GLOBAL LOGISTICS

A more volatile and fragmented global environment

Global disruptions are increasing in both frequency and intensity. Pandemics, geopolitical tensions, trade fragmentation, and climate-related events are reshaping logistics performance.

The COVID-19 crisis exposed the limits of traditional systems. Container imbalances, port congestion, and capacity shortages revealed structural weaknesses.

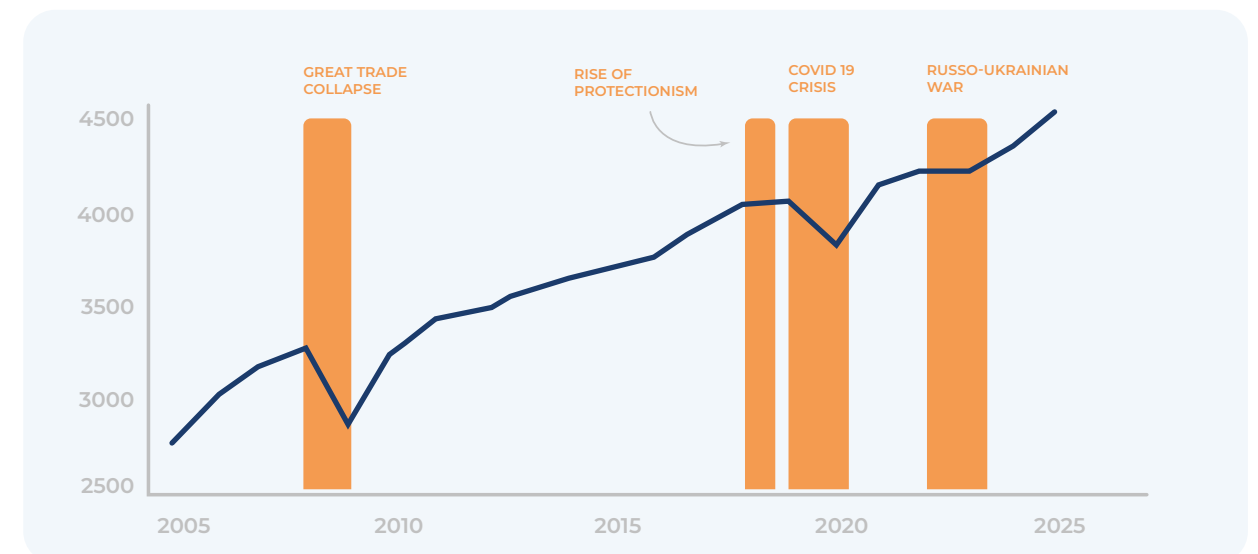
More recently, disruptions have continued to multiply:

- ◆ Trade tensions between major economies
- ◆ Conflicts affecting key maritime routes
- ◆ Climate constraints on critical infrastructure

These events are no longer exceptional, they are becoming structural features of the system and are even reflected on the traded volumes' evolution.



Major disruptions and their impact on global trade volume since 2005 (index 1950 = 100)



Source: WTO

At the same time, the sector is moving away from the previous phase of hyper-globalization, which was largely built around highly concentrated manufacturing networks and long-distance supply chains. China remains central to global manufacturing, accounting for around 27% of global manufacturing value added in 2025¹, but recent shocks have exposed the risks of excessive concentration in a limited number of production geographies. This does not mean the end of globalization, but rather a reconfiguration of globalization.

¹World Bank. Manufacturing. Value added (2025)

Rising complexity and speed of operations

Supply chains have become structurally more complex. They involve multi-tier sourcing, globalized production, and increasingly interdependent nodes.

At the same time, demand patterns have accelerated e-commerce expansion, shortened delivery expectations, and increased shipment fragmentation. Logistics systems are now required to operate faster, with greater variability, and with limited tolerance for errors.

Traditional planning tools are struggling to adapt. Static models are no longer suited to dynamic and fragmented networks.



Sustainability as a structural constraint

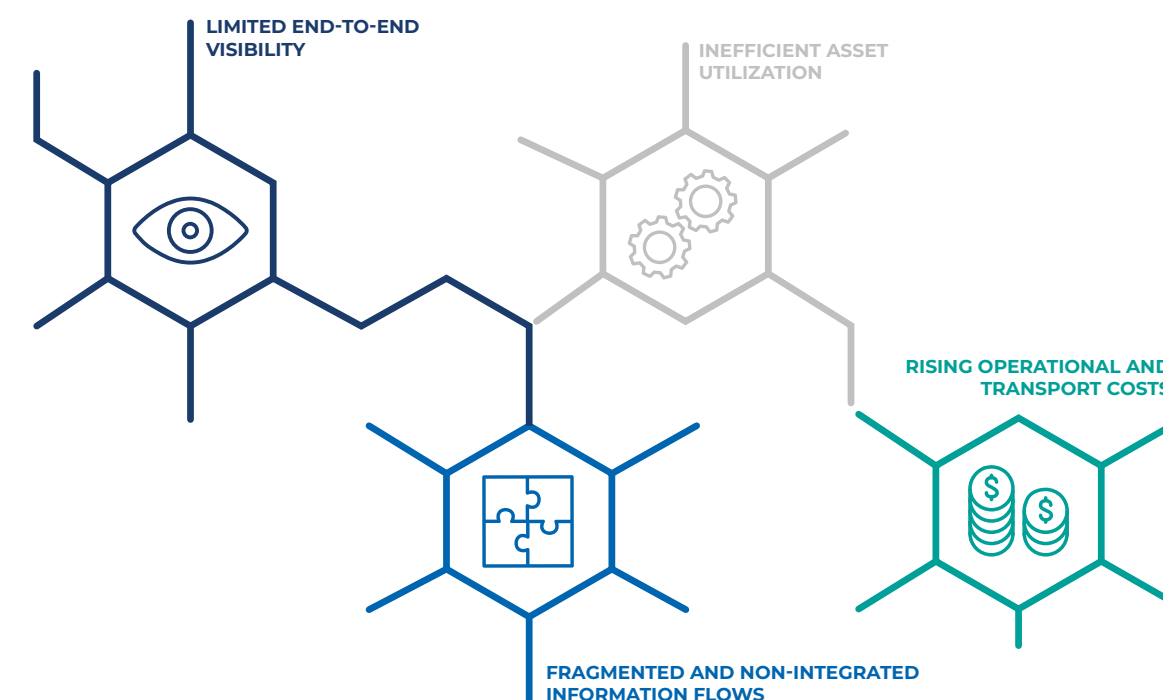
In parallel, environmental pressure is becoming a central constraint for the logistics sector. Freight transport represents a significant share of global emissions, accounting for a substantial portion of CO₂ emissions within the transport sector.

Regulators, investors, and customers are accelerating the transition toward sustainable practices like carbon pricing mechanisms, emissions standards, and ESG-driven investment strategies

Decarbonization is no longer a compliance objective, it is becoming a condition for long-term competitiveness.

A system reaching its operational limits

The combined effect of volatility and complexity is pushing logistics systems to their limits. Several structural inefficiencies are becoming more visible:



At the same time, capacity constraints are emerging in key nodes such as ports and terminals, cross-border corridors and urban last-mile networks. The system is increasingly misaligned with current operating conditions.

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A turning point for the logistics sector

These dynamics are converging and redefining the foundations of global logistics. Volatility is becoming more recurrent, supply chains are becoming more complex, and sustainability constraints are increasingly shaping investment and operational decisions. At the same time, the previous model of highly globalized, cost-optimized supply chains is being challenged by the need for greater resilience, diversification, and proximity to end markets.

This does not imply a reversal of globalization, but rather a reconfiguration of how global flows are organized. Logistics systems are progressively moving away from linear, highly concentrated networks toward more regionalized, connected, and adaptive structures. In this new environment, the ability to anticipate disruptions, coordinate multiple actors, and adjust networks dynamically is becoming a central source of competitiveness.

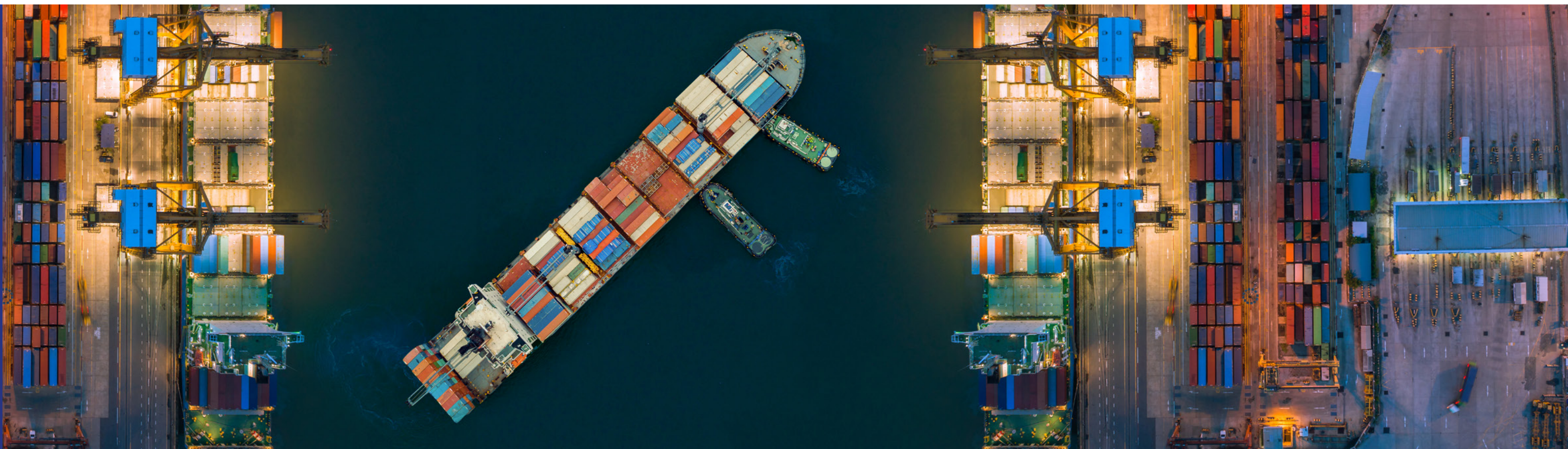
The logistics sector is therefore approaching a structural turning point. Its future performance will depend less on scale and cost efficiency alone, and more on the capacity to combine resilience, visibility, flexibility, and environmental performance within integrated logistics systems.

HOW TRANSFORMATION IS MATERIALIZING

The transformation affecting the logistics sector results from the convergence of multiple forces acting simultaneously across operations, infrastructure, and strategic positioning.

These transformations can be broadly grouped into two complementary dimensions.

- ◆ Soft transformations are reshaping how logistics systems operate, driven by digitalization and new organizational models.
- ◆ Hard transformations are physically reconfiguring supply chains, infrastructure, and trade flows.



Digitalization and the rise of data-driven logistics

This set of transformations is rooted in the growing availability and accessibility of digital technologies. Artificial intelligence, cloud computing, and advanced analytics are becoming increasingly integrated into logistics operations. These technologies enable a transition from reactive management to predictive and prescriptive decision-making. Logistics systems are evolving toward models where demand is anticipated rather than observed, routes are dynamically optimized, and inventory is continuously adjusted in real time.

This shift is not only improving efficiency but is fundamentally changing how decisions are made across the supply chain.

AI-DRIVEN MARITIME LOGISTICS (MAERSK)

Maersk's AI-driven maritime logistics illustrates the use of predictive analytics to anticipate equipment failures up to three weeks in advance, with reported accuracy of around 85%.

The system supports predictive maintenance and operational planning, contributing to a 30% reduction in downtime.

Reported impacts include more than USD 300 million in annual savings and around 1.5 million tons of CO₂ emissions avoided.



At the same time, infrastructure itself is becoming increasingly connected. The deployment of sensors, IoT devices, and digital twins is transforming physical assets into data-generating systems. A digital twin is a virtual replica of a physical asset, infrastructure, or logistics system, continuously fed by operational data to monitor performance, simulate scenarios, and support decisions before acting in the real world. Ports, terminals, and logistics platforms can now simulate operational scenarios before execution, identify bottlenecks in real time, or optimize asset utilization continuously.



DIGITAL TWIN IN PORT OPERATIONS (SINGAPORE)

Singapore's port digital twin illustrates the use of connected infrastructure, integrating thousands of sensors and operational data streams into a real-time simulation environment.

The system enables port operators to simulate disruptions such as adverse weather, congestion or equipment failure before they affect operations.



It supports operational optimization, with reported reductions of around 20% in ship turnaround time and significant avoidance of multi-million-dollar operational losses.

As a result, visibility is becoming a central pillar of logistics performance.

Platformization and the reorganization of market structures

Beyond internal optimization, digitalization is also reshaping how market participants interact. The emergence of digital freight platforms and logistics marketplaces is addressing long-standing inefficiencies.

Historically, the sector has been characterized by fragmentation, limited transparency, and information asymmetry. Platform-based models introduce a different logic that enables real-time matching of supply and demand, increase pricing transparency, and reduce idle capacity.

DIGITAL FREIGHT MARKETPLACE (TRANSPOREON)

Transporeon illustrates the shift toward digital freight marketplaces, using a two-sided model that provides free access for shippers and a subscription-based model for carriers.

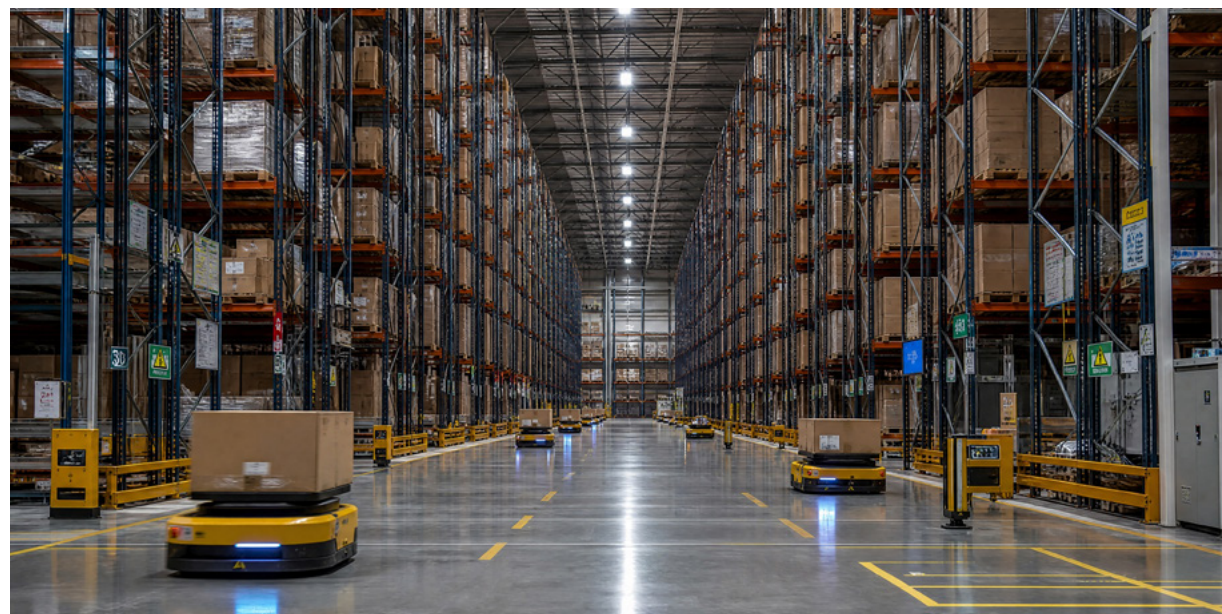
The platform supports more efficient transport allocation, with reported transport cost savings of up to 10%.

It also contributes to better asset utilization, with empty runs reduced by up to 13%².



Over time, this is leading to a gradual transition from bilateral, relationship-based contracting to dynamic, data-driven ecosystems. This transformation does not remain limited to transactions, it also influences the spatial organization of logistics activities, affecting the location of consolidation centres, cross-docks, and urban hubs.

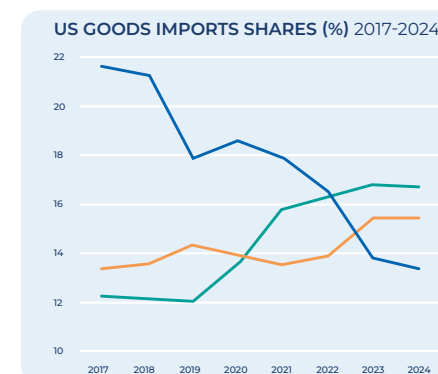
²Transporeon, Fact sheet Transport execution (2025)



Reconfiguration of global supply chains

In parallel to digital changes, structural transformations are reshaping the geography of logistics systems. Recent disruptions have exposed the risks associated with highly concentrated supply chains. In response, companies are increasingly prioritizing resilience, flexibility, and risk diversification.

This has led to the acceleration of strategies such as nearshoring and reshoring. Production and distribution networks are being reorganized closer to end markets or within regional clusters.



USA IMPORTS NEARSHORING TO MEXICO

China's share of U.S. goods imports has structurally declined, falling from a peak of 21.6% in 2017 to 13.4% in 2024, indicating a gradual reduction in U.S. import dependence on China.

Mexico has gained relative weight in U.S. sourcing, becoming the largest source of U.S. goods imports in 2023 and accounting for 15.5% of U.S. goods imports in 2024³.

The shift is not only toward Mexico but toward a more diversified regional and allied sourcing base, with imports from alternative Asian manufacturing hubs also increasing, reflecting broader supply chain diversification rather than a simple one-to-one replacement of China.

This movement is not uniform and varies by sector, cost structure, and geopolitical considerations. However, the overall direction is clear: global supply chains are becoming shorter, more regionalized, and more diversified.

³Federal Reserve Bank, China remains modest player in U.S.-Mexico trade despite growing scrutiny (2025)

The rise of logistics mega hubs and integrated ecosystems

At the same time, logistics networks are becoming more concentrated around high-capacity nodes. Ports, airports, and multimodal platforms are evolving into integrated logistics ecosystems. These hubs combine infrastructure, industrial activity, and logistics services within a single coordinated environment.

This concentration is driven by economies of scale and the need to handle increasingly complex flows. Large hubs enable higher throughput, facilitate multimodal integration, and improve connectivity with hinterlands.

However, their performance depends on more than their size. Connectivity, governance, and integration with regional networks are critical success factors.

This dynamic is reshaping not only trade routes, but also regional economic structures and industrial location patterns.

JEBEL ALI INTEGRATED PORT-FREE ZONE-AIRPORT ECOSYSTEM (DUBAI, UAE)

Jebel Ali is a benchmark integrated logistics ecosystem, combining Jebel Ali Port with Jebel Ali Free Zone (Jafza) and nearby logistics / industrial zones south of Dubai, with Dubai South and Al Maktoum International Airport (DWC) providing a complementary air-cargo and logistics platform.



Jebel Ali Port forms the backbone of the ecosystem, with 15.5 million TEUs handled in 2024, while Jafza strengthens its role as an integrated logistics and industrial hub, hosting more than 11,000 businesses around the port⁴.

Dubai Aviation Engineering Projects states that the logistics district of Dubai South is ultimately planned to support up to 12 million tons of air cargo⁵.

Jebel Ali illustrates the mega-hub model through the concentration of several logistics functions in one area: a major maritime gateway, a large free zone, industrial and logistics activities, airport connectivity, customs-related services, and multimodal links within a single trade ecosystem.

⁴DP World, DP World Records Highest Cargo Volumes At Jebel Ali Port Since 2015 (2025)

⁵DAEP, Logistics District (2025)

Decarbonization as a system-wide transformation

Environmental constraints are reinforcing and accelerating these structural changes. Decarbonization is no longer a parallel initiative: it is becoming embedded in infrastructure planning, fleet design, and supply chain strategy.

This transition affects all layers of the logistics system:

- ◆ Fleet renewal and alternative fuels
- ◆ Modal shift toward rail and maritime solutions
- ◆ Energy-efficient infrastructure and buildings

It also influences investment decisions and competitive positioning. Access to low-carbon corridors and certified green logistics solutions is becoming a differentiating factor for both operators and regions.

However, the transition is uneven across geographies. Regions with access to renewable energy, supportive policy frameworks, and financing capacity are moving faster.

TRANS-PACIFIC GREEN CORRIDOR (LOS ANGELES – SHANGHAI)

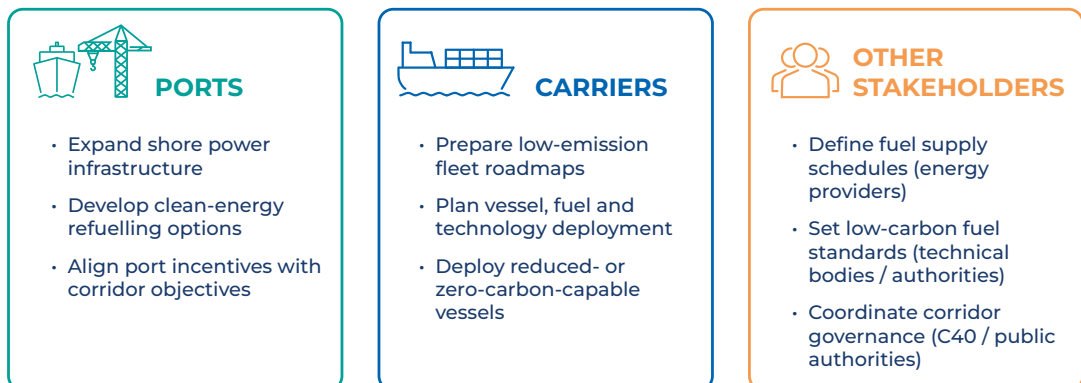
Voluntary partnership designed to decarbonize maritime trade flows between Los Angeles, Long Beach and Shanghai, one of the busiest trans-Pacific container routes.

Jointly led by the Port of Los Angeles, Port of Long Beach and the Shanghai Municipal Transportation Commission, with C40 Cities acting as facilitator.

Involves major shipping lines including CMA CGM, COSCO Shipping Lines, Maersk and ONE, with participation from cargo owners and technical stakeholders.

Launched in January 2022, followed by an Implementation Plan Outline in September 2023 and a first Annual Progress Report in October 2024.

The corridor aims to demonstrate the feasibility of zero-lifecycle-carbon container shipping by 2030.⁶



The Port of Los Angeles is also developing green shipping corridor MOUs with Singapore, Japanese ports (Nagoya, Tokyo, Yokohama), Guangzhou ports (China) and Vietnamese ports (Long Son, Nam Do Son), while the LA-Long Beach-Shanghai corridor is already more advanced, with an implementation plan published.⁷

⁶The Port of Los Angeles, Implementation Plan outline for first Trans-Pacific Green Shipping Corridor (2023)

⁷The Port of Los Angeles, Green Shipping Corridors (n.d.)

LESSONS LEARNED FROM TRANSFORMATION LEADERS

The first wave of logistics transformation provides an important conclusion: the sector is not being reshaped by technology alone. The most advanced players are not those that simply adopted artificial intelligence, digital twins, platforms, green fuels, or larger infrastructure first. They are those that managed to translate these tools into operational performance, organizational change, and network-level integration.

The experiences observed across AI-driven supply chains, connected infrastructure, digital marketplaces, decarbonization initiatives, nearshoring strategies, and mega-hub development reveal a common pattern. Transformation delivers value when it is built around real operational constraints, supported by reliable data, embedded into decision-making processes, and scaled through the wider logistics ecosystem. When these conditions are absent, initiatives tend to remain isolated pilots, with limited impact on cost, resilience, service quality, or emissions performance.



Technology adoption must start from operational relevance

A first lesson is that logistics transformation should begin with clearly identified operational problems, not with technology selection. The most successful digital initiatives have targeted pain points that are measurable and directly linked to performance: vessel downtime, congestion, empty runs, poor asset utilization, inventory volatility, or limited visibility.

In AI-driven supply chains, for example, predictive maintenance and dynamic routing generate value because they address tangible inefficiencies. Similarly, digital twins in ports and terminals are effective when they help operators anticipate bottlenecks, simulate disruptions, or adjust resources before congestion materializes. In both cases, technology is not an end in itself. It becomes valuable because it improves specific decisions in complex, time-sensitive environments.

01 >>**Pilot initiative****02** >>**Focused operational use case****03** >>**Measured performance improvement****04** >>**Process redesign and adoption****05** >>**System-wide integration****06** >>**Network-level optimization**

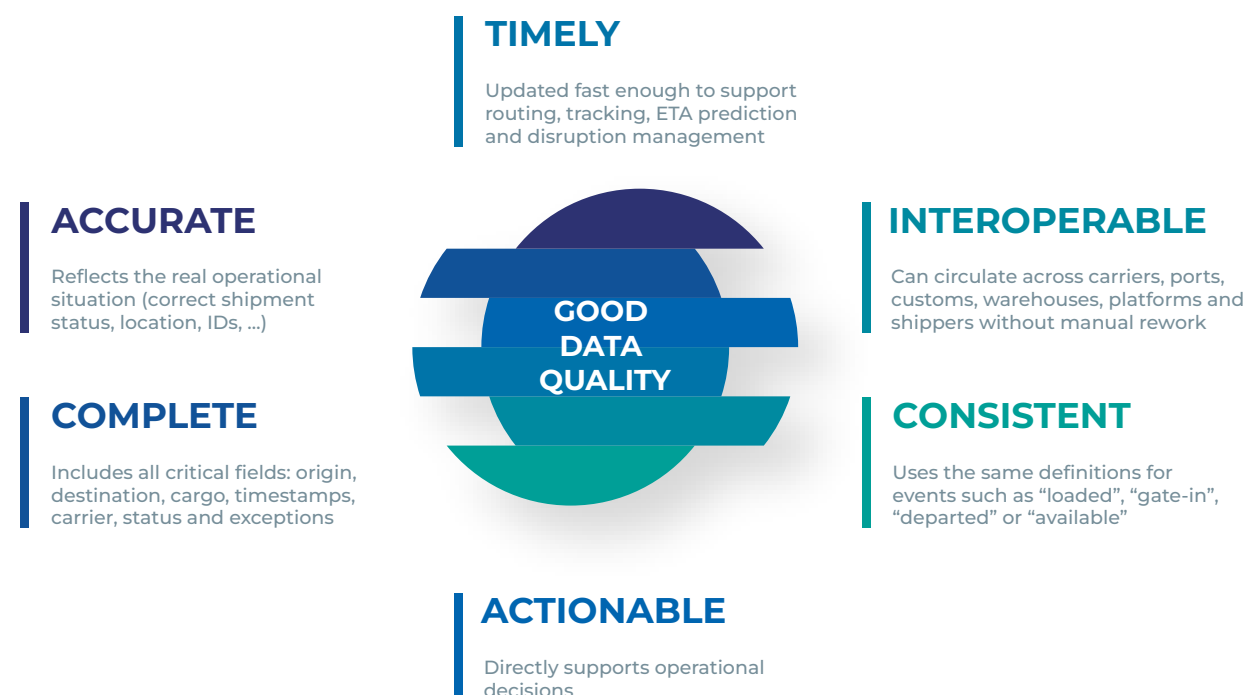
This explains why focused use cases often outperform broad transformation programs. Early adopters tend to start with areas where the operational problem is sufficiently defined, and the impact can be measured. Predictive maintenance, demand forecasting, inventory optimization, berth planning, yard management, or cargo tracking are typical entry points. These applications provide proof of value before wider deployment.



Data quality is becoming a core performance factor

A second lesson is the decisive role of data. Artificial intelligence, predictive analytics, digital twins, and marketplace platforms all depend on the availability of reliable, structured, and interoperable data. In logistics, where operations involve multiple assets, locations, transport modes, subcontractors, and authorities, data fragmentation remains one of the main barriers to transformation.

Poor data quality limits the accuracy of forecasts, reduces trust in algorithmic recommendations, and prevents real-time visibility across the chain. Conversely, strong data governance allows operators to move from reactive management to predictive and prescriptive decision-making. This is particularly relevant for AI-driven supply chains, where the value of optimization depends on the consistency of the data architecture behind it.



The same applies to digital twins. Their value increases when they are connected to live operational systems and continuously updated. A digital twin used as a one-off simulation tool can support punctual analysis, but its strategic value remains limited. Its full potential emerges when it becomes part of regular planning, maintenance, disruption management, and infrastructure investment decisions.

Organizational change is as important as technological capability

Transformation leaders also show that logistics innovation is not only a technical exercise. It requires changes in processes, decision rights, skills, and performance management. Logistics remains a highly operational sector, where technology must be adopted by planners, drivers, port operators, warehouse teams, dispatchers, commercial teams, and management.

PREDICTIVE SYSTEMS TO GENERATE IMPACT

Users must trust the recommendations and adapt their workflows accordingly

DIGITAL TWINS TO IMPROVE OPERATIONS

Simulation outputs must influence planning and resource allocation

PLATFORMS TO SCALE

Shippers and carriers must accept new ways of matching capacity, managing service quality, and resolving disputes

This means that change management is not a secondary component of transformation. It is a central condition for value capture. Successful initiatives typically combine technology deployment with training, process redesign, cross-functional teams, and new governance mechanisms. The organizations that benefit most are those that treat logistics transformation as an operating model change rather than an IT project.

Interoperability determines whether local gains become a system-wide impact

Many logistics innovations generate limited value because they remain isolated. A digital solution deployed in a terminal, warehouse, customs system, or transport fleet can improve local performance, but logistics efficiency is ultimately created across networks. The critical issue is therefore not only whether a solution works, but whether it connects with other systems, actors, and modes.

This is especially important in ports, trade corridors, multimodal networks, and cross-border logistics. A digital twin has stronger value when it integrates information from shipping lines, terminals, road and rail operators, customs authorities, and inland logistics nodes. A marketplace becomes more powerful when it connects with transport management systems, carrier databases, port systems, and payment or documentation processes.

The broader lesson is that logistics transformation needs to be designed at system level. Isolated optimization can reduce inefficiencies in specific nodes, but interoperability enables network-wide performance gains.



Decarbonization requires a system approach

A further lesson from early movers is that decarbonization cannot be effectively addressed through isolated measures. In logistics, emissions are embedded across fleets, fuels, infrastructure, routing, warehousing, asset utilization, and modal choices. As a result, one-dimensional initiatives often generate limited impact.

The most effective approaches combine several levers: fleet renewal, energy transition, operational efficiency, modal shift, green corridors, low-carbon infrastructure, and emissions reporting.

For example, the transition to alternative fuels requires not only new vessels or vehicles, but also fuel availability, refuelling infrastructure, financing mechanisms, regulatory incentives, and customer demand for lower-carbon services.

This explains why regulation and incentives play a major role. Where carbon pricing, subsidies, green corridor initiatives, or emissions standards are in place, adoption tends to accelerate. Where policy signals remain fragmented, progress is slower and less coordinated.

Structural transformation requires alignment between infrastructure, skills and policy

The reconfiguration of global supply chains also provides important lessons. Nearshoring and reshoring are often presented as strategies to reduce supply chain exposure. However, relocating production closer to end markets does not automatically create resilience. New industrial locations require logistics capacity, reliable infrastructure, skilled labour, customs efficiency, energy availability, and integrated services.

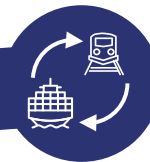
Where these conditions are not in place, the expected benefits of nearshoring can be weakened by congestion, delays, labour shortages, or cost escalation. In practice, supply chain resilience depends not only on geography, but on the quality of the ecosystem supporting production and distribution.

This makes policy coherence essential. Industrial policy, trade policy, infrastructure planning, land-use strategy, skills development, and logistics regulation need to be aligned. Regions that coordinate these dimensions are better positioned to attract new production and logistics flows. Regions that develop them separately risk creating disconnected assets with limited economic impact.



Scale matters, but connectivity defines hub performance

The development of mega hubs and high-capacity logistics ecosystems confirms the importance of scale in global logistics. Large ports, airports, free zones, and multimodal platforms can generate economies of scale, attract industrial activity, and support the concentration of value-added logistics services.



MULTIMODAL CONNECTIVITY



INLAND CORRIDORS AND DRY PORTS' LOCATION



CUSTOMS EFFICIENCY



DIGITAL INTEGRATION



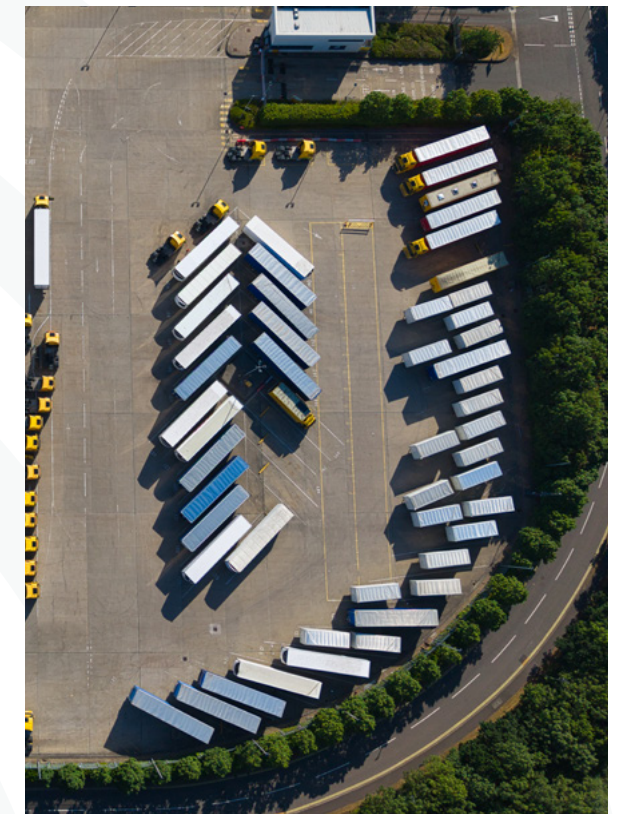
INDUSTRIAL CLUSTERING



GOVERNANCE QUALITY

However, transformation leaders also show that size alone is not sufficient. Some large infrastructure projects can face overcapacity, weak utilization, high debt exposure, or limited economic spillovers if they are not connected to strong hinterlands and industrial demand. The most successful hubs are not only large; they are integrated.

The strongest ecosystems combine logistics infrastructure with free zones, manufacturing activity, bonded warehousing, service providers, and innovation capabilities.



FROM DISRUPTION TO TRANSFORMATION: INSIGHTS FROM ALG'S EXPERIENCE

The logistics sector is entering a phase where disruption is no longer an external shock to absorb but a structural condition to operate within. Geopolitical fragmentation, climate constraints, evolving sourcing strategies and rising customer expectations are reshaping logistics networks and accelerating the transition from purely cost-driven models toward systems that also prioritize resilience, visibility, flexibility and sustainability. This evolution does not mark the end of globalization, but rather its reconfiguration around more diversified sourcing bases, regional corridors and increasingly connected logistics ecosystems.

The key lesson emerging from these transformations is that successful logistics strategies cannot rely on isolated initiatives. Technology, infrastructure and decarbonization efforts generate value only when they are integrated within coherent systems that connect assets, data, organizations, regulation and market demand. As a result, factors such as data quality, interoperability, governance and operational relevance are becoming as critical to logistics performance as physical capacity and connectivity.

This paper is also grounded in what ALG observes through its work across transport, logistics, and infrastructure projects in Europe, the Middle East, Latin America, Africa, and Asia. Across these regions, the same structural shifts appear in different forms: some markets are upgrading mature hubs and corridors, while others are building new logistics systems around digital platforms, inland nodes, regional corridors, or low-carbon infrastructure. This cross-regional perspective allows ALG to not only identify these transformations, but also support public and private stakeholders in translating them into actionable strategies, investment decisions, and operational best practices.

The implications of these shifts will not unfold uniformly across geographies. They will depend on each region's infrastructure base, trade exposure, policy context, industrial structure, and investment capacity. Building on ALG's extensive experience across global transport, logistics, and infrastructure markets, a regional lens could further assess how these trends translate into specific opportunities, constraints, and implementation priorities in different contexts.

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